

# Curriculum

For

**Doctor of Medicine (M.D.)  
Program**

**2013**

**International University  
School of Medicine  
(IUSOM)**

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## Table of Contents

<b>No.</b>	<b>Subject</b>	<b>Page No.</b>
	<i>Preface</i>	4
	<i>Summary</i>	5
1.	Introduction to Doctor of Medicine (M.D.) Curriculum	8
2.	Grading and Examining System	8
3.	Examining Formats	8
4.	US-, Canada- and The Netherlands-Tear System	8
5.	Attendance Requirements	8
6.	Withdrawing Policy	9
7.	Misconduct	9
8.	Overview of Courses and Programs for M.D. Degree	9
9.	Courses for the First Semester of M.D. Degree (IUSOM—BO—MD—01—00)	9
	9.1 Anatomy (IUSOM—BO—MD—01—01)	9
	9.2 Embryology (IUSOM—BO—MD—01—02)	12
	9.3 Histology (IUSOM—BO—MD—01—03)	14
	9.4 Molecular Cell Biology (IUSOM—BO—MD—01—04)	16
	9.5 Epidemiology and Biostatistics (IUSOM—BO—MD—01—05)	19
10.	Courses for the Second Semester of M.D. Degree (IUSOM—BO—MD—02—00)	21
	10.1 Medical Biochemistry (IUSOM—BO—MD—02—01)	21
	10.2 Human Physiology (IUSOM—BO—MD—02—02)	23
	10.3 Neuroscience (IUSOM—BO—MD—02—03)	25
	10.4 Medical and Legal Ethics (IUSOM—BO—MD—02—04)	27
11.	Courses for the Third Semester of M.D. Degree (IUSOM—BO—MD—03—00)	30
	11.1 General Pathology (IUSOM—BO—MD—03—01)	30
	11.2 Medical Microbiology (IUSOM—BO—MD—03—02)	33
	11.3 Medical Immunology (IUSOM—BO—MD—03—03)	40
	11.4 Behavioral Sciences (IUSOM—BO—MD—03—04)	41
12.	Course for the fourth Semester of M.D. Degree (IUSOM—BO—MD—04—00)	43
	12.1 Systemic Pathology (IUSOM—BO—MD—04—01)	43
	12.2 Pharmacology (IUSOM—BO—MD—04—02)	52
	12.3 Medical Genetics (IUSOM—BO—MD—04—03)	58
	12.4 Physical Diagnosis (IUSOM—BO—MD—04—04)	60
13.	Courses for the Fifth Semester of M.D. Degree (IUSOM—BO—MD—05—00)	61
	13.1 Introduction to Clinical Medicine (IUSOM—BO—MD—05—01)	61
	13.2 Medical Board Review (IUSOM—BO—MD—05—02)	63
14.	Clinical Science Program for M.D. Degree	64
15.	Program for the Sixth Semester of M.D. Degree (IUSOM—BO—MD—06—00)	65
	15.1 Internal Medicine Program (IUSOM—BO—MD—06—01)	65
16.	Program for the Seventh Semester of M.D. Degree (IUSOM—BO—MD—07—00)	67
	16.1 General Surgery Program (IUSOM—BO—MD—07—01)	67
17.	Program for the Eighth Semester of M.D. Degree (IUSOM—BO—MD—08—00)	69
	17.1 Obstetrics and Gynecology Program (IUSOM—BO—MD—08—01)	69
	17.2 Family Medicine Practice Program (IUSOM—BO—MD—08—02)	71

## Table of Contents (continues)

<b>No.</b>	<b>Subject</b>	<b>Page No.</b>
18.	Program for the Ninth Semester of M.D. Degree (IUSOM—BO—MD—09—00)	72
	18.1 Pediatrics Program (IUSOM—BO—MD—09—01)	72
	18.2 Psychiatry Program (IUSOM—BO—MD—09—02)	74
19.	Program for the Tenth Semester of M.D. Degree (IUSOM—BO—MD—10—00)	76
	19.1 Elective Medicine Clinical Rotations Program (IUSOM—BO—MD—10—XX)	76
20.	Program for the Eleventh Semester of M.D. Degree (IUSOM—BO—MD—11—00)	77
	20.1 Elective Surgery Clinical Rotations Program (IUSOM—BO—MD—11—XX)	78

## *Preface*

This document presents a complete curriculum for the Doctor of Medicine (MD) program to be offered at the Bonaire-Campus (BO) of the International University School of Medicine (IUSOM) in Dutch Caribbean (Formerly Netherlands Antilles (NA)) as well at Worldwide IUSOM Branch Campuses located at Barranquilla (Colombia), México City (México), and Sialkot (Pakistan),, which is the result of several years' careful thinking, hard work, expert advices and suggestions of medical professionals and educationalists at the health sciences faculties and schools as well as at both academic and non-academic hospitals all located in USA, Canada, and EU including The Netherlands and Dutch Caribbean.

After brief introduction to MD curriculum in the Section 1 of this document, grading and examining system, examining format, US-, Canada-, and The Netherlands-tear system, attendance requirements, withdrawal policy, and misconduct policy at IUSOM are cited in Sections 2 – 7. Section 8 includes an overview of the courses and programs for MD degree. Courses to be followed during the first five semesters of this curriculum covering Basic Medical Sciences are detailed in Sections 9 – 13. Section 14 covers a brief description of the Clinical Sciences program to be offered during the subsequent six semesters. Core Clinical Rotations / Clerkships to be taken during semesters 6 through 9 are described in full details in Sections 15 – 18, respectively, whilst Sections 19 and 20 cover Elective Clinical Rotations / Clerkships to be completed during semesters 10 and 11.

In general, each subsection covering a course or a clinical rotation is further divided into seven subsections, namely, purpose, goal, objectives, prerequisites, format, textbooks both required and recommended, and detailed description of the subject matter.

In brief, in order to acquire a Doctor of Medicine degree from IUSOM, a medical student is required to complete in total 2,970 lecture/lab hours covering 198 credit hours at Bonaire-Campus together with 72 weeks of Clinical Rotations / Clerkships in various hospitals.

This extensive curriculum has been constructed not only to enable students to achieve an MD Degree at IUSOM but also to pass all steps of USMLE and / or similar licensing examinations held in Canada and EU including The Netherlands depending upon their choice of country where they wish to practice a medical profession.

Finally, this document is open to constructive criticism and comments from prospective students, academic staff members, potential competitors and alliances, medical educational institutions, governmental and non-governmental organizations and any other such associations and societies, and it shall be time to time modified accordingly.

Bonaire, Dutch Caribbean (Formerly Netherlands Antilles), September 2, 2013



Prof. Dr. Ghulam G. Choudhry, Ph.D., D.Sc.  
President, International University School of Medicine (IUSOM) Foundation

### ***Summary***

In order to obtain a Doctor of Medicine (M.D.) degree, at the International University School of Medicine (IUSOM) in Bonaire, Dutch Caribbean (Formerly Netherlands Antilles), the students are required to successfully complete all Basic Medical Sciences courses at IUSOM-Bonaire Campus or at any Worldwide IUSOM Branch Campus located at Barranquilla (Colombia), México City (México), and Sialkot (Pakistan), during five semesters, each such semester consisting of four months. In addition, during next six semesters (duration of such each semester being three months), the students need to go through Clinical Rotations /Clerkships at various IUSOM-affiliate hospitals located in Dutch Caribbean (Formerly Netherlands Antilles), in USA (via a Branch Campus of IUSOM, namely, International University School of Medicine (IUSOM) – Michigan Clinical Campus at Ark Medical Center (AMC) and at AMC-Affiliated Hospitals), in Canada, in India (at MIOT Hospitals in Chennai, Tamil Nadu) and / or in The Netherlands. Thereafter, the students are awarded M.D. degrees by IUSOM.

During this medical education program at IUSOM, the students are trained to pass all steps of USMLE and / or similar exams, depending upon their final destination of medical practice after acquiring their M.D. degrees.

An overview of M.D. Curriculum to be followed at IUSOM is recorded in TABLE 1, given on pages 6 and 7 of this document.

**TABLE 1. Summary of the Basic Medical Sciences Courses and Clinical Rotations (Clerkships) required for Acquiring a Doctor of Medicine (M.D.) Degree at IUSOM.**

<b>SEMESTER # (COURSE / PROGRAM TYPE)</b>	<b>COURSE/ PROGRAM CODE: NAME</b>	<b>LECTURE /LAB HOURS</b>	<b>CREDIT HOURS</b>	<b>CLINICAL ROTATION DURATION</b>
<b>First Semester (Basic Medical Sciences)</b>	IUSOM-BO-MD-01-01: Anatomy	225 hrs	15 hrs	NA
	IUSOM-BO-MD-01-02: Embryology	60 hrs	4 hrs	NA
	IUSOM-BO-MD-01-03: Histology	120 hrs	8 hrs	NA
	IUSOM-BO-MD-01-04: Molecular Cell Biology	150 hrs	10 hrs	NA
	IUSOM-BO-MD-01-05: Epidemiology & Biostatistics	45 hrs	3 hrs	NA
	<b>Total</b>	<b>600 hrs</b>	<b>40 hrs</b>	
<b>Second Semester (Basic Medical Sciences)</b>	IUSOM-BO-MD-02-01: Medical Biochemistry	150 hrs	10 hrs	NA
	IUSOM-BO-MD-02-02: Human Physiology	225 hrs	15 hrs	NA
	IUSOM-BO-MD-02-03: Neuroscience	150	10 hrs	NA
	IUSOM-BO-MD-02-04: Medical & Legal Ethics	75 hrs	5 hrs	NA
		<b>Total</b>	<b>600 hrs</b>	<b>40 hrs</b>
<b>Third Semester (Basic Medical Sciences)</b>	IUSOM-BO-MD-03-01: General Pathology	195 hrs	13 hrs	NA
	IUSOM-BO-MD-03-02: Medical Microbiology	195 hrs	13 hrs	NA
	IUSOM-BO-MD-03-03: Medical Immunology	30 hrs	2 hrs	NA
	IUSOM-BO-MD-03-04: Behavioral Sciences	150 hrs	10 hrs	NA
		<b>Total</b>	<b>570 hrs</b>	<b>38 hrs</b>
<b>Fourth Semester (Basic Medical Sciences)</b>	IUSOM-BO-MD-04-01: Systemic Pathology	195 hrs	13 hrs	NA
	IUSOM-BO-MD-04-02: Pharmacology	195 hrs	13 hrs	NA
	IUSOM-BO-MD-04-03: Medical Genetics	60 hrs	4 hrs	NA
	IUSOM-BO-MD-04-04: Physical Diagnosis	150 hrs	10 hrs	NA
		<b>Total</b>	<b>600 hrs</b>	<b>40 hrs</b>
<b>Fifth Semester (Basic Medical Sciences)</b>	IUSOM-BO-MD-05-01: Introduction to Clinical Medicine	225 hrs	15 hrs	NA
	IUSOM-BO-MD-05-02: Medical Board Review	375 hrs	25 hrs	NA
		<b>Total</b>	<b>600 hrs</b>	<b>40 hrs</b>
<b>Sixth Semester (Core Clinical Rotation)</b>	IUSOM-BO-MD-06-01: Internal Medicine <b>Total</b>	NA	NA	12 weeks <b>12 weeks</b>
<b>Seventh Semester (Core Clinical Rotation)</b>	IUSOM-BO-MD-07-01: General Surgery <b>Total</b>	NA	NA	12 weeks <b>12 weeks</b>
<b>Eighth Semester (Core Clinical Rotations)</b>	IUSOM-BO-MD-08-01: Obstetrics / Gynecology	NA	NA	06 weeks
	IUSOM-BO-MD-08-02: Family Medicine Practice	NA	NA	06 weeks
		<b>Total</b>		<b>12 weeks</b>



## **1. Introduction to Doctor of Medicine (M.D.) Curriculum**

At International University School of Medicine (IUSOM), Bonaire, Dutch Caribbean (Formerly Netherlands Antilles) as well at Worldwide IUSOM Branch Campuses located at Barranquilla (Colombia), México City (México), and Sialkot (Pakistan), a total of five semesters' class room course work covering Basic Medical Sciences is required in pursuit of Doctor of Medicine (M.D.) degree. Each such course is offered at all IUSOM Campuses. Each semester for Basic Sciences consists of four months. In addition, M.D. seeking students are required to go through Clinical Rotations / Clerkships of six semesters' duration (each semester consisting of three months and total weeks being of the range 72 weeks), at IUSOM-affiliate hospitals located in Bonaire, in other parts of Dutch Caribbean (Formerly Netherlands Antilles), in USA (via a Branch Campus of IUSOM, namely, International University School of Medicine (IUSOM) – Michigan Clinical Campus at Ark Medical Center (AMC) and at AMC-Affiliated Hospitals), in Canada, in India (at MIOT Hospitals in Chennai, Tamil Nadu) and / or in The Netherlands..

At IUSOM, the medium of instructions for entire M.D. curriculum is English.

After successful completion of both Basic Sciences course work and Clinical Rotations/Clerkships of above cited durations, the students are offered M.D. degrees by IUSOM.

## **2. Grading and Examining System**

At IUSOM, minimum passing marks are 70%, i.e., 69% marks are considered as failing marks. Letter grades, namely, A, B, and C for each subject are awarded to the M.D. students, whose overall marks in a semester amount to the range of 90-100%, 80-89%, 70-79%, respectively.

During each Basic Sciences semester, IUSOM holds two EXAMs (one Midterm EXAM and the other Final EXAM), with a weight of 45% marks for each EXAM, for each subject, total weight being 90% of both EXAMs. The remaining 10% marks are awarded basing upon the daily assignments completed by the students and their daily attendances in the class.

## **3. Examining Formats**

In accordance to USMLE, all examining formats shall be multiple choice questions. A non-cumulative multiple-choice written examination (50 questions) and practical examination (50 questions) will be given at the scheduled periods. The examination shall not be constructed to assess everything a student knows or should know, but rather, it shall attempt to target the essentials.

## **4. US-, Canada-, and The Netherlands-Tear Systems**

Depending upon where the students wish to practice medicine, IUSOM in Bonaire provides not only education for eventual award of M.D. degrees but it provides also training to US-Tear, Canada-Tear, and The Netherlands-Tear system students, for all levels of United States Medical Licensing Examination (USMLE), Medical Council of Canada Evaluating Examination (MCCEE), and The Netherlands Medical Licensing Examination, respectively.

## **5. Attendance Requirements**



It is the policy of IUSOM that 90% of attendance for a subject is must. Otherwise, such course is required to be repeated in the subsequent semester, regardless of the fact that a student might have done fairly good in the all EXAMS.

## **6. Withdrawing Policy**

An MD-student may voluntarily withdraw from any course at any time. For rules and regulations, please consult the **Handbook of Rules and Regulation for IUSOM Students**.

## **7. Misconduct**

Student misconduct in any fashion is strictly forbidden at IUSOM. Please consult the **Handbook of Rules and Regulation for IUSOM Students**. Its policies shall be strictly enforced.

## **8. Overview of Courses and Programs for M.D. Degree**

Details of the curriculum of the Basic Medical Sciences course work for M.D. for all five semesters (duration of each semester being four months), offered at IUSOM-Bonaire campus, is described in the next five sections (see Sections 9 – 13). Thereafter, Clinical Medicine curriculum consisting of both Required Core Clinical Rotations as well as Elective Clinical Rotations to be followed at IUSOM-affiliated hospitals in USA, Canada, The Netherlands, and Dutch Caribbean (Formerly Netherlands Antilles) is cited in the subsequent sections (see Sections 14 – 20). Clinical Rotations Program requires in total six semesters, duration of each semester being three months.

A summary of both Basic Medical Sciences part and Clinical Rotations part of this curriculum is also documented in TABLE 1 given on pages 6-7.

## **9. Courses for the First Semester of M.D. Degree (IUSOM—BO—MD—01—00)**

At IUSOM, the courses required for the first semester of M.D. degree (IUSOM—BO—MD—01—00) are mentioned below in full details (**Total Lecture/Lab hrs: 600 & Total Credits: 40**).

### **9.1 Anatomy (IUSOM—BO—MD—01—01)**

Anatomy course required during the first semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—01—01) is cited below (**Lecture/Lab hrs: 225 & Credits: 15**):

#### **9.1.1 Purpose**

The purpose of Anatomy course is to familiarize the medical students with the parts of the human body, their relationships with one another and the clinical correlations due to diseases like injuries, infections and congenital abnormalities. It is a basic belief that for doctors to be able to make a diagnosis of a disease, they must have a good understanding and knowledge of what is a healthy and normal human body.

#### **9.1.2 Goal**

The course goal is to equip the future doctors with a fundamental knowledge of the anatomy of the human body, making them more prepare to tackle the difficulties they

may encounter during their clinical experiences, when they have to deal with the abnormal or diseased human body.

### **9.1.3 Objectives**

After the completion of this anatomy course, the student is expected to be able to describe, enumerate and draw any specific and particular part, organ, or region of the human body in order for them to correlate these facts with the presenting signs or symptoms of their future patients, and help them in making their correct diagnosis.

### **9.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program are prerequisites.

### **9.1.5 Format**

The course materials in the form of lectures/discussions shall be presented and tested in a traditional format using modern audiovisual equipments, like LCD projectors, MS PowerPoint presentations, overhead transparencies and human models.

### **9.1.6 Anatomy Textbooks**

The following textbooks and support materials are required / recommended for this Anatomy course:

#### Required:

1. CLINICALLY ORIENTED ANATOMY (2009) by Keith L. Moore, Arthur F. Dalley, and Anne M.R. Agur, Publishers: Lippincott, Williams and Wilkins, 6<sup>th</sup> Edition, ISBN-10: 0781775256 or ISBN-13: 978-0781775250.

#### Recommended:

2. ATLAS OF HUMAN ANATOMY (2010) by Frank H. Netter, Publishers: Saunders, 5<sup>th</sup> Edition, ISBN-10: 1437709702 or ISBN: 978-1437709704.
3. DIAGNOSTIC IMAGING (2009) by Peter Armstrong, Martin Wastie, and Andrea Rockall Publishers: Wiley-Blackwell, 6<sup>th</sup> Edition, ISBN-10: 1405170395 or ISBN-13: 978-1405170390.
4. A.D.A.M. Interactive Anatomy V4.0 Windows Version DVD (2005), Publishers: Ventura Education System, 3/E.

### **9.1.7 Description of the Anatomy Course Contents**

The subject matter to be covered in the Anatomy course (IUSOM—BO—MD—01—01) is as follows:

INTRODUCTION TO CLINICALLY ORIENTED ANATOMY (approaches to studying anatomy: regional anatomy, systemic anatomy, and clinical anatomy, anatomicomedical terminology: anatomical position and planes, terms of relationship and comparison, terms of laterality and movement, structure and abbreviations of terms, anatomical variations, skin and fascia, skeletal system: bones and joints, muscular system: skeletal, cardiac, and smooth muscle, cardiovascular: arteries, veins and capillaries, lymphatic system, nervous system: central, peripheral, somatic, and

autonomic nervous systems, and medical imaging techniques: radiography, computed tomography (CT), ultrasonography, magnetic resonance imaging (MRI), and nuclear medicine imaging); THORAX (thoracic wall: its fascia, skeleton, joints, movements, muscles, nerves, vasculature, and its surface anatomy, breasts, thoracic apertures, thoracic cavity and viscera: surface anatomy of pleurae, lungs, and heart and mediastinum, medical imaging of the thorax: radiography, echocardiography, CT and MRI scanning, case studies and discussion on them, and subject matter with clinical emphasis); ABDOMEN (abdominal cavity, anterolateral wall: its fascia, muscles, nerves, vessels, internal surface, and surface anatomy, and inguinal region, peritoneum and peritoneal cavity: descriptive terms for parts of the peritoneum and embryology and subdivisions of peritoneal cavity, abdominal viscera: esophagus, stomach and its surface anatomy, small and large intestine, spleen and pancreas and their surface anatomy, liver and its surface anatomy, biliary ducts and gallbladder, portal vein and portal portal-systemic, anastomoses, kidneys and ureters and their surface anatomy, suprarenal glands, thoracic diaphragm: vessels, nerves, and actions of the diaphragm and diaphragmatic apertures, posterior abdominal wall: its fascia, muscles, nerves, arteries, veins, and lymphatics, and surface anatomy of the abdominal aorta, medical imaging of the abdomen, case studies and discussion on them, and subject matter with clinical emphasis); PELVIS AND PERINEUM (pelvis: bony pelvis and orientation of the pelvis, pelvic joints and ligaments, walls and floor, nerves, arteries, and veins, viscera of pelvic cavity: urinary organs, male and female internal genital organs, and pelvic fascia, perineum: perineal fascia, superficial and deep perineal pouch, pelvic diaphragm, and male and female perineum, medical imaging of pelvis and perineum: radiography, echocardiography, CT and MRI scanning, case studies and discussion on them, and subject matter with clinical emphasis); BACK (vertebral column: its curvatures, joints, vasculature, and surface anatomy, vertebrae: their structure and function, regional characteristics, and ossification, muscles of the back: superficial or extrinsic and deep or intrinsic, surface anatomy of the back, suboccipital and deep neck muscles, spinal cord and meninges: structure of spinal nerves, spinal meninges and cerebrospinal fluid and vasculature of the spinal cord, medical imaging of the back: radiography, myelography, CT and MRI scanning, case studies and discussion on them, and subject matter with clinical emphasis); LOWER LIMB (bones of lower limb: arrangement of the bones, hip bone, femur, tibia and fibula, bones of the foot, and surface anatomy of the lower limb, fascia, vessels, and nerves of the lower limb: venous drainage, lymphatic drainage, and cutaneous innervation, organization of thigh muscles: anterior thigh muscles and medial thigh muscles, gluteal region: ligaments, muscles, nerves, arteries, and veins, posterior thigh muscles: semitendinosus, semimembranosus, biceps femoris, and surface anatomy of the gluteal region and thigh popliteal fossa: its fascia, blood vessels, nerves, lymph nodes, leg: its anterior, lateral, and posterior compartment and surface anatomy, foot: its skin, deep fascia, muscles, nerves, arteries, venous drainage, and lymphatic drainage, joints of the lower limb: hip joint, knee joint, tibiofibular joints, ankle joints, foot joints, arches of the foot, and surface anatomy of the ankle and foot, posture and gait, medical imaging of the lower limb: radiography, arteriography, CT and MRI scanning, case studies and discussion on them, and subject matter with clinical emphasis); UPPER LIMB (bones of the upper limb: clavicle, scapula, humerus, ilna,

radius, bones of the hand, and surface anatomy of the upper limb bones, superficial structures of the upper limb: fascia, cutaneous, superficial veins, and lymphatic drainage, anterior thoracoappendicular of the upper limb, posterior thoracoappendicular and scapulohumeral muscles: superficial posterior thoracoappendicular (extrinsic shoulder) muscles and scapulohumeral (intrinsic shoulder) muscles, axilla: artery, vein, lymph nodes, brachial, and surface anatomy of the pectoral and scapular regions, arm: its muscles, brachial artery, veins, nerves, and cubital fossa, and surface anatomy of the arm and cubital fossa, forearm: its compartments, muscles, arteries, veins, nerves, and surface anatomy, hand: its muscles, arteries, veins, and nerves, fascia of the palm, flexor tendons of extrinsic hand muscles, and surface anatomy of the hand, joints of the upper limb: its sternoclavicular, acromioclavicular, glenohumeral (shoulder), elbow, proximal and distal radioulnar, wrist, intercarpal, carpometacarpal and intermetacarpal, metacarpophalangeal and interphalangeal joint(s), medical imaging of the upper limb: radiography, ultrasonography, arteriography, CT and MRI scanning, case studies and discussion on them, and subject matter with clinical emphasis); HEAD (skull: its anterior, lateral, posterior, and superior aspects, cranial base: its external and internal aspects, and walls of the cranial cavity, face: its muscles, nerves, and vasculature, and parotid gland, scalp: its layers, nerves, and vasculature, cranial meninges: dura mater, pia-arachnoid, and meningeal spaces, brain: its parts, ventricular system, blood supply, and venous drainage, orbit: its contents, muscles, innervation, and vasculature, eyelids and lacrimal apparatus, and surface anatomy of the eyeball, eyelids, and lacrimal apparatus, temporal region: temporal and intertemporal fossa, temporomandibular joint (TMJ): oral region and cavity, lips, cheeks, and gingivae, teeth, palate, tongue, and salivary glands, pterygopalatine fossa: its contents, nose: external, nasal cavities, and paranasal sinuses, ear: external, middle and internal, medical imaging of the head: radiography, ultrasonography, CT and MRI scanning, case studies and discussion on them, and subject matter with clinical emphasis); NECK (bones: cervical vertebrae and hyoid bone, fascia: superficial and deep cervical, superficial and lateral muscles: platysma, sternocleidomastoid, trapezius, triangles: posterior and anterior cervical, and their surface anatomy, deep structures: prevertebral muscles and root of the neck, viscera: endocrine, respiratory, alimentary layers of the cervical, lymphatics in the neck: surface anatomy of the neck, medical imaging of the neck: radiography, ultrasonography, CT and MRI scanning, case studies and discussion on them, and subject matter with clinical emphasis); and CRANIAL NERVES (CN): THEIR SUMMARY (an overview, olfactory nerve (CN I), optic nerve (CN II), oculomotor nerve (CN III), trochlear nerve (CN IV), trigeminal nerve (CN V), abducent nerve (CN VI), facial nerve (CN VII): branchial motor, general sensory, and taste (special sensory), vestibulocochlear nerve (CN VIII), glossopharyngeal nerve (CN IX): sensory (general visceral), taste (special sensory), and branchial motor, vagus nerve (CN X), accessory nerve (CN XI), and hypoglossal nerve (CN XII)) . **(Lecture/Lab hrs: 225 & Credits: 15)**

## **9.2 Embryology (IUSOM—BO—MD—01—02)**

Embryology course required during the first semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—01—02) is cited below **(Lecture/Lab hrs: 60 & Credits: 4):**

**9.2.1 Purpose**

The purpose of Embryology course is to enhance students' ability to: 1. read and ask medical-related questions, 2. seek medical informational sources for answers to medical-related questions, and 3. precisely, efficiently, and succinctly identify answers to medical-related issues or questions.

**9.2.2 Goal**

The course goal is to provide students, through Lecture Presentations, a manageable synopsis of the common and important features and events of the particular systems of Human Development to be covered in the course.

**9.2.3 Objectives**

An objective of this Embryology course is to provide students with the relevance of the material presented by reference to Issues of Medical Practice and Practitioners.

**9.2.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program are prerequisites.

**9.2.5 Format**

The course materials in the form of lectures/discussions shall be presented and tested in a traditional format using modern audiovisual equipments, like LCD projectors, MS PowerPoint presentations, overhead transparencies and human models.

**9.2.6 Embryology Textbooks**

The following textbooks and support materials are required / recommended for this Embryology course:

**Required:**

1. THE DEVELOPING HUMAN: CLINICALLY ORIENTED EMBRYOLOGY (2007) by Keith L. Moore and T.V.N. Persaud, Publisher: WB Saunders, 8<sup>th</sup> Edition, ISBN-10: 1416037063 or ISBN-13: 978-1416037064.

**Recommended:**

2. HUMAN EMBRYOLOGY (2001) by William J. Larsen, Publishers: Churchill Livingstone, 3<sup>rd</sup> Edition, ISBN-10: 0443065837 or ISBN-13: 978-0443065835.

**9.2.7 Description of the Embryology Course Contents**

The subject matter to be covered in the Embryology course (IUSOM—BO—MD—01—02) is as follows:

INTRODUCTION; HUMAN DEVELOPMENT; EMBRYONIC DISC FOMATION; GERM CELL LAYERS FORMATION; ORGAN FORMATION; FETAL PERIOD; PLACENTA & FETAL MEMBRANES; BIRTH DEFETCS; BODY CAVITIES; PHARYNGEAL STRUCTURE; RESPIRATORY SYSTEM; DIGESTIVE SYSTEM; UROGENITAL SYSTEM; CARDIOVASCULAR SYSTEM;

SKELETAL SYSTEM; MUSCULAR SYSTEM; LIMBS; NERVOUS SYSTEM; EYE & EAR; and SKIN. (**Lecture/Lab hrs: 60 & Credits: 4**)

### **9.3 Histology (IUSOM—BO—MD—01—03)**

Histology course required during the first semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—01—03) is cited below (**Lecture/Lab hrs: 120 & Credits: 8**):

#### **9.3.1 Purpose**

The purpose of this course is to familiarize the medical students with the basic parts and interpretation of microscopic anatomy. The students will better understand how structure and function are integrated in the molecules, cells, tissues, and organs of a living creature. Histology centers on the biology of cells and tissues within an organism, and as such, serves as the foundation on which pathology and pathophysiology are built.

#### **9.3.2 Goal**

The course goal is to provide students a solid foundation in basic cellular anatomy and function.

#### **9.3.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Identify clinically important structures of human cells and tissues.
2. Identify human cells and tissues.
3. Understand the relationships between structure and function in cells and tissues.
4. Understand the mechanisms by which cellular components communicate.
5. Understand the specific microanatomy of cellular structures.

#### **9.3.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program are prerequisites.

#### **9.3.5 Format**

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. Additionally, students will be provided with the opportunity to participate in regularly scheduled laboratory sessions designed to permit first hand experience in the examination of the nervous system tissues.

#### **9.3.6 Histology Textbooks**

The following textbooks and support materials are required / recommended for this Histology course:

##### Required:

1. BASIC HISTOLOGY TEXT AND ATLAS (2005) by Luiz C. Junqueira and Jose Carneiro, Publishers: McGraw-Hill, 11<sup>th</sup> Edition, ISBN-10: 0071440917 or ISBN-13: 978-0071440912 (CD and text).

Recommended:

2. MOLECULAR BIOLOGY OF THE CELL (2007) by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter, Publishers: Garland Science, 5<sup>th</sup> Edition, ISBN-10: 0815341059 or ISBN-13: 978-0815341055.
3. Histology interactive CD by Luis C. Junqueira.
4. WHEATER'S FUNCTIONAL HISTOLOGY: A TEXT AND COLOR ATLAS (2006) by Barbara Young, James S. Lowe, Allan Stevens, and John W. Heath, Publishers: Churchill Livingstone, 5<sup>th</sup> Edition, ISBN-10: 044306850X or ISBN-13: 978-0443068508.
5. COLOR ATLAS OF BASIC HISTOLOGY (2003) by Irwin Berman, Publisher: McGraw-Hill / Appleton & Lange, 3<sup>rd</sup> Edition, ISBN: 00-714-0288-8.
6. Histology Board Review Series by various authors.
7. USMLE Review – Step 1 by various Authors.

**9.3.7 Description of the Histology Course Contents**

The subject matter to be covered in the Histology course (IUSOM—BO—MD—01—03) is as follows:

HISTOLOGY & ITS METHODS OF STUDY (tissues preparation for microscopic examination, cell & tissue culture, cell fractionation, various microscopic techniques: light, phase-contrast & differential interference, polarizing, confocal, fluorescence & electron, autoradiography, histochemistry & cytochemistry, and detection methods); CYTOPLASM (cellular differentiation & ecology, cell components, and cytoskeleton); CELL NUCLEUS (division, cycle, and apoptosis); EPITHELIAL, CONNECTIVE AND ADIPOSE TISSUES (forms, types, characteristics, and unilocular & multilocular adipose tissues); CARTILAGE (hyaline, elastic, fibro, and intervertebral disks); BONE (types, histogenesis, cells, matrix, periosteum & endosteum, growth & remodeling, internal structure, bone tissue: its metabolic role, and joints); NERVE TISSUE & NERVOUS SYSTEM (development, Neurons, cell body, dendrites, axons, membrane potentials, synaptic communications, glial cells & neuronal activity, central, peripheral & autonomic nervous systems, meninges, choroids plexus, cerebrospinal fluid, nerve fibers, nerves, ganglia, degeneration & regeneration of nerve tissue, and neuronal plasticity); MUSCLE TISSUE (skeletal, cardiac & smooth muscles, and their regeneration); CIRCULATORY SYSTEM (tissue components of the vascular wall, structural plan of blood vessels, vasa vasorum, innervation, large elastic arteries, arterial degenerative alterations, carotid bodies & sinuses, arteriovenous, muscular arteries & veins, arterioles, capillaries, postcapillary venules, heart, and lymphatic vascular system); BLOOD CELLS (composition of plasma, staining of blood cells, erythrocytes, leukocytes, neutrophils, eosinophils, basophils, lymphocytes, monocytes, and platelets); HAMATOPOIESIS (stem cells: their growth factors & differentiation, bone marrow and its role as a source of stem cells for other tissues, maturation of erythrocytes, granulocytes, lymphocytes & monocytes, granulopoiesis, kinetics of neutrophil production, and origin of platelets); LYMPHOID ORGANS (antigens, antibodies, cytokines, cells of the immune system, types of the immune responses, lymphoid tissue, mucosa-

associated lymphoid tissue & tonsils, thymus, lymph nodes, and spleen); DIGESTIVE TRACT (general structure, oral cavity, tongue, pharynx, teeth & associated structures, esophagus, stomach, small intestine, and appendix); ORGANS ASSOCIATED WITH THE DIGESTIVE TRACT (salivary glands, pancreas, liver, biliary tract, and gallbladder); RESPIRATORY SYSTEM (nasal cavity, paranasal sinuses, nasopharynx, larynx, trachea, bronchial tree, pulmonary: blood vessels & lymphatic vessels, nerves, pleura, respiratory movements, and defense mechanisms); SKIN (epidermis, dermis, immunological activity, subcutaneous tissue, vessels & sensorial receptors, hairs, nails, and glands); URINARY SYSTEM (kidneys, and bladder and urinary passages); ENDOCRINE GLANDS (hormones, hypophysis, adenohypophysis, neurohypophysis, adrenal, parathyroid pineal glands, islets of Langerhans, and thyroid); MALE REPRODUCTIVE SYSTEM (testes, intratesticular genital ducts, excretory, accessory genital glands, penis); FEMALE REPRODUCTIVE SYSTEM (ovaries, oviducts, uterus, vagina, exfoliative cytology, external genitalia, and mammary glands); PHOTORECEPTOR SYSTEM (vision); and AUDIORECEPTOR SYSTEM (hearing). (**Lecture/Lab hrs: 120 & Credits: 8**)

#### **9.4 Molecular Cell Biology (IUSOM—BO—MD—01—04)**

Molecular Cell Biology course required during the first semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—01—04) is cited below (**Lecture/Lab hrs: 150 & Credits: 10**):

##### **9.4.1 Purpose**

The purpose of this course is to familiarize the medical students with the basic parts and interpretation of microscopic anatomy. The students will better understand how structure and function are integrated in the molecules, cells, tissues, and organs of a living creature. Molecular Cell Biology course centers on the biology of cells and tissues within an organism, and as such, serves as the foundation on which pathology and pathophysiology are built.

##### **9.4.2 Goal**

The course goal is to provide students a solid foundation in basic cellular anatomy and function.

##### **9.4.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Identify clinically important structures of human cells and tissues.
2. Identify human cells and tissues.
3. Understand the relationships between structure and function in cells and tissues.
4. Understand the mechanisms by which cellular components communicate.
5. Understand the specific microanatomy of cellular structures.
6. Understand Genome and Proteome Science as a tool for searching solutions for Avian Flu, SARS, and other infectious and non-infectious diseases.

##### **9.4.4 Prerequisites**



Biology, Botany, Zoology, General Chemistry and Organic Chemistry covering various Spectroscopic Techniques taken during Pre-Medical program are prerequisites.

#### **9.4.5 Format**

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. Additionally, students will be provided with the opportunity to participate in regularly scheduled laboratory sessions designed to permit first hand experience in the examination of the nervous system tissues.

#### **9.4.6 Molecular Cell Biology Textbooks**

The following textbooks and support materials are required / recommended for this Molecular Cell Biology course:

##### Required:

1. MOLECULAR BIOLOGY OF THE CELL (2007) by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter, Publishers: Garland Science, 5<sup>th</sup> Edition, ISBN-10: 0815341059 or ISBN-13: 978-0815341055.

##### Recommended:

2. Histology interactive CD by Luis C. Junqueira.
3. WHEATER'S FUNCTIONAL HISTOLOGY: A TEXT AND COLOR ATLAS (2006) by Barbara Young, James S. Lowe, Allan Stevens, and John W. Heath, Publishers: Churchill Livingstone, 5<sup>th</sup> Edition, ISBN-10: 044306850X or ISBN-13: 978-0443068508.
4. ATLAS OF BASIC HISTOLOGY COLOR (2003) by Irwin Berman, Publisher: McGraw-Hill / Appleton & Lange, 3<sup>rd</sup> Edition, ISBN: 00-714-0288-8.
5. Board Review Series, Cell Biology.
6. USMLE Review – Step 1 by various authors.

#### **9.4.7 Description of the Molecular Cell Biology Course Contents**

The subject matter to be covered in the Molecular Cell Biology course (IUSOM—BO—MD—01—04) is as follows:

CELLS AND GENOMES (universal features of cells, diversity of genomes, and genetic information in eukaryotes); CELL CHEMISTRY AND BIOSYNTHESIS (chemical components of a cell, catalysis & the utilization of energy by cells, and mechanisms involved in the gain of energy by cells); PROTEINS (shapes, structures, and functions); DNA AND CHROMOSOMES (DNA: structures & functions, chromosomal DNA: its packaging in the chromatin fiber, and chromosomes: their structures); DNA REPLICATION, REPAIR, AND RECOMBINATION (DNA: maintenance of its sequences, replication mechanisms, initiation & completion, replication in chromosomes, repair, general recombination, and site-specific recombination); MECHANISMS IN READING THE GENOME IN BY CELLS (from DNA to RNA, from RNA to proteins, the RNA world, and the origins of life);

CONTROL OF GENE EXPRESSIONS (DNA-binding motifs in gene regulatory proteins, how genetic switches work, molecular genetic mechanisms involved in the generation of specialized cell types, posttranscriptional controls, and how genomes evolve); MANIPULATING PROTEINS, DNA, AND RNA (cells: their isolation & then growth in culture, DNA: isolating, cloning & sequencing, proteins: structures & functions, genes: expression & function); VISUALIZING CELLS (structures with microscope, molecules in living cells); MEMBRANE STRUCTURE (lipid bilayer, and membrane proteins); MEMBRANES: THEIR ELECTRICAL PROPERTIES AND TRANSPORT OF SMALL MOLECULES (membrane transport: its principles, carrier proteins & active membrane transport, ion channels, and electrical properties of membranes); INTRACELLULAR COMPARTMENTS AND PROTEIN SORTING (compartmentalization of cells, transport of molecules between nucleus and cytosol, transport of proteins into mitochondria & chloroplasts, peroxisomes, and endoplasmic reticulum); INTRACELLULAR VESICULAR TRAFFIC (molecular mechanisms of membrane transport & maintenance of compartmental diversity, transport from the ER through golgi apparatus, transport from the trans golgi network to lysosomes, transport into the cell from the plasma membrane: endocytosis, and transport from the trans golgi network to the cell exterior: exocytosis); ENERGY CONVERSION: MITOCHONDRIA AND CHLOROPLASTS (mitochondrion, electron-transport chain & their proton pumps, chloroplasts & photosynthesis, genetic systems of mitochondria & plastids, and evolution of electron-transport chains); CELL COMMUNICATION (general principles, signaling through G-protein-linked cell-surface receptors, signaling through enzyme-linked cell-surface receptors, signaling pathways which depend upon regulated proteolysis, and signaling in plants); CYTOSKELETON (cytoskeletal filaments: their self-assembly, dynamic structures & pathways of their regulating by cells, molecular motors, and the behaviors of cytoskeleton & cell); CELL CYCLE AND PROGRAMMED CELL DEATH (components of the cell-cycle control system, intracellular control of cell-cycle events, programmed cell death (apoptosis), and extracellular control of cell division, cell growth & apoptosis); MECHANICS OF CELL DIVISION (M phase, mitosis, and cytokinesis); CELL JUNCTIONS, CELL ADHESION, AND THE EXTRACELLULAR MATRIX (cell junctions, cell-cell adhesion, extracellular matrix of animals, integrins, and plant cell wall); GERM CELLS AND FERTILIZATION (benefits of sex, meiosis, primordial germ cells & sex determination in mammals, eggs, sperm, and fertilization); DEVELOPMENT OF MULTICELLULAR ORGANISMS (universal mechanisms of animal development, caenorhabditis elegans: development from the perspective of the individual cell, drosophila & molecular genetics of pattern formation: genesis of the body plan; homeotic selector genes & patterning of anteroposterior axis, organogenesis & patterning of appendages, cell developments & shaping of vertebrate body, mouse, neural development, and plant development); HISTOLOGY: LIVES AND DEATHS OF CELLS IN TISSUES (epidermis & its renewal by stem cells, sensory epithelia, airways & gut, blood vessels & endothelial cells, renewal by pluripotent stem cells: blood cell formation, skeletal muscles: genesis, modulation & regeneration, fibroblasts & their transformations: connective-tissue cell family, and stem-cell engineering); ADAPTIVE IMMUNE SYSTEM (lymphocytes & cellular basis of

adaptive immunity, B cells & antibody, generation of antibody diversity, T cells & MHC proteins, and helpert cells & lymphocyte activation); and PATHOGENS, INFECTION, AND INNATE IMMUNITY (introduction to pathogens, cell biology of infection, and innate immunity). (**Lecture/Lab hrs: 150 & Credits: 10**)

## **9.5 Epidemiology and Biostatistics (IUSOM—BO—MD—01—05)**

Epidemiology and Biostatistics course required during the first semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—01—05) is cited below (**Lecture/Lab hrs: 45 & Credits: 3**):

### **9.5.1 Purpose**

The purpose of this course is to familiarize the medical students with the essentials of Epidemiology as well as Biostatistics as applied to the profession of medicine. The students will better understand how the acquired epidemiological data can be treated using various statistical methodologies.

### **9.5.2 Goal**

The course goal is to enable students to: 1. Apply epidemiological methods to conduct critical evaluation of the evidence utilized in the medical decision-making. 2. Carry out assessments of the data using epidemiological and biostatistical principles and evaluate conclusions basing upon study data.

### **9.5.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Apply epidemiological methods to evaluate the distribution and determinants of disease in the population.
2. Identify and demonstrate the utility of epidemiology within the context of health education and public health.
3. Identify and demonstrate the ability to apply methods for organizing and analyzing epidemiological data.
4. Describe the nature of epidemiological investigations.
5. Describe the role and components of various clinical epidemiological theories.
6. Demonstrate the ability to conduct sound disease surveillance.
7. Identify the key components of epidemiological models (e.g. health field concept, triangle, and wheel).
8. Demonstrate a mastery of basic epidemiological terms and concepts.
9. Describe and engage in the process of investigating disease outbreaks through a case study.
10. Demonstrate the ability to identify epidemiological trends and applications.
11. Demonstrate the ability to access and assess indices of morbidity and mortality.
12. Discuss ideological and historical foundations of epidemiology, disease detection, prevention, and control.
13. Evaluate and critique recent studies and investigations using epidemiological concepts.
14. Identify local, state, and national resources for use in epidemiological investigations.
15. Become familiar with the role of technology, computers, and media with concern for epidemiological concepts.

### **9.5.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry, Organic Chemistry, and Calculus taken during Pre-Medical program are prerequisites.

### 9.5.5 Format

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. In addition, students will be provided with the opportunity to participate in regularly scheduled presentation and discussion sessions designed to prepare students to present their own research data at the international conferences.

### 9.5.6 Epidemiology and Biostatistics Textbooks

The following textbooks and support materials are required / recommended for this Epidemiology and Biostatistics course:

Required:

1. A STUDY GUIDE TO EPIDEMIOLOGY AND BIOSTATISTICS (2006) by Richard F. Morton, J.R. Hebel, and Robert J. McCarter, Publishers: Jones & Bartlett, 6<sup>th</sup> Edition, ISBN-10: 0763734918 or ISBN-13: 978-0763734916.

Recommended:

2. INTRODUCTION TO EPIDEMIOLOGY (2006) by Ray M. Merrill and Thomas C. Timmreck, Publishers: Jones & Bartlett, 4<sup>th</sup> Edition, ISBN-10: 0763735825 or ISBN-13: 978-0763735821.
3. APPLETON AND LANGE'S REVIEW OF EPIDEMIOLOGY & BIOSTATISTICS FOR THE USMLE (1994) by Edward J. Hanrahan and Gangadhar Madudu, Publishers: Appleton & Lange, 1<sup>st</sup> Edition, ISBN-10: 083850244X or ISBN-13: 978-0838502440.
4. NMS PREVENTIVE MEDICINE AND PUBLIC HEALTH (1992) by Brett J. Casens, Publisher: Lippincott Williams & Wilkins, 2<sup>nd</sup> Edition, ISBN-10: 068306262X or ISBN-13: 978-0683062625.

### 9.5.7 Description of the Epidemiology and Biostatistics Course Contents

The subject matter to be covered in the Epidemiology and Biostatistics course (IUSOM—BO—MD—01—05) is as follows:

INVESTIGATION OF AN EPIDEMIC (rate, attack rate, cases of a disease, epidemic curve, analysis, and exercises); MEASURES OF MORTALITY (crude mortality rate, mortality & age, age-specific mortality rates, age-adjusted mortality rates, race- & sex-specific mortality rates, cause-specific mortality rates, case fatality rates, proportionate mortality ratio, and exercises); INCIDENCE AND PREVALENCE (incidence rates, prevalence rates, relationship between incidents & prevalence, and exercises); MEASURES OF RISK (relative & attributable risk, clinical implications, effect modification, and exercises); BIOLOGICAL VARIABILITY (variations: indices, indices of central tendency, distributions: frequency, symmetrical, skewed & normal (Gaussian) curve, normal range, and exercises); PROBABILITY (definitions, conditional probability, complex events, multiplication rule, addition rule, and exercises); SCREENING (prevention targets: primary, secondary & tertiary, sensitivity & specificity and their computation, false-positive & false-negative results, predictive value of a positive test, and exercise); SAMPLING (target population, sampling error, random sampling, standard error, confidence limits, and exercises);

STATISTICAL SIGNIFICANCE (interpretation of comparison results, significance tests, the P value, sampling size & the interpretation of nonsignificance, clinical significance vs. statistical significance, and exercises); CORRELATION (description of quantitative relationships, regression equations, correlation coefficients, and exercises); MULTIPLE REGRESSION (multiple regression equation, interpretation of the slope coefficients, the coefficients of determination, logistic regression model, Cox proportional hazards regression model, and exercises); CASE-CONTROL (RETROSPECTIVE) STUDIES (experimental & observational studies, sequence of investigation for etiology of disease, study design, bias, matching, testing a hypothesis, analysis of results, odds ratio & estimation of relative risk, and exercises); COHORT (PROSPECTIVE) STUDIES (definitions, subjects lost to follow-up, analysis of results, computation of relative risk, comparison with case-control studies, nonconcurrent cohort study, cross-sectional studies, nested case-control studies, and exercises); RANDOMIZED CLINICAL TRIALS (to test a hypothesis, informed consent, random allocation of study subjects, elimination of bias, placebo effect, analysis, and exercises); SURVIVAL ANALYSIS (uneven observation, person-time approach, life table analysis, proportional hazard model, and exercises); ASSOCIATION AND CAUSATION (yields of epidemiological studies, causal & noncausal associations, multiple causation, establishing causation, and exercises); and KEYS TO UNDERSTANDING ARTICLES ON EPIDEMIOLOGIC STUDIES (critical review of research reports, review of an article reporting results of a single study: purpose of the study, target population & study design, questions to consider evaluating epidemiological studies & their applications to different types of study design, special vulnerabilities of the case-control design, special vulnerabilities of the prospective design, cohort & randomized clinical trials, articles reporting the results of multiple studies, exercises). (**Lecture/Lab hrs: 45 & Credits: 3**)

## **10. Courses for the Second Semester of M.D. Degree (IUSOM—BO—MD—02—00)**

At IUSOM, the courses required for the second semester of M.D. degree (IUSOM—BO—MD—02—00) are mentioned below in full details (**Total Lecture/Lab hrs: 600 & Total Credits: 40**).

### **10.1 Medical Biochemistry (IUSOM—BO—MD—02—01)**

Medical Biochemistry course required during the second semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—02—01) is cited below (**Lecture/Lab hrs: 150 & Credits: 10**):

#### **10.1.1 Purpose**

The purpose of this course is to familiarize the medical students with the concepts in human biochemistry. The students will better understand the functioning of the human body at the molecular level. Medical Biochemistry centers on the chemical reactions of cells and tissues within an organism, and as such, serves as the foundation on which pharmacology, pathology and pathophysiology are built.

#### **10.1.2 Goal**

To provide a solid foundation in basic medical biochemistry.

### 10.1.3 Objectives

The objectives of this course are that upon its completion, a student should be able to:

1. Grasp biological, medical oriented biochemistry.
2. Understand metabolism of amino acids, proteins, sugars, lipids, nucleotides and other compounds, e.g., heme is taught, as well as effects of glucagon, insulin, epinephrine and steroid hormones on basic metabolic pathways.
3. Emphasize the medical importance of the subjects such as haemoglobin, lipoproteins, vitamins, minerals and inter-organ connections in the context of genetic defects as well as enzyme inhibitions.
4. Understand biochemical reactions in relation to the human body and the purpose they serve under specific situations.

### 10.1.4 Prerequisites

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Histology and Molecular Cell Biology attended in the first semester of M.D. program are prerequisites.

### 10.1.5 Format

A traditional lecture/discussion format will be used to present course materials using MS PowerPoint slide presentation techniques.

### 10.1.6 Medical Biochemistry Textbooks

The following textbooks and support materials are required / recommended for this Medical Biochemistry course:

#### Required:

1. LIPPINCOTT'S ILLUSTRATED REVIEWS: BIOCHEMISTRY (2009) by Pamela C. Champe, Richard A. Harvey, and Denise R. Ferrier, Publishers: Lippincott William & Wilkins, 4<sup>th</sup> Edition, ISBN-10: 1608315215 or ISBN-13: 978-1608315215.

#### Recommended:

2. BIOCHEMISTRY (2010) by Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer, Publisher: W. H. Freeman, 7<sup>th</sup> edition, ISBN-10: 1429229365 or ISBN-13: 978-1429229364.
3. Biochemistry Board Review Series by various authors.
4. USMLE Review – Step 1 by various authors.
5. MARKS' BASIC MEDICAL BIOCHEMISTRY: A CLINICAL APPROACH (2008), by Michael Lieberman and Allan D. Marks, Publishers: Lippincott, Williams and Wilkins, 3<sup>rd</sup> edition, ISBN-10: 078177022X or ISBN: 978-0781770224.

### 10.1.7 Description of the Medical Biochemistry Course Contents

The subject matter to be covered in the Medical Biochemistry course (IUSOM—BO—MD—02—01) is as follows:

INTRODUCTION TO BIOCHEMISTRY; PROTEINS (structures, synthesis, globular, and fibrous); ENZYMES; BIOENERGETICS AND OXIDATIVE PHOSPHORYLATION; METABOLISM (basic concepts); GLYCOLYSIS; GLUCONEOGENESIS; CITRIC ACID CYCLE; HEXOSE MONOPHOSPHATE; STRUCTURES OF CARBOHYDRATES; METABOLISM (monosacchs & disacchs, glycogen, glycoproteins, dietary lipids, fatty acids, triacylglyceride, phospholipids, cholesterol, plasma lipoproteins, steroids, purines, and pyrimidine); GLYCOSAMINOGLYCANS; AMINO ACIDS (structures, metabolism of carbon skeletons, and their conversions into specialized products); METABOLIC EFFECTS OF INSULIN AND GLUCAGON; ADDITIONAL METABOLISM (well-fed state, starvation, diabetes mellitus, injury); NUTRITION; VITAMINS (water-soluble, and fat-soluble); DNA (structure, and replication); RNA (structures, and synthesis); GENETIC DISEASES AND TOOLS TO INVESTIGATE THEM; and TOOLS OF MOLECULAR BIOLOGY & PRENATAL DIAGNOSIS. (**Lecture/Lab hrs: 150 & Credits: 10**)

## **10.2 Human Physiology (IUSOM—BO—MD—02—02)**

Human Physiology course required during the second semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—02—02) is cited below (**Lecture/Lab hrs: 150 & Credits: 10**):

### **10.2.1 Purpose**

The purpose of this course is to familiarize the medical students with the concepts in human physiology. The students will better understand the functions of the human body that allow life. Physiology centers on the biology of cells and tissues within an organism, and as such, serves as the foundation on which pathology and pathophysiology are built.

### **10.2.2 Goal**

The course goal is to provide students, through Lecture Presentations, a manageable synopsis of the common and important features and events of the solid foundation of basic Human Physiology.

### **10.2.3 Objectives**

An objective of this Human Physiology course is to provide students with the relevance of the material presented by reference to Issues of Medical Practice and Practitioners.

### **10.2.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program are prerequisites.

### **10.2.5 Format**

The course materials in the form of lectures/discussions shall be presented and tested in a traditional format using modern audiovisual equipments, like LCD projectors, MS PowerPoint presentations, and overhead transparencies. Additionally, students

will be provided with the opportunity to participate in regularly scheduled laboratory sessions designed to permit first hand experience in the examination of the nervous system tissues.

### **10.2.6 Human Physiology Textbooks**

The following textbooks and support materials are required / recommended for this Human Physiology course:

Required:

1. GUYTON AND HALL TEXTBOOK OF MEDICAL PHYSIOLOGY (2010) by John E. Hall, Publisher: WB Saunders, 12<sup>th</sup> Edition, ISBN-10: 1416045740 or ISBN-13: 978-1416045748.

Recommended:

2. GANONG'S REVIEW OF MEDICAL PHYSIOLOGY (2009) by Kim E. Barrett, Susan M. Barman, Scott Boitano, and Heddwen L. Brooks, Publisher: McGraw-Hill/Appleton and Lange, 23<sup>rd</sup> Edition, ISBN-10: 0071605673 or ISBN-13: 978-0071605670.
3. Physiology Board Review Series by various authors.

### **10.2.7 Description of the Human Physiology Course Contents**

The subject matter to be covered in the Human Physiology course (IUSOM—BO—MD—02—02) is as follows:

FUNCTIONAL ORGANIZATION OF THE HUMAN BODY AND CONTROL OF THE INTERNAL ENVIRONMENT; CELL AND ITS FUNCTION; GENETIC CONTROL OF PROTEIN SYNTHESIS, CELL FUNCTION, AND CELL REPRODUCTION; TRANSPORT OF SUBSTANCE THROUGH CELL MEMBRANE; MEMBRANE POTENTIALS AND ACTION POTENTIAL; SKELETON MUSCLES (contraction, excitation (neuromuscular transmission and excitation-contraction coupling)); CONTRACTION AND EXCITATION OF SMOOTH MUSCLES; HEART MUSCLES: HEART AS A PUMP; RHYTHMICAL EXCITATION OF HEART; NORMAL ELECTROCARDIOGRAM (ECG); ECG INTERPRETATION OF CARDIAC MUSCLES AND CORONARY BLOOD FLOW ABNORMALITIES: VECTORIAL ANALYSIS; CARDIAC ARRHYTHMIAS AND THEIR ECG INTERPRETATIONS; OVERVIEW OF CIRCULATION: MEDICAL PHYSICS OF PRESSURE, FLOW, AND RESISTANCE; VASCULAR DISTENSIBILITY AND FUNCTIONS OF ARTERIAL AND VENOUS SYSTEMS; MICROCIRCULATION AND LYMPHATIC SYSTEM (capillary fluid exchange, interstitial fluid and lymph flow); LOCAL CONTROL OF BLOOD FLOW BY TISSUES AND HUMORAL REGULATION; NERVOUS REGULATION OF THE CIRCULATION AND RAPID CONTROL OF ARTERIAL PRESSURE; DOMINANT ROLE OF THE KIDNEYS IN LONG-TERM REGULATION OF ARTERIAL PRESSURE AND IN HYPERTENSION: THE INTEGRATED SYSTEM FOR PRESSURE CONTROL; CARDIAC OUTPUT, VENOUS RETURN, AND THEIR REGULATION; MUSCLE BLOOD FLOW AND CARDIAC OUTPUT DURING



EXERCISE (circulation and ischemic heart disease); CARDIAC FAILURE; HEART VALVES AND HEART SOUNDS (dynamics of valvular and congenital heart defects); CIRCULATORY SHOCK AND PHYSIOLOGY OF ITS TREATMENT; BODY FLUID COMPARTMENTS (Extracellular & Intracellular fluids, interstitial fluid, and edema); URINE FORMATION BY KIDNEYS (GFR, RBF, AND their control); URINE FORMATION (tubular processing of glomerular filtrate); REGULATION OF ECF OSMOLARITY AND Na CONCENTRATION; INTREGRATION OF RENAL MECHANISM FOR CONTROL OF BLOOD VOLUME AND ECF VOLUME, AND RENAL REGULATION OF K, Ca, P, AND Mg; REGULATION OF ACID-BASE BALANCE; MICTURATION, DIURESIS, AND KIDNEY DISEASE; RED BLOOD CELLS, ANEMIA, AND POLYCYTHEMIA; RESISTANCE OF THE BODY TO INFECTION (leukocytes, granulocytes, monocyte—macrophage system, immunity, and allergy); BLOOD (groups and transfusion); TRANSPLANTATION (tissues and organs); HEMOSTATIS AND BLOOD COAGULATION; PULMONARY (ventilation, circulation, edema and pleural fluid); PHYSICAL PRINCIPLES OF GAS EXCHANGE (diffusion of oxygen and carbon dioxide); TRANSPORT OF OXYGEN AND CARBON DIOXIDE (in blood and body fluids); REGULATION OF RESPIRATION; RESPIRATORY INSUFFICIENCY (pathophysiology, diagnosis, and oxygen therapy); GENERAL PRINCIPLES OF GASTROINTESTINAL FUNCTION (pathophysiology, diagnosis, oxygen therapy); PROPULSION AND MIXING OF FOOD IN ALIMENTARY TRACT; SECRETORY FUNCTIONS OF ALIMENTARY TRACT; DIGESTION AND ABSORPTION IN ALIMENTARY TRACT; PHYSIOLOGY OF GASTROINTESTINAL DISORDERS; INTRODUCTION TO ENDOCRINOLOGY; PITUITARY HORMONES AND THEIR CONTROL BY THE HYPOTHALMUS; THYROID METABOLIC HORMONES; ADRENOCORTICAL HORMONES; INSULIN, GLUCAGON, AND DIABETES MELLITUS; PARATHYROID HORMONES (calcitonin, calcium and phosphate metabolism); REPRODUCTIVE AND HORMONAL FUNCTION OF MALE: PINEAL GLAND; FEMALE PHYSIOLOGY PRIOR TO PREGNANCY: FEMALE HORMONES; PREGNANCY AND LACTATION; FETAL AND NEONATAL PHYSIOLOGY; SPORTS PHYSIOLOGY; and AVIATION, SPACE, AND DEEP-SEA DIVING PHYSIOLOGY . (**Lecture/Lab hrs: 225 & Credits: 15**)

### **10.3 Neuroscience (IUSOM—BO—MD—02—03)**

Neuroscience course required during the second semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—02—03) is cited below (**Lecture/Lab hrs: 150 & Credits: 10**):

#### **10.3.1 Purpose**

The purpose of this course is to familiarize the medical students with the necessary knowledge essential to understanding and appreciating the complexities of the human nervous system. Emphasis will be placed upon developing a solid foundation in the basic and applied neurosciences, which will permit students to readily understand

both normal and abnormal functions of the nervous system essential in clinical practice.

### **10.3.2 Goal**

The course goal is to provide a solid foundation in the basic and applied neurosciences relevant to the general practice of high quality medicine.

### **10.3.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Identify clinically important structures of the human nervous system.
2. Explain the clinical importance of each named structure.
3. Identify clinically important connections between structures.
4. Explain the clinical importance of the connection between structures.
5. Comfortably discuss the human nervous system within the context of functional systems.
6. Recognize common signs and symptoms of nervous system dysfunction.
7. Readily provide a reasonable explanation to account for the dysfunction.
8. Provide a reasonable explanation as to the location and suspected neuropathophysiology of common lesions of the human nervous system likely to present in the general practice medical setting.

### **10.3.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program as well as Anatomy, Embryology, Histology and Molecular Cell Biology taken during the first semester of M.D. program are prerequisites.

### **10.3.5 Format**

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. Additionally, students will be provided with the opportunity to participate in regularly scheduled laboratory sessions designed to permit first hand experience in the examination of the nervous system tissues.

### **10.3.6 Neuroscience Textbooks**

The following textbooks and support materials are required / recommended for this Neuroscience course:

#### Required:

- 1 CLINICAL NEUROANATOMY FOR MEDICAL STUDENTS (2009) by Richard S. Snell, Publishers: Lippincott-Raven, 7<sup>th</sup> Edition, ISBN-10: 0781794277 or ISBN-13: 978-0781794275.

#### Recommended:

- 2 HIGH YIELD NEUROANATOMY (2009) by James D. Fix, Publisher: Lippincott-Williams and Wilkins, 4<sup>th</sup> Edition, ISBN-10: 0781779464 or ISBN-13: 978-0781779463.

### **10.3.7 Description of the Neuroscience Course Contents**

The subject matter to be covered in the Neuroscience course (IUSOM—BO—MD—02—03) is as follows:

INTRODUCTION (review of skull and vertebrae); ORGANIZATION OF THE NERVOUS SYSTEM; NEUROBIOLOGY OF THE NEURON; NERVE FIBERS AND PERIPHERAL NERVES; RECEPTOR AND EFFECTOR ENDINGS; DERMATOMES AND MUSCULAR ACTIVITY; MENINGES OF THE BRAIN AND SPINAL CORD; VENTRICULAR SYSTEM (CSF and blood brain barrier); CEREBROVASCULAR DISORDERS; DEVELOPMENT THE NERVOUS SYSTEM; SPINAL CORD (anatomy, organization, and ascending & descending tracts); BRAINSTEM (medulla, pons varolii, midbrain, and correlation); CEREBELLUM; CEREBRUM (diencephalon, cerebral hemispheres & cortex, and clinical notes); RETICULAR FORMATION (limbic system and clinical notes); BASAL NUCLEI; CRANIAL NERVES, THALMUS; HYPOTHALAMUS; AUTONMIC NERVOUS SYSTEM (ANS); GUSTATION; OLFACTION; VISUAL SYSTEM; AUDITORY SYSTEM; NEUROTRANSMITTERS; LEARNING AND MEMORY; and DEMENTIA AND AGING (Alzheimer disease). **(Lecture/Lab hrs: 150 & Credits: 10)**

#### **10.4 Medical and Legal Ethics (IUSOM—BO—MD—02—04)**

Medical and Legal Ethics course required during the second semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—02—04) is cited below **(Lecture/Lab hrs: 75 & Credits: 5)**:

##### **10.4.1 Purpose**

The purpose of this course is to familiarize the medical students with approximately the entire American Medical Association (AMA) code of ethics for physicians.

##### **10.4.2 Goal**

The course goal is to provide students a solid foundation in fundamental Medical and Legal Ethics.

##### **10.4.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Understand AMA code of ethics for physicians as well as day to day ethical issues.
2. Have a basic understanding of medical ethics.
3. Gain basis for writing of, for instance, the United States Medical Licensing Examination (USMLE STEP ONE).
4. Be in possession of understanding of the need to develop personal responsibility compared to corporate responsibility.

##### **10.4.4 Prerequisites**

Not applicable.

##### **10.4.5 Format**

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. Furthermore, students will

be provided with the opportunity to participate in regularly scheduled discussion sessions.

#### **10.4.6 Medical and Legal Ethics Textbooks**

The following textbooks and support materials are required / recommended for this Medical and Legal Ethics course:

Required:

1. ETHICS IN CLINICAL PRACTICE (2004) by Judith C. Ahronheim, Jonathan D. Moreno, and Connie Zuckerman, Publisher: Jones & Barlett, 2<sup>nd</sup> Edition, ISBN-10: 0763729450 or ISBN-13: 978-0763729455.

Recommended:

2. HEALTH CARE LAW AND ETHICS (2007) by Mark A. Hall, Marry Anne Bobinski, and David Orenlichter, Publishers: Aspen Publishers, 7<sup>th</sup> Edition, ISBN-10: 0735563500 or ISBN-13: 978-0735563506.
3. THE LAW OF MEDICAL LIABILITY (1995) by Marcia Mobilia Boumill and Clifford E. Elias, Publishers: West Publishing, 1<sup>st</sup> Edition, ISBN-10: 0314066608 or ISBN-13: 978-0314066602.

#### **10.4.7 Description of the Medical and Legal Ethics Course Contents**

The subject matter to be covered in the Medical and Legal Ethics course (IUSOM—BO—MD—02—04) is as follows:

PRINCIPLES OF MEDICAL ETHICS; INTRODUCTION (terminology, the relation of law, and ethics); OPINION ON SOCIAL POLICY ISSUES (abortion, mandatory parental consent to abortion, abuse of spouses, children, and elderly, allocation of limited medical resources, futile care, medical end-of-life care, artificial insemination by known and anonymous donors, ethical conduct in assisted reproductive technology, capital punishment, court-initiated medical treatments in criminal cases, torture, clinical investigation, subject selection for clinical trials, surgical 'placebo' controls, ethical considerations in international research, safeguards in the use of DNA databanks in genomic research, commercial use of human tissue, costs, the provision of adequate health care, fetal research guidelines, patenting human genes, gene therapy, genetic counseling, genetic testing by employers, insurance companies and genetic information, genetic information and the criminal justice system, ethical issues in carrier screening of genetic disorders, genetic testing of children, multiplex genetic testing, in vitro fertilization, frozen pre-embryos, pre-embryo splitting, human cloning, financial incentives for organ donation, cadaveric organ donation: encouraging the study of motivation, mandated choice and presumed consent for cadaveric organ donation, organ procurement following cardiac death, organ transplantation guidelines, medical applications of fetal heart transplantation, anencephalic neonates as organ donors, fetal umbilical cord blood, the use of minors as organ and tissue donors, the ethical implications of xenotransplantation, quality of life, surrogate mothers, unnecessary services, withholding or withdrawing life-sustaining medical treatment, euthanasia, physician assisted suicide, treatment decisions for seriously ill newborns, do-not-resuscitate orders, optimal use of orders

not-to-intervene and advance directives, HIV testing, impaired drivers and their physicians, and information from unethical experiment); OPINIONS ON INTERPROFESSIONAL RELATIONS (nonscientific practitioners, nurses, allied health professionals, referral of patients chiropractic, specialists, sports medicine, teaching, sexual harassment and exploitation between medical supervisors and trainees, and medical students performing procedures on fellow students); OPINIONS ON HOSPITAL RELATIONS (admission fee, assessments, compulsory billing for house staff and student services, economic incentives and levels of care, organized medical staff, physician-hospital contractual relations, and staff privileges); OPINIONS ON CONFIDENTIALITY, ADVERTISING AND COMMUNICATIONS AND MEDIA RELATIONS (advertising and managed care organizations, direct to consumer advertisements of prescription drugs, advertising and publicity physician advisory or referral services by telecommunications, the use of electronic mail communication media: press relations, communications media: standards of professional responsibility, filming patients in health care settings, confidentiality of medical information postmortem, confidential care of minors, confidentiality of HIV status on autopsy reports, privacy in the context of health care, confidentiality: attorney-physician relation, computers, disclosure of records to data collection companies, insurance company representative, and industry-employed physicians and independent medical examiners); OPINIONS ON FEES AND CHARGES (contingent physician fees, fee splitting: referrals to health care facilities, drug or device prescription rebates, fees: for medical services, for group practice, insurance from completion charges, interest charges and finance charges, laboratory bills, services provided by multiple physicians, competition, forgiveness on waiver of insurance co-payments, and professional courtesy); OPINIONS ON PHYSICIANS RECORDS (records of physicians: availability of information to other physicians, information and patients, access by non-treating medical staff, upon retirement or departure from a group, sale of a medical practice, and retention of medical records); OPINIONS ON PRACTICE MATTERS (appointment changes, ethical guidelines for physicians in management positions and other non-clinical roles, ethical obligations of medical directors, conflicts of interest: guidelines, biomedical research, managing conflicts of interest in the conduct of medical trials, conflicts of interest: health facility ownership by a physician, in home health care, consultation, second opinions, ethical implications of surgical co-management, contractual relationships, conflict of interest under capitation, negotiating discounts for specialty care, restrictions on disclosure in health care plan contracts, financial incentives and the practice of medicine, prescribing and dispensing drugs and devices, gifts to physicians from industry, sale of non-health-related goods from physician's offices, sale of health-related good from physician's offices, gifts to physicians: offers of indemnity, informed consent, surrogate decision making, waiver of informed consent for research in emergency situations, medical student involvement in patient care, laboratory services, reporting clinical test results: general guidelines, lien laws, neglect if patient, limitation of the physician-patient relationship, patient information, managed care, referral of patients: disclosure of limitations, cost containment involving prescription drugs in health care plans, restrictions on disclosure in managed care contracts, sexual misconduct in the practice of medicine, sexual or

romantic relations between physicians and by key third parties, substance abuse, substitution of surgeon without patient's knowledge or consent, use of restraints, informing families of a patient's death, performing procedures on the newly deceased for training purposes, self-treatment or treatment of immediate family members, invalid medical treatment, and use of chaperons during physical exams); OPINIONS ON PROFESSIONAL RIGHTS AND RESPONSIBILITIES (accreditation, continuing medical education, physician's political communications with patients and their families, restrictive covenants and the practice of medicine, covenants-not-to-compete for physicians-in-training, collective action and patient advocacy, civil rights and professional responsibility, reporting impaired, incompetent, or unethical colleagues, reporting adverse drug or device events, gender discrimination in the medical profession, signing bonuses to attract graduates of U.S. medical schools, discipline and medicine, physicians with disruptive behavior, due process, disputes between medical supervisors and trainees, free choice, caring for the poor, medical testimony, new medical procedures, patient for surgical or diagnostic instrument, patenting of medical procedures, peer review, ethics committees in health care institutions, ethics consultations, patient-physician relationship: respect for law and human rights, racial disparities in health care, physicians and infectious diseases, HIV-infected patients and physicians, and health care fraud and abuse); and OPINIONS ON THE PATIENT-PHYSICIAN RELATIONSHIP (fundamental elements, patient-physician relationship, patient responsibilities, patient-physician relationship in the context of work-related and independent medical examinations, potential patients). (**Lecture/Lab hrs: 75 & Credits: 5**)

## **11. Courses for the Third Semester of M.D. DEGREE (IUSOM—BO—MD—03--00)**

At IUSOM, the courses required for the third semester of M.D. degree (IUSOM—BO—MD—03—00) are mentioned below in full details (**Total Lecture/Lab hrs: 570 & Total Credits: 38**).

### **11.1 General Pathology (IUSOM—BO—MD—03—01)**

General Pathology course required during the third semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—03—01) is cited below (**Lecture/Lab hrs: 195 & Credits: 13**):

#### **11.1.1 Purpose**

The purpose of this course is to familiarize the medical students with the subject of General Pathology and to present to them a well organized, informative, and focused course in Pathology that emphasizes the essential information that students must possess in order to understand the biology of the diseases they are witnessing and treating.

#### **11.1.2 Goal**

To provide a solid foundation in basic General Pathology, which is the study of disease and the foundation of modern medical practice..

#### **11.1.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Read and ask medical-related questions.
2. Seek medical informational sources for answers to medical-related questions.
3. Precisely, efficiently, and succinctly identify answers to medical-related issues or questions.
4. Prepare written responses.
5. Evaluate their responses.
6. Critique their responses.
7. Manage synopsis of the common and important diseases and disease processes embodied in the particular systems of the human body.
8. Understand the relevance of the material presented in this course, by careful blending of mini-clinical pathological case studies and personal anecdotes.
9. Identify references to moral, ethical, and professional issues of medical practice and practitioners.

#### **11.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Biochemistry, Physiology, Anatomy, Histology and Molecular Cell Biology attended in the previous semesters of M.D. program are prerequisites.

#### **11.1.5 Format**

A traditional lecture/discussion format will be used to present course materials using MS PowerPoint slide presentation techniques.

#### **11.1.6 General Pathology Textbooks**

The following textbooks and support materials are required / recommended for this General Pathology course:

##### Required:

1. ROBBINS AND COTRAN PATHOLOGIC BASIS OF DISEASE (2009) by Vinay Kumar, Abdul K. Abbas, Nelson Fausto, and Jon Aster, Publishers: W.B. Saunders, 8<sup>th</sup> Edition, ISBN-10: 1437707920 or ISBN-13: 978-1437707922.

##### Recommended:

2. POCKET COMPANION TO ROBBINS AND COTRAN PATHOLOGIC BASIS OF DISEASE (2006) by Richard Mitchel, Vinay Kumar, Abdul K. Abbas, and Nelson Fausto, Publishers: W.B. Saunders, 7<sup>th</sup> Edition, ISBN-10: 0721602657 or ISBN-13: 978-0721602653.

#### **11.1.7 Description of the General Pathology Course Contents**

The subject matter to be covered in the General Pathology course (IUSOM—BO—MD—03—01) is as follows:

CELLULAR INJURY AND ADAPTATION (Introduction, definition and causes of cellular injury and adaptation, mechanisms of cell injury: ischemic and hypoxic injury, free radicals and cell injury, chemical injury, morphology of injured cells, intracellular accumulations, subcellular alterations, and cellular adaptations of growth and differentiation); INFLAMMATION AND REPAIR (inflammation: historical highlights acute inflammation, changes in vascular flow and caliber, changes in vascular permeability, cellular events: leukocytic exudation and phagocytosis,

chemical mediators of inflammation, lymphatics in acute inflammation mononuclear phagocytes chronic inflammation, and morphologic patterns in acute and chronic inflammation); FLUID AND HEMODYNAMIC DERANGEMENTS (edema, hyperemia and congestion, hemorrhage, thrombosis, shock, thrombogenesis, disseminated intravascular coagulation, embolism, and infarction); GENETIC DISORDERS (the normal karyotype: cytogenetics, mutations, cytogenetic disorders, mendelian disorders, autosomal dominant disorders, autosomal recessive disorders, sex-linked (X-linked) disorders, disorders with multifactorial inheritance disorders with variable genetic backgrounds, congenital malformations ehlers-danlos syndromes(EDS) neoplasia, and disease diagnosis by recombinant DNA methods); DISEASES OF IMMUNITY (general features of the immune system, histocompatibility antigens: significance of HLA complex, mechanisms of immunologic tissue injury (hypersensitivity reactions), type I hypersensitivity (anaphylactic type), type II hypersensitivity, type III hypersensitivity (immune complex – mediated), type IV hypersensitivity (cell – mediated), transplant rejection, and autoimmune diseases (e.g., AIDS)); NEOPLASIA ( definitions, nomenclature, characteristics of benine and malignant neoplasms, grading and staging of cancer, biology of tumor growth, mechanisms of invasion and metastasis, vascular dissemination and homing of tumor cells, karyotypic changes in tumors, predisposition to cancer, carcinogenic agents and their cellular interactions, oncogenes and cancer, cancer suppressor genes (anti-oncogenes) pathogenesis of cancer tumor-host interaction, and laboratory diagnosis of cancer); INFECTIOUS DISEASES (viral, chlamydial, rickettsial, and bacterial diseases, factors relating to parasite transmission of infectious agents, factors relating to host, host-parasite relationships, host tissue responses to infection, viral diseases, viral epithelial growths, viral disorders with exanthomas or skin rashes, herpesvirus diseases, arbovirus diseases, viral diseases of the central nervous system; viral heart disease, viral hepatitis, retroviral diseases: human T-cells leukemia, AIDS, Kawasaki's syndrome, chlamydial diseases, rickettsial diseases, mycoplasma, bacterial, spirochetal, and mycobacterial diseases, pyogenic cocci, gram-negative rods, infections of childhood, entropathogenic bacteria, clostridia, zoonotic bacteria, treponemes, uncommon bacteria, mycobacteria, and actinomycetes); ADDITIONAL INFECTIOUS DISEASES: FUNGAL, PROTOZOAL, AND HELMINTHIC DISEASES AND SARCOIDOSIS (fungal diseases: deep fungi, and superficial fungi (dermatophytosis), protozoal diseases: luminal protozoa, blood and tissue protozoa, and intracellular protozoa, helminthic diseases: intestinal roundworms, tissue roundworms, cestodes, tapeworms, and trematodes (flukes), and sarcoidosis (or Boeck's sarcoid)); NUTRITIONAL DISEASES AND ENVIRONMENTAL PATHOLOGY (protein-energy malnutrition, vitamins, minerals, air pollution, tobacco smoking, pneumoconiosis, chemical and drug injury, adverse drug reactions (ADRs), non-therapeutic agents, physical injuries, mechanical force, changes in temperature, changes in atmospheric pressure, electrical injuries, radiations injury, and non-ionizing radiations); DISEASES OF INFANCY AND CHILDHOOD (birth weight and gestational age, small-for-gestational-age (SGA) infants, immaturity of organ systems, apgar score, birth injuries, congenital malformations deformations, respiratory distress syndrome in newborn, neonatal asphyxia; erythroblastosis fetalis:



hemolytic disease of newborn, inborn errors of metabolism, cystic fibrosis (CF, mucoviscidosis), sudden infant death syndrome (SIDS), tumors and tumor-like lesions of infancy and childhood choriostomas, and hamartomas benign & malignant tumors and tumor-like lesions); and DISEASES OF AGING AND BLOOD VESSELS (cellular aging, wear and tear theories, genome-based theories, aging changes in organs and systems, diseases of aging arteries, congenital anomalies, arteriosclerosis, inflammatory diseases: the vasculitides, Raynaud's disease and Raynaud's phenomenon, aortic aneurysms, veins, varicose veins, phlebothrombosis and trombophlebitis, lymphatics, lymphangitis, lymphedema, tumors, benign tumors and tumor-like conditions, intermediate-grade tumors, malignant tumors, and tumors of lymphatics). (**Lecture/Lab hrs: 195 & Credits: 13**)

## **11.2 Medical Microbiology (IUSOM—BO—MD—03—02)**

Medical Microbiology course required during the third semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—03—02) is cited below (**Lecture/Lab hrs: 195 & Credits: 13**):

### **11.2.1 Purpose**

The purpose of this Medical Microbiology course is to provide the student with an understanding of the principles related to the nature and characteristics of microorganisms and to the process of epidemiology of infections. The course serves as a basis for analyzing clinical and epidemiological situations as a means of rendering professional care for the individual patient, family and community groups.

### **11.2.2 Goal**

The course goal is to provide students, through Lecture Presentations, a manageable synopsis of the common and important features and events of the solid foundation of basic Medical Microbiology.

### **11.2.3 Objectives**

The Objectives of this Medical Microbiology course are that upon completion of this course, medical students should be able to: 1. Understand the methods used in identification of microorganisms as a tool for making professional judgment in individual clinical situations. 2. Develop skill in the use of aseptic situations. 3. Understand the beneficial aspects of microorganisms as they relate to everyday life in the promotion and maintenance of health. 4. Acquire an attitude of alertness toward recognition of potential infectious conditions as a means of control and prevention of disease. 5. Stimulate professional growth by keeping abreast of new developments in the study of microorganisms of organizations, and other pertinent resources.

### **11.2.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Medical Biochemistry, Human Physiology, Anatomy, Histology and Molecular Cell Biology attended in the previous semesters of M.D. program are prerequisites.

### 11.2.5 Format

The course materials in the form of lectures/discussions shall be presented and tested in a traditional format using modern audiovisual equipments, like LCD projectors, MS PowerPoint presentations, and overhead transparencies. Additionally, students will be provided with the opportunity to participate in regularly scheduled laboratory sessions designed to permit first hand experience in the use of Medical Biological ultramodern techniques and methodologies.

### 11.2.6 Medical Microbiology Textbooks

The following textbooks and support materials are required / recommended for this Medical Microbiology course:

Required:

1. SHERRIS MEDICAL MICROBIOLOGY: AN INTRODUCTION TO INFECTIOUS DISEASES (2003) by Kenneth J. Ryan (Editor), Publisher: McGraw-Hill Medical, 4<sup>th</sup> Edition, ISBN-10: 0071212450 or ISBN-13: 978-0071212458.

Recommended:

2. MOSBY'S DIAGNOSTIC AND LABORATORY TEST REFERENCE (2010) by Kathleen Deska Pagana and Timothy J. Pagana, Publisher: Elsevier, 10<sup>th</sup> Edition, ISBN-10: 0323074057 or ISBN-13: 978-0323074056.
3. SCHNEIERSON'S ATLAS OF DIAGNOSTIC MICROBIOLOGY (1984) by Stanley S. Scheierson, Edward J. Bottone, and Stamm Roland Girolami, Publishers: Abbott Labs, 9<sup>th</sup> Edition, ISBN-10: 9999656781 or ISBN-13: 978-9999656788.
4. THE DISCOVERY OF GERM: TWENTY YEARS THAT TRANSFORMED THE WAY WE THINK ABOUT DISEASE (REVOLUTION IN SCIENCE) (2003) by J. Waller, Publishers: Columbia University Press, NY, 1<sup>st</sup> Edition, ISBN-10: 023113150X or ISBN-13: 978-0231131506.

### 11.2.7 Description of the Medical Microbiology Course Contents

The subject matter to be covered in the Medical Microbiology course (IUSOM—BO—MD—03—02) is as follows:

INTRODUCTION (comparison of bacteria with other micro-organisms and the classes of clinically relevant micro-organisms and their main properties, comparison of the main properties of prokaryotic and eukaryotic cells, and distinguishing between the properties of bacteria, fungi, parasites and viruses); STRUCTURE OF BACTERIAL CELLS (common features of bacterial cells, together with those features that differ between bacterial genera, species and strains, comparison of the shape and size of bacteria with one another and with other organisms, chemical components of bacteria, cell walls of bacteria with reference to the Gram stain and acid-fast stain, bacterial cell membrane: nucleoid, ribosomes, mesosome, and periplasm, bacterial capsules (including the glycocalyx): pili and fimbriae, flagella, plasmids and granules, and the formation and nature of bacterial endospores); GROWTH OF BACTERIAL CELLS (exponential and colonial growth, the effects of

temperature, pH, oxygen, nutrients (including growth factors) and water availability on microbial growth, and defined and complex medium); CLASSIFICATION OF MEDICALLY IMPORTANT BACTERIA (a range of criteria and systems for classification of bacteria and a simplified system for the classification of medically important bacteria); BACTERIAL GENETICS (processes through which bacteria achieve genetic recombination, bacterial plasmids: F-plasmid and Hfr conjugation, transposons, insertion sequences, programmed rearrangements, process of mutation: base substitution, frameshifts and transposons, spontaneous and induced mutations and conditional lethal mutations, and processes of conjugation, transduction and transformation); NORMAL FLORA (definitions, composition, roles, significance, and the composition of the normal flora of the skin, upper respiratory tract, intestinal tract and genitourinary tract); BACTERIAL PATHOGENESIS (terminologies, the specific factors that determine virulence, quantification of virulence, stages of pathogenesis and disease, Koch's postulates and the requirements for etiologic diagnosis, portals of entry, significance of adhesion, invasion, inflammation and survival in bacterial pathogenesis, roles of bacterial virulence factors: exoenzymes, exotoxins and endotoxins, and toxic shock syndrome and septic shock); HOST DEFENCES (differentiation between the various forms and defences of the human host against infection, differentiation between innate and acquired immunity, the roles of the skin and epithelia as barriers to infection, factors causing predisposition to infection, mucosal immunity, differentiation between pyogenic and granulomatous inflammatory responses, mechanisms of killing of bacteria by phagocytes, and acquired immunity); LABORATORY DIAGNOSIS (methodologies for acquisition, handling and laboratory-based identification of bacterial in clinical specimens, differentiation between bacteriologic and serologic approaches to laboratory diagnosis, biochemical and DNA-based methods for identification, appropriate approaches to the acquisition and handling of specimens, methods for the isolation and culture of micro-organisms, composition and applications of a range of selective media, issues specific to culture from blood, throat, sputum, stools, urine, genital tract, wounds and abscess specimens, and tests based on antigen-antibody interactions including the use of known antisera and ELISA); ANTIBACTERIAL DRUGS AND MECHANISMS OF ACTION (mechanisms of action and applications of antibacterial antibiotics, differentiation between bacteriostatic and bactericidal antibiotics, measuring antibiotic activity, the use of antibiotics in combination, and the structure, source, mechanism and spectrum of activity and principal side effects of: antibacterial drugs which inhibit cell wall synthesis, antibacterial drugs which inhibit protein synthesis, antibacterial drugs inhibiting nucleic acid synthesis and antibacterial drugs acting on cell membranes); BACTERIAL DRUG RESISTANCE (mechanisms, spread and prevention of bacterial resistance to antibiotics, non-genetic resistance, differentiation between chromosomal and plasmid-encoded resistance, nature and role of R-plasmids, mechanisms of resistance: inactivation by modification of drug, modification of the drug target and reduction of permeability to drug or export of drug from cell, antibiotic susceptibility testing, and MDR (multi-drug resistance) in Mycobacterium tuberculosis and spread of antibiotic resistance and its prevention); STERILIZATION AND DISINFECTION (terminologies and methods of sterilisation and disinfection, measuring the effectiveness of sterilization and

disinfection treatments, chemical agents which act by: disruption of cell membranes, modification of proteins and modification of nucleic acids, sterilization and disinfection using physical agents, specifically heat, radiation and filtration, and advantages and disadvantages of various methods); BACTERIAL VACCINES (origin and action of bacterial vaccines, differentiation between active, passive and active-passive immunity, nature and action of capsular polysaccharide vaccines, toxoid vaccines, purified protein vaccines, live attenuated bacterial vaccines, killed bacterial vaccines, differentiation between vaccines and antitoxins, the nature and action of antitoxins, and vaccines currently recommended against clinically important bacteria); MAJOR PATHOGENS (major bacterial pathogens, major Gram positive, Gram negative and non-Gram-staining bacterial pathogens, the most common notifiable diseases, and anaerobic bacteria and the clinical infections caused by them); STAPHYLOCOCCUS (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of staphylococcal diseases, Staphylococcus aureus as a causative agent of endocarditis, osteomyelitis, food-poisoning, toxic shock syndrome, hospital-acquired pneumonia, septicemia and surgical wound infections, importance of Staphylococcus aureus as a pathogen, emergence of methicillin resistant Staphylococcus aureus, Staphylococcus epidermidis as a causative agent of endocarditis and prosthetic joint infection, and Staphylococcus saprophyticus as a causative agent of urinary tract infection); STREPTOCOCCUS (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of streptococcal diseases, classification of systems applied to the streptococci including Lancefield groupings, Streptococcus pyogenes (group A streptococcus) as a causative agent of pharyngitis and cellulites, immunologic diseases (rheumatic fever and acute glomerulonephritis) related to Streptococcus pyogenes infection, Streptococcus agalactiae (group B streptococcus) as a causative agent of neonatal sepsis and meningitis, Enterococcus faecalis as a causative agent of hospital-acquired UTI and endocarditis, endocarditis caused by the viridans streptococci and S. bovis, Streptococcus pneumoniae as a causative agent of community-acquired pneumonia, meningitis, bacteraemia, otitis media and sinusitis, and importance of Streptococcus pneumoniae as a pathogen); NEISSERIA (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by Neisseria, Neisseria meningitidis as a causative agent of meningitis, and meningococemia, Neisseria gonorrhoeae gonorrhoea as a causative agent of neonatal conjunctivitis and pelvic inflammatory disease (PID), and importance of testing for other possible sexually-transmitted disease in individuals diagnosed with gonorrhoea); GRAM-POSITIVE RODS: BACILLUS, CLOSTRIDIUM, LISTERIA, AND CORYNEBACTERIUM (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by Gram positive rods, Bacillus anthracis as the causative agent of cutaneous, pulmonary and gastrointestinal anthrax, Bacillus cereus as a causative agent of food poisoning, Clostridium tetani as the causative agent of tetanus, Clostridium botulinum as the causative agent of botulism, Clostridium perfringens as a causative agent of gas gangrene and food poisoning, Clostridium

difficile as the causative agent of pseudomembranous colitis, role of endospores in the etiology of the above diseases, *Corynebacterium diphtheriae* as the causative agent of diphtheria, and *Listeria monocytogenes* as a causative agent of meningitis and sepsis in the newborn and immunosuppressed adults, and febrile gastroenteritis); **GRAM-NEGATIVE RODS RELATED TO ENTERIC TRACT** (categories of Gram negative rods related to the enteric tract according to the site at which they cause disease, the use of antigens in typing and identification of Gram negative rods, aspects of laboratory diagnosis and antibiotic therapy and resistance particular to Gram negative rods related to the enteric tract, coliforms and Public Health, *Escherichia coli* as a causative agent of UTI, Gram negative sepsis, neonatal meningitis and enterotoxigenic, enteroinvasive and enterohaemorrhagic enterocolitis, *Salmonella* as a causative agent of enterocolitis, enteric fevers including typhoid fever, and septicaemia accompanied by metastatic infections, *Shigella* as a causative agent of dysentery, *Vibrio* as a causative agent of cholera, diarrhea, cellulitis and sepsis, *Campylobacter* as a causative agent of enterocolitis and bacteraemia, *Helicobacter* as a causative agent of gastritis and peptic ulcers and as a risk factor for gastric carcinoma, *Klebsiella/Enterobacter/Serratia* group as causative agents of pneumonia and UTI, *Proteus/Providencia/Morganella* groups as causative agents of UTI, *Pseudomonas* as a causative agent of sepsis, pneumonia and UTI, importance of *Pseudomonas* as a pathogen within hospitals, and *Bacteriodes* and *Prevotella* as causative agents of anaerobic sepsis, peritonitis and abscesses); **GRAM-NEGATIVE RODS RELATED TO THE RESPIRATORY TRACT** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention of diseases caused by Gram-negative rods related to the respiratory tract, *Haemophilus influenzae* as a causative agent of meningitis and sepsis in young children, upper respiratory tract infections in young children and pneumonia in adults, and *Bordetella pertussis* as the causative agent of whooping cough, *Legionella pneumophila* as the causative agent of Legionnaires disease); **GRAM-NEGATIVE RODS RELATED TO ANIMAL SOURCES** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by Gram negative rods related to animal sources, *Brucella* as the causative agent of Brucellosis, *Francisella tularensis* as the causative agent of Tularaemia, *Yersinia pestis* as the causative agent of bubonic and pneumonic plague, and *Pasteurella multocida* as the causative agent of Pasteurellosis); **MYCOBACTERIA** (To describe *Mycobacterium tuberculosis* as a causative agent of tuberculosis and scrofula, *Mycobacterium bovis* as a causative agent of gastrointestinal tuberculosis, *Mycobacterium leprae* as the causative agent of leprosy, differentiation between tuberculoid and leptomatous leprosy, impact of slow growth rate on diagnosis, treatment and antibiotic resistance of Mycobacteria, *Mycobacterium kansasii* as a causative agent of tuberculosis, *Mycobacterium marinum* as the causative agent of swimming pool granuloma, *Mycobacterium scrofulaceum* as a causative agent of scrofula, *Mycobacterium avium-intracellulare* complex as causative agents of TB-like disease in the immunocompromised, and *Mycobacterium fortuitum-chelonei* complex as causative agents of rare skin and soft tissue infections in the immunocompromised and in patients with prosthetic hip

joints); **MYCOPLASMAS** ( general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment, prevention of diseases caused by Mycoplasmas, *Mycoplasma pneumoniae* as a causative agent of atypical pneumonia, atypical pneumonia, *Mycoplasma hominis* as an infrequent causative agent of pelvic inflammatory disease, and *Ureaplasma urealyticum* as a causative agent of non-gonococcal urethritis); **ACTINOMYCETES** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by Actinomycetes, *Actinomyces israelii* as the causative agent of Actinomycosis, and *Nocardia asteroides* as the causative agent of Nocardiosis); **SPIROCHETES** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by Spirochetes, *Treponema pallidum* as the causative agent of Syphilis, use of treponemal and non-treponemal antibodies in the detection of Syphilis, *Borrelia burgdorferi* as the causative agent of Lyme disease, *Borrelia recurrentis* and related species as causative agents of Relapsing Fever, and *Leptospira interrogans* as the causative agent of Leptospirosis); **CHALMYDIAE AND RICKETTSIAE** (*Chlamydia trachomatis* as a causative agent of Trachoma and genital tract infections, *Chlamydia psittaci* as the causative agent of Psittacosis, *Chlamydia pneumoniae* as a causative agent of Atypical pneumonia, *Rickettsia rickettsiae* as the causative agent of Rocky mountain spotted fever, *Rickettsia akari* as the causative agent of Rickettsialpox, *Rickettsia prowazekii* as the causative agent of Epidemic typhus, *Rickettsia typhi* as the causative agent of Endemic typhus, *Rickettsia tsutsugamushi* as the causative agent of Scrub typhus, and *Coxiella burnetii* as the causative agent of Q fever); **MINOR BACTERIAL PATHOGENS** (To list, where relevant, the general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by minor bacterial pathogens, and the minor bacterial pathogens and the diseases they cause); **BASIC MYCOLOGY** (laboratory diagnosis and antifungal chemotherapy, fungal cell structure, differentiation between yeasts, dimorphic fungi and filamentous fungi, fungal life cycles and reproduction, criteria for classification of fungi, and the main taxonomic groups, laboratory diagnosis of fungi, and antifungal chemotherapy and to list the agents used and their main side effects); **CUTANEOUS AND SUBCUTANEOUS MYCOSES** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of cutaneous and subcutaneous mycoses, dermatophytes (including *Trichophyton*, *Microsporum* and *Epidermophyton*) as causative agents of dermatophycoses , including tinea capitis, tinea pedis and ringworm, and *Sporothrix schenckii* as the causative agent of sporotrichosis); **SYSTEMIC MYCOSES** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of systemic mycoses, *Histoplasma capsulatum* as the causative agent of histoplasmosis, *Coccidioides immitis* as the causative agent of coccidioidomycosis, *Blastomyces dermatidis* as the causative agent of blastomycosis, and *Paracoccidioides immitis* as the causative agent of paracoccidioidomycosis); **OPPORTUNISTIC MYCOSES** (general characteristics, toxins and other virulence

factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of opportunistic mycoses, *Candida albicans* as the causative agent of thrush, disseminated candidiasis and chronic mucocutaneous candidiasis, *Cryptococcus neoformans* as the causative agent of cryptococcosis, particularly cryptococcal meningitis, *Aspergillus fumigatus* as the causative agent of invasive aspergillosis, allergic bronchopulmonary aspergillosis and aspergilloma, and Zygomycetes (including *Mucor* and *Rhizopus*) as causative agents of Zygomycoses, *Pneumocystis carinii* as a causative agent of pneumonia); **INTESTINAL AND UROGENITAL PROTOZOA** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by intestinal and urogenital protozoa, *Entamoeba histolytica* as a causative agent of amoebic dysentery and liver abscess, diarrhea caused by *Balantidium coli* from that caused by *Entamoeba histolytica*, *Giardia lamblia* as the causative agent of giardiasis, especially diarrhea, *Cryptosporidium parvum* as the causative agent of cryptosporidiosis, especially diarrhea, and *Trichomonis vaginalis* as the causative agent of trichomoniasis); **BLOOD AND TISSUE PROTOZOA** (To describe the general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by blood and tissue protozoa, *Plasmodium* spp. as causative agents of malaria, difference between the properties, pathogenesis and treatment of *P. malariae*, *P. falciparum*, *P. vivax* and *P. ovale*, *Toxoplasma gondii* as the causative agent of toxoplasmosis, including congenital and disseminated disease, *Trypanosoma cruzi* as the causative agent of Chagas' disease, *Trypanosoma brucei* var. *gambiense* and *T. brucei* var. *rhodesiense* as causative agents of sleeping sickness, *Leishmania donovani* as the causative agent of Kala-azar (visceral leishmaniasis), *Leishmania tropicana* and *L. mexicana* as causative agents of cutaneous leishmaniasis, and *Leishmania braziliensis* as the causative agent of mucocutaneous leishmaniasis); **MINOR PROTOZOAN PATHOGENS** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by minor protozoan pathogens, *Acanthamoeba castellanii* and *Naegleria fowleri* as causative agents of meningoencephalitis, *Babesia microti* as the causative agent of babesiosis, and *Cyclospora cayentanensis*, *Isopora belli* and microsporidia including *Enterocytozoon bieneusi* and *Septata intestinalis* as causative agents of diarrhea); **CESTODES** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by cestodes, *Taenia solium* as a causative agent of taeniasis and cysticercosis, *Taenia saginata* as a causative agent of taeniasis, *Diphyllobothrium latum* as the causative agent of diphyllobotriasis, *Echinococcus granulosus* as the causative agent of hydatid cyst disease (albenazole), and other tapeworms including *Hymenolepis nana* and *Dipylidium caninum*, as causative agents of disease); **TREMATODES** (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by trematodes, *Schistosoma* spp. as the causative agent of schistosomiasis, *Chlonorchis sinensis* as a causative agent of disease, and *Paragonimis westermani* as the causative agent of paragonimiasis); **INTESTINAL**

NEMATODES (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by tissue nematodes, *Ancylostoma duodenale* and *Necator americanus* as causative agents of hookworm disease, *Ascaris lumbricoides* as the causative agent of ascariasis, *Enterobius vermicularis* as the causative agent of enterobiasis, *Strongyloides stercoralis* as a causative agent of disease, *Trichinella spiralis* as the causative agent of trichinelliasis, and *Trichuris trichiura* as the causative agent of trichuriasis); TISSUE NEMATODES (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by tissue nematodes, *Dracunculus medinensis* as a causative agent of disease, *Loa loa* as the causative agent of Loa loa, *Onchocerca volvulus* as the causative agent of river blindness, and *Wuchereria bancrofti* as a causative agent of filariasis); NEMATODES WHOSE LARVAE CAUSE DISEASE (general characteristics, toxins and other virulence factors, transmission, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention of diseases caused by nematode larvae, *Toxocara canis* as the causative agent of visceral larva migrans, *Ancylostoma caninum* and *Ancylostoma braziliense* as causative agents of cutaneous larva migrans (thiabendazole), and *Anisakis simplex* as a causative agent of disease). **(Lecture/Lab hrs: 195 & Credits: 13)**

### **11.3 Medical Immunology (IUSOM—BO—MD—03—03)**

Medical Immunology course required during the third semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—03—03) is cited below **(Lecture/Lab hrs: 30 & Credits: 2)**:

#### **11.3.1 Purpose**

The purpose of this course is to familiarize the medical students with the necessary knowledge essential to understanding and appreciating the complexities of the Medical Immunology.

#### **11.3.2 Goal**

The course goal is to provide a solid foundation in the basic and applied Medical Immunology relevant to the general practice of high quality medicine.

#### **11.3.3 Objectives**

The Objectives of this Medical Microbiology course are that upon completion of this course, medical students should be able to: 1. Understand the methods used in identification of microorganisms as a tool for making professional judgment in individual clinical situations. 2. Understand the beneficial aspects of microorganisms as they relate to everyday life in the promotion and maintenance of health. 3. Stimulate professional growth by keeping abreast of new developments in the study of microorganisms of organizations, and other pertinent resources.

#### **11.3.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Medical Microbiology, Medical Biochemistry,



Physiology, Anatomy, Histology and Molecular Cell Biology attended in the previous semesters of M.D. program are prerequisites.

### **11.3.5 Format**

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. Additionally, students will be provided with the opportunity to participate in regularly scheduled laboratory sessions designed to permit first hand experience in the field of Medical Immunology.

### **11.3.6 Medical Immunology Textbooks**

The following textbooks and support materials are required / recommended for this Medical Immunology course:

#### Required:

1. IMMUNOLGY (2006) by Ivan Roitt, Jonathan Brostoff, David Male, and David Roth, Publishers: Mosby, 7<sup>th</sup> Edition, ISBN-10: 0323033997 or ISBN-13: 978-0323033992.

#### Recommended

2. HIGH YIELD IMMUNOLOGY (2005) by Arthur G. Johnson and Benjamin L. Clarke, Publishers: Lippincott, Williams and Wilkins, 2<sup>nd</sup> Edition, ISBN-10: 0781774691 or ISBN-13: 978-0781774697.

### **11.3.7 Description of the Medical Immunology Course Contents**

The subject matter to be covered in the Medical Immunology course (IUSOM—BO—MD—03—03) is as follows:

OVERVIEW OF THE IMMUNE SYSTEM; IMMUNOGENS AND IMMUNOGLOBULINS; IMMUNOLOGIC ASSAYS; IMMUNOGENETICS; THE IMMUNE RESPONSE; HYPERSENSITIVITY; IMMUNODEFICIENCY, AUTOIMMUNE DISORDERS; CANCER IMMUNOLOGY; and IMMUNIZATION. (**Lecture/Lab hrs: 30 & Credits: 2**)

## **11.4 Behavioral Sciences (IUSOM—BO—MD—03—04)**

Behavioral Sciences course required during the third semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—03—04) is cited below (**Lecture/Lab hrs: 150 & Credits: 10**):

### **11.4.1 Purpose**

The purpose of this class is to develop the student's clinical skills in diagnosis and treatment of patients who have mental disorders. Students will develop their skills in a variety of diagnostic and treatment procedures that are commonly involved in psychiatric care.

### **11.4.2 Goal**

The course goal is to provide students a solid foundation in fundamental Behavioral Sciences.

### 11.4.3 Objectives

The major objective of this Behavioral Sciences course is to provide medical students with an overview of this field focusing four major areas, namely: 1. Historical roots and conceptual models in behavioral sciences. 2. Professional issues in behavioral sciences. 3. Assessment techniques used in behavioral sciences. 4. Therapeutic approaches in behavioral sciences.

### 11.4.4 Prerequisites

Not applicable.

### 11.4.5 Format

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. Furthermore, students will be provided with the opportunity to participate in regularly scheduled discussion sessions.

### 11.4.6 Behavioral Sciences Textbooks

The following textbooks and support materials are required / recommended for this Behavioral Sciences course:

#### Required:

1. KAPLAN & SADOCK'S COMPREHENSIVE TEXT BOOK OF PSYCHIATRY (2 VOLUME SET) (2009) by Benjamin J. Sadock (Editor), Virginia Alcott Sadock (Editor), and Pedro Ruiz (Editor), Publishers: Lippincott Williams & Wilkins, 9<sup>th</sup> Edition, ISBN-10: 0781768993 or ISBN-13: 978-0781768993.

#### Recommended:

2. KAPLAN & SADOCK'S SYNOPSIS OF PSYCHIATRY: BEHAVIORAL SCIENCES / CLINICAL PSYCHIATRY (1998) by B.J. Sadock and V.A. Sadock, Publishers: Lippincott Williams & Wilkins, 9<sup>th</sup> Edition, ISBN: 07-817-3183-6

### 11.4.7 Description of the Behavioral Sciences Course Contents

The subject matter to be covered in the Behavioral Sciences course (IUSOM—BO—MD—03—04) is as follows:

THE DOCTOR PATIENT RELATIONSHIP AND INTERVIEWING TECHNIQUES; HUMAN DEVELOPMENT THROUGHOUT THE LIFE CYCLE (life cycle and normality, pregnancy, childbirth, infancy, and childhood, adolescence, adulthood, late adulthood, thanatology, death, and bereavement); TYPICAL SIGNS AND SYMPTOMS OF PSYCHIATRIC ILLNESS DEFINED (Sigmund Freud, Erik Erikson, Jean Piaget); THEORIES OF PERSONALITY AND PSYCHOPATHOLOGY (schools derived from psychoanalysis and Psychology); MOTOR SKILLS DISORDER; LEARNING DISORDERS; ATTENTION DEFICIT DISORDERS; PERVASIVE DEVELOPMENTAL DISORDERS; MENTAL RETARDATION; PSYCHOMETRIC AND NEURO-PSYCHOLOGICAL

TESTING (psychological testing of intelligence and personality and neuropsychological assessment of adults); CLASSIFICATION IN PSYCHIATRY; TIC DISORDERS; ELIMINATION DISORDERS; CONTRIBUTION OF THE PSYCHOLOGICAL SCIENCES TO HUMAN BEHAVIOR; DELIRIUM, DEMENITA, AND AMNESTIC AND OTHER COGNITIVE DISORDERS DUE TO A GENERAL MEDICAL CONDITION (overview, delirium, dementia, amnestic disorders, attachment theory, learning theory, aggression and accidents, sociobiology, epidemiology, biostatistics and social psychiatry, and health care delivery in psychiatry and medicine); SUBSTANCE RELATED DISORDERS (overview, alcohol-related disorders, amphetamine ( or amphetamine related ) disorders, caffeine-related disorders, cannabis, cocaine, hallucinogen, inhalants, nicotine, opioid, phencyclidine ( or phencyclidine related ) disorders, and anabolic steroid abuse); ADOLESCENT SUBSTANCE ABUSE; ETHICS IN PSYCHIATRY; SCHIZOPHRENIA; SCHIZOPHRENIA WITH CHILDHOOD ONSET; OTHER PSYCHOTIC DISORDERS (overview, schizophreniform disorders, schizoaffective disorder, delusional disorder, and brief psychotic disorder); MOOD DISORDERS (overview, MDD, bipolar I disorder, bipolar II disorder, dysthymic disorder, and cyclothymine disorder); ANXIETY DISORDERS (overview, panic disorder and agoraphobia, specific phobia and social phobia, obsessive-compulsive disorder, posttraumatic stress disorder and acute stress disorder, and generalized anxiety); SOMATOFORM DISORDERS; NEURASTHENIA AND CHRONIC FATIGUE SYNDROME; FACTITIOUS DISORDERS; DISSOCIATIVE DISORDERS; HUMAN SEXUALITY (normal, sexual dysfunctions, and paraphilias and sexual disorder not otherwise specified); GENDER IDENTITY DISORDERS; EATING DISORDERS (anorexia nervosa, bulimia nervosa and eating disorder NOS, and Obesity); NORMAL SLEEP DISORDERS; IMPULSE-CONTROL DISORDERS NOC; PROBLEMS RELATED TO ABUSE OR NEGLECT; PSYCHIATRIC EMERGENCIES; ADJUSTMENT DISORDERS; RELATIONAL PROBLEMS (suicide and other emergencies); BIOLOGICAL THERAPIES (general principles, medical-induced movement disorders, psychotherapeutic drugs, electroconvulsive therapy, and other biological therapies); and PSYCHOTHERAPIES (psychoanalysis and psychoanalytic psychotherapy, brief psychotherapy and crisis intervention, group psychotherapy, combined individual and group psychotherapy and couples therapy, biofeedback, behavior therapy, hypnosis, cognitive therapy, psychosocial treatment and rehabilitation, combined psychotherapy, and pharmacotherapy). **Lecture/Lab hrs: 150 & Credits: 10)**

## **12. Courses for the Fourth Semester of M.D. DEGREE (IUSOM—BO—MD—04—00)**

At IUSOM, the courses required for the fourth semester of M.D. degree (IUSOM—BO—MD—04—00) are mentioned below in full details (**Total Lecture/Lab hrs: 600 & Total Credits: 40**).

### **12.1 Systemic Pathology (IUSOM—BO—MD—04—01)**

Systemic Pathology course required during the fourth semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—04—01) is cited below (**Lecture/Lab hrs: 195 & Credits: 13**):

**12.1.1 Purpose**

The purpose of this course is to familiarize the medical students with the subject of Systemic Pathology and to present to them a well organized, informative, and focused course in Pathology that emphasizes the essential information that students must possess in order to understand the biology of the diseases they are witnessing and treating.

**12.1.2 Goal**

To provide a comprehensive coverage of specific organ based diseases together with to provide a foundation upon which to build the practitioner's knowledge of specific clinical disorders.

**12.1.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Describe the etiology, pathogenesis, structural and functional manifestations of diseases that affect specific organ systems of the body and to be able to place specific diseases in context with their prevalence, morbidity and mortality in society as a whole.
2. Lay the groundwork for the study of the clinical disciplines by stressing on theoretical understanding of the material so as to be able to explain a multi-system health problem in terms of pathogenesis, mechanisms of system interactions, and potential complications.
3. Develop a vocabulary with which to communicate this knowledge to others.
4. Understand the natural course of specific disease states and the results of interventions by the physician.
5. Relate anatomic alterations induced by specific diseases to their radiological findings.
6. Relate pathologic classification, staging and behavior of neoplasms to their response to treatment.
7. Appreciate how medical knowledge is acquired, evaluated and disseminated so as to be able to critically analyze current medical issues and future advances.
8. Describe how pathology as a clinical specialty is essential to the proper practice of clinical medicine.

**12.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Biochemistry, Physiology, Anatomy, Histology, Molecular Cell Biology, and General Pathology attended in the previous semesters of M.D. program are prerequisites.

**12.1.5 Format**

A traditional lecture/discussion format will be used to present course materials using MS PowerPoint slide presentation techniques.

**12.1.6 Systemic Pathology Textbooks**

The following textbooks and support materials are required / recommended for this Systemic Pathology course:

Required:

1. ROBBINS AND COTRAN PATHOLOGIC BASIS OF DISEASE (2009) by Vinay Kumar, Abdul K. Abbas, Nelson Fausto, and Jon Aster, Publishers: W.B. Saunders, 8<sup>th</sup> Edition, ISBN-10: 1437707920 or ISBN-13: 978-1437707922..

Recommended:

2. POCKET COMPANION TO ROBBINS AND COTRAN PATHOLOGIC BASIS OF DISEASE (2006) by Richard Mitchel, Vinay Kumar, Abdul K. Abbas, and Nelson Fausto, Publishers: W.B. Saunders, 7<sup>th</sup> Edition, ISBN-10: 0721602657 or ISBN-13: 978-0721602653.

### **12.1.7 Description of the Systemic Pathology Course Contents**

The subject matter to be covered in the Systemic Pathology course (IUSOM—BO—MD—04—01) is as follows:

DISEASES OF THE BLOOD VESSELS (review histology of blood vessels, types of arteries: muscular and elastic, atherosclerosis: atherosclerosis and lesions in it's stages of development (fatty streak and fibrous plaque), proposed mechanisms of atherosclerosis (reaction to injury theory, thrombogenic, and monoclonal), American Heart Association Classification of Atherosclerotic lesion, natural history and sequelae, type of vessel involved, major risk factors for developing atherosclerosis, sequence of events of the "response to injury" hypothesis of atherogenesis, and changes which may occur in an atherosclerotic plaque making it a "complicated plaque," Monckeberg's medial calcification: features and significance, hypertension: blood pressure, mechanism of regulation of normal blood pressure, the causes and possible factors of hypertension, classification of hypertension (benign and malignant), and arteriolosclerosis (hyaline and hyperplastic), vasculitis syndromes: their pathogenesis, classification and it's criteria, and various vasculitides (blood vessels that are most commonly affected, histological features, clinical features, and diagnosis and treatment: giant cell arteritis, takayasu's vasculitis, polyarteritis nodosa, kawasaki's disease, thromboangiitis obliterans, Churg-Strauss syndrome, Wegener's granulomatosis, Lymphomatoid granulomatosis, and infectious vasculitis), aneurysms: types (abdominal aortic aneurysm, berry aneurysm, mycotic aneurysm, syphilitic aneurysm, and dissecting aortic aneurysm), vessel affected and the usual location of each type of aneurysm, etiology of each, which type is usually found in the abdominal aorta, pathogenesis of a dissecting aneurysm, and pathogenesis and clinical significance of berry aneurysms (usual location and clinical consequence when a berry aneurysm ruptures), tumors of the vascular system: benign (hemangioma, types, clinical features, and morphological characteristics), and malignant (angiosarcoma (hemangiosarcoma): location, gross Features, and histological characteristics, hemangiopericytoma, and Kaposi's sarcoma: four forms of Kaposi's sarcoma, gross features, association with AIDS, and histological features), venous system: significance of valves and unidirectional flow of blood, phlebothrombosis and thrombophlebitis, deep venous thrombosis and it's clinical significance, and factors associated with development of varicose veins, pathology of therapeutic interventions in vascular disease: balloon angioplasty and related techniques, and coronary artery bypass graft surgery); DISEASES OF THE HEART (normal anatomy of the heart, basic principles of cardiac dysfunction, congestive

heart failure (both left-sided and right-sided heart failure): congestive heart failure, the effects of congestive heart failure on the lungs, its effects on the liver and spleen, its effects on the subcutaneous tissues of the ankles, differentiation between right heart failure and left heart failure, compensatory mechanisms in heart failure – hypertrophy and dilatation, and symptoms and signs of heart failure, main types of heart diseases: ischemic heart disease, hypertensive heart disease, valvular disease, non ischemic (primary) myocardial disease, and congenital heart disease, ischemic heart disease: role of acute plaque change and factors triggering acute plaque change, four clinical patterns of ischemic heart disease: angina pectoris (patterns of angina pectoris: stable or typical angina, Prinzmetal's or variant angina, and unstable or crescendo angina), myocardial infarction (transmural vs. subendocardial infarction, incidence and risk factors, pathogenesis of myocardial infarction, coronary artery occlusion, myocardial response, histopathological sequence of events in MI, serum markers – their role in diagnosing MI, symptoms of myocardial infarction, and sequelae of acute myocardial infarction), chronic ischemic heart disease with heart failure, and sudden cardiac death, morphologic effect and clinical consequences of prolonged hypertension on the heart, cor pulmonale: its pathophysiology and morphology, valvular heart disease: types of valvular heart disease (calcific aortic valve stenosis, calcification of the mitral annulus, mitral valve prolapse, rheumatic heart disease, vegetative endocarditis, infective endocarditis, nonbacterial thrombotic endocarditis, endocarditis of systemic lupus erythematosus, and carcinoid Heart Disease), etiology of major heart valve diseases, morphology of valvular diseases, rheumatic heart diseases (morphologic findings' differentiation between acute rheumatic heart disease, and chronic rheumatic heart disease, clinical course, term verrucae, Aschoff body, and components of the Aschoff body), infective endocarditis (pathogenesis, major etiologic organisms, clinical course, laboratory diagnosis, and complications), myocardial diseases: cardiomyopathy –types, etiology, histological features, clinical features (dilated cardiomyopathy, hypertrophic cardiomyopathy, and restrictive cardiomyopathy), myocarditis – etiologic agents, clinical features and complications, pericarditis: types and causes (acute pericarditis: serous pericarditis, fibrinous and serofibrinous pericarditis, purulent/ suppurative pericarditis, hemorrhagic pericarditis, and caseous pericarditis, healed pericarditis: constrictive pericarditis, pericardial effusion, cardiac tamponade), clinical features, tumors of the heart: primary (common primary tumors and myxoma – commonest site, clinical features and histological characteristics), metastatic, and know the spectrum of effects on the heart and pericardium, and congenital anomalies of the heart: review the embryology of heart, basic types of congenital diseases, pathophysiology of shunts (right to left – genesis of early cyanosis: tetralogy of Fallot – four associated morphologic findings, transposition of great arteries, truncus arteriosus, tricuspid atresia, and total anomalous pulmonary venous connection, left to right – genesis of late cyanosis: atrial septal defect, ventricular septal defect, patent ductus arteriosus, and atrioventricular septal defect), and obstruction (coarctation of aorta, pulmonary stenosis or atresia with intact ventricular septum, and aortic stenosis and atresia));

**DISEASES OF THE RESPIRATORY SYSTEM** (acinar unit of lung, the pulmonary lobule, normal histology of alveolus and structure of alveolar wall, congenital anomalies: pulmonary sequestration – intralobar / extralobar, atelectasis: types,

features, and causes, pulmonary edema: causes, pathophysiology, and morphological and histological features, adult respiratory distress syndrome and the microscopic pathology equivalent for the clinical disorder of ARDS, pulmonary thromboembolism - the sources of thromboemboli and clinical sequelae, clinical physical findings and symptomatology, factors that may precipitate pulmonary infarction; factors that promote thromboembolism, gross and microscopic characteristics of pulmonary infarction, causes of pulmonary hypertension and manifestations of primary pulmonary hypertension, major obstructive pulmonary diseases and understand the two basic causes: intrinsic disease of the airway and loss of elastic recoil, some restrictive pulmonary disorders and understand the two major categories: chest wall disorders and acute or chronic interstitial or infiltrative diseases, emphysema, centrilobular emphysema, panlobular emphysema: protease-antiprotease theory for genesis of emphysema, alpha-1 antitrypsin bodies and in which organ are they found, predominant normal phenotype for the pair of codominant alleles at the Pi Locus, and clinical consequences of homozygosity for ZZ phenotype, pathophysiologic mechanisms which account for the clinical polar types of obstructive disease i.e. the blue bloater and the pink puffer, chronic bronchitis: Reid index and what constitutes a normal index and an index diagnostic of chronic bronchitis, features of respiratory bronchiolitis, asthma and understand its clinical manifestations, including: sputum findings, status asthmaticus, two types of asthma, extrinsic and mechanism of pathogenesis, intrinsic and precipitating factors, and characteristic histologic triad seen in the airways of patients during an asthmatic attack, bronchiectasis: clinical features, its causes, Kartagener's syndrome, morphologic types of bronchiectasis, and possible sequelae, pneumonic alveolar consolidation (pneumonia): two major patterns of pneumonia, differences in etiologic agents, and manner of clinical presentation, classic stages of lobar pneumonia, possible sequelae of lobar pneumonia, and organizing pneumonia, agents that may give rise to primary atypical pneumonia, histologic pattern of this type of pneumonia, causes of lung abscess and etiologic agents. What are the possible sequelae, clinical characteristics of restrictive lung disease, concept of alveolitis as an antecedent to interstitial lung disease, pneumoconiosis and know: importance of particle size, clinicopathologic patterns of coal workers pneumoconiosis (simple anthracosis differ, progressive massive fibrosis or complicated pneumoconiosis, and Caplan's syndrome and lesion), clinicopathologic patterns of silicosis ( factors that may be operative in the eventual induction of fibrosis, how does acute silicoproteinosis differ from classic nodular silicosis, and what disease is at increase risk in silicosis), asbestos minerals(disorders linked to asbestosis exposure, how does the fibrosis of asbestosis differ from silicosis, ferruginous body, fibrous pleural plaques and malignant mesothelioma, and risk for lung carcinoma in the sitting of asbestosis and the multiplicative effect of concomitant cigarette smoking), which disorder resembles chronic berylliosis pathologically, and sarcoidosis (diagnosis of exclusion, clinicopathologic features of sarcoidosis including uveoparotid fever, elevated ACE level, and why tuberculin anergy is common in sarcoidosis), synonyms for idiopathic pulmonary fibrosis: many cases are cryptogenic and that some cases are associated with connective tissue disease and characteristic histologic pattern and clinical evolution, agents that are causal in hypersensitivity pneumonitis: examples of this disorder and clinical features

– acute and chronic form, byssinosis producing an asthmatic-like clinical state in textile workers, major PIE syndromes (pulmonary infiltrates with eosinophilia), etiologic agents, clinicopathologic features of eosinophilic granuloma of lung, Langerhan's cell and Birbeck granule, three disorders which may give rise to a pulmonary hemorrhage syndrome: Goodpasture's syndrome (pulmonary and renal manifestations and findings on direct immunofluorescence and the meaning of the findings), idiopathic pulmonary hemosiderosis (similarities and differences with Goodpasture's syndrome), and Wegener's granulomatosis (classic clinical triad of findings, pathologic findings, and ANCA's including C-ANCA and P-ANCA), clinicopathologic features of pulmonary alveolar proteinosis: in what clinical setting might it occur and opportunistic infections at risk, following regarding carcinoma of the lung: etiologic factors including the role of cigarette smoking, industrial risk factors, scarring of the lung, and genetic factors, four major categories of lung carcinoma, their relative incidence, clinicopathologic features, and behavioral features, pancoast tumor, Horner's syndrome, superior vena caval syndrome, endocrine paraneoplastic syndromes (name a few), middle lobe syndrome, hypertrophic pulmonary osteoarthropathy, APUD cells and the features identifying these cells ultrastructurally, TNM staging System for lung carcinoma, the stages that are not considered operable in non-small cell carcinoma, features of bronchioloalveolar carcinoma, and clinicopathologic features of bronchial carcinoid tumor, and disorders that involve the pleura: hydrothorax, Meig's syndrome, empyema, hemothorax and sanguineous effusion and the differences between them, chylothorax, tension pneumothorax, interstitial emphysema, solitary fibrous tumor, malignant mesothelioma, and Bleb); DISEASES OF THE HEAD AND NECK (oral cavity: cheilitis, gingivitis, glossitis and stomatitis and supporting structures of the oral cavity that can give rise to benign or malignant tumors, salivary glands: local and systemic diseases that can affect the salivary glands and common salivary gland tumors, characterization of disorders of the upper respiratory tract: vocal cord polyp (vocal nodule), multiple juvenile papillomatosis, nasopharyngeal carcinoma, and laryngeal squamous cell carcinoma, definitions: antero-superior, middle, and posterior mediastinal compartments and identifying disorders that show preferential involvement in each compartment, neurenteric cyst: the mediastinal compartment that does it tend to involve and the associated vertebral abnormalities (hemivertebra and butterfly vertebra), thymoma, malignant thymoma, and thymic carcinoma: the finding in the thymus that is most commonly found in association with myasthenia gravis, putative mechanism for myasthenia gravis which makes myoid cells in the thymus, thymoma is found in what percent of patients with myasthenia, and Eaton-Lambert syndrome); DISEASES OF THE GI TRACT (esophagus: atresia, stenosis, achalasia, diverticula, rings and webs, hiatal hernia and esophageal varices, reflex esophagitis in terms of its clinical significance, symptoms, histologic changes and possible consequences, and esophageal carcinoma in terms of etiology, clinical presentation, prognosis as well as gross and microscopic appearances, stomach: pyloric stenosis in terms of incidence, pathogenesis, risk factors and anatomic features, acute and chronic gastritis and understand the role of *Helicobacter pylori* in gastrointestinal disease, peptic ulcer disease, discuss locations, gross and microscopic appearances and complications, and gross and microscopic features of gastric carcinoma, its



clinical setting, prognosis and associations, small and large intestine: clinical effects and pathologic consequences of infectious enterocolitis (viral, bacterial, parasitic and fungal), cause of celiac disease, describe its gross and morphologic appearance and its comparison with tropical sprue, clinical setting and morphology of ischemic bowel disease. Have a clear understanding about the differences between transmural intestinal infarct and mucosal infarcts, comparison and contrast of the clinical setting, gross and microscopic appearance of ulcerative colitis and Crohn's disease, clinical and pathological features and associations of acute appendicitis and list the complications, volvulus/intussusception/hernias and give its common cause and complications, diverticular disease, its clinical presentation, pathologic features and complications, Hirschsprung's disease, its clinical manifestations, gross and microscopic pathology, juvenile polyp, hyperplastic polyp, tubular adenoma, and villous adenoma, familial polyposis syndromes and their significance, adenocarcinoma of the intestine including most common location, gross pattern, histology, clinical presentation, biological behavior and staging, carcinoid tumors of the bowel, the nature, the location, morphology and relation to the carcinoid syndrome, lymphomas of the GI tract including distribution and cell type, and smooth muscle tumors of the intestine); **DISEASES OF THE LIVER AND PANCREAS** (different types, patterns and degrees of liver injury, clinical and laboratory effects of liver failure, portal hypertension: consequences of portal hypertension, spectrum of biliary atresia and its relationship to neonatal hepatitis, natural histories of alcoholic, viral and autoimmune injury to the liver, chronic hepatitis and classify it based on etiology, acute hepatitis and classify it based on etiology, mode of inheritance and clinical, laboratory and pathologic features of Wilson's Disease, cirrhosis, state its cause, describe its gross and microscopic features and give its clinical and laboratory sequelae, similarities and difference between primary biliary cirrhosis and primary sclerosing cholangitis, effects of alpha-1-antitrypsin deficiency in the liver, primary hemochromatosis and contrast it with secondary hemochromatosis (hemosiderosis), drug induced liver disease, major types of primary liver tumors and be familiar with their etiology and pathogenesis, clinical and pathologic features of cholecystitis, cholelithiasis and the consequences, carcinoma of the gallbladder, its relationship to cholelithiasis, gender differences and prognosis, and pancreas: pathophysiology of diabetes mellitus, classification, pathogenesis, complications, clinical correlations, clinical syndromes associated with islet cell tumors, comparison of the clinical features of acute pancreatitis with carcinoma of the pancreas, and enzymatic and morphologic alterations which occur in acute pancreatitis); **DISEASES OF THE RENAL SYSTEM** (review of normal anatomy and histology of the kidneys, introduction to terminology related to Congenital renal anomalies, various renal cystic diseases, differentiations between the nephrotic and the nephritic syndrome, glomerular lesion seen with circulating immune complex nephritis, glomerular lesions seen with anti-basement membrane nephritis, differences between lipoid nephrosis (minimal change disease) and membranous glomerulonephritis with emphasis on: etiology, clinical course and prognosis, and size and location of immune-complex deposits, acute tubular necrosis, comparison of diffuse cortical necrosis with acute tubular necrosis, hypertension in terms of the levels of systolic and diastolic pressure levels in adults, causes of hypertension and name the most

common cause, artery stenosis and its associated features, severe conditions that may result from long term hypertension, schematic outline of the rennin-angiotensin system as it pertains to hypertension, compare the renal alterations in benign hypertension with those of malignant hypertension, pathogenesis of acute pyelonephritis with emphasis on: etiologic agents, routes of bacterial spread, factors predisposing to infection, and prognosis, analgesic abuse nephropathy: features, clinical course, and microscopic changes, urolithiasis: types of renal stones, causes of urolithiasis, clinical features, and causes of hydronephrosis, the most common type of carcinoma of the kidney, clinical findings that are characteristic of renal cell carcinoma, the most common cell type of carcinoma of the ureter, urethra, or urinary bladder, and Wilm's tumor: features, staging, and management); DISEASES OF THE LOWER URINARY TRACT (congenital anomalies of the ureter, inflammation of the urinary bladder, malakoplakia, urinary bladder neoplasms: transitional cell tumors – grades & morphology, other rarer types, etiology and factors implicated in the genesis of transitional cell tumors, clinical course, diagnosis, and prognosis, urinary tract outlet obstruction, inflammation, and tumors of the urethra: benign and malignant); DISEASES OF THE MALE GENITAL TRACT (penis: congenital anomalies (hypospadias and epispadias and phimosis), inflammations (specific infections: syphilis, gonorrhea, chancroid, granuloma inguinale, lymphopathia venereum, and genital herpes and nonspecific infections: balanoposthitis), and tumors (benign tumors: condyloma acuminatum and carcinoma in situ (Bowen's disease, erythroplasia of queyrat, and Bowenoid papulosis) and carcinoma of the penis), testis and epididymis: congenital anomalies (cryptorchidism), regressive changes, atrophy, inflammations (non-specific epididymitis and orchitis, granulomatous (autoimmune) orchitis, and specific inflammations), vascular disturbances, torsion, testicular tumors (germ cell tumors, sex cord-stromal tumors, and testicular lymphoma), and prostate: inflammation, benign prostatic hyperplasia, and carcinoma (histological features, clinical course, staging, treatment, and prognosis)); DISEASES OF THE FEMALE GENITAL TRACT (normal: embryology, anatomy, and endometrial histology and menstrual cycle, female genital infections: specific and non-specific, vulva: bartholin's cyst, vestibular adenitis, vulvar dystrophy, and tumors, vagina: congenital anomalies and tumors (benign and malignant: adenocarcinoma- the role of DES therapy and sarcoma botryoides), cervix: inflammation (nabothian cysts) and state the major features of carcinoma of the cervix (epidemiology, major screening test, relationship to human papilloma viruses, risk factors, and staging – CIN I, II, III), body of uterus and endometrium: dysfunctional uterine bleed – understand the pathophysiology, adenomyosis – characteristic features, endometriosis (areas of occurrence, theories of genesis, clinical features, and gross and microscopic features), endometrial hyperplasia, and endometrial Carcinoma, fallopian tubes: inflammation (acute salpingitis and chronic salpingitis) and ectopic pregnancy, ovaries, state the usual manifestations of ovarian diseases, cystic ovarian diseases, ovarian tumors: surface coelomic epithelium derived tumors (clear cell carcinoma, serous tumors, mucinous tumors, endometrioid tumor, brenner tumor, and undifferentiated), sex-cord-stromal cell derived tumors (granulosa-theca cell tumors, thecoma-fibromas, sertoli-leydig cell tumors (androblastomas), sex cord tumor with annular tubules, steroid (lipid) cell tumors, stromal luteomas, and hilum cell tumors), and germ cell

derived ovarian tumors (teratoma (cystic and immature), dysgerminoma, yolk sac tumor, embryonal cell carcinoma, and choriocarcinoma), and gestational and placental disorders: spontaneous abortion, multiple gestation, gestational trophoblastic diseases (hydatidiform mole and invasive moles), placenta accrete, placenta previa, and abruptio placentae); DISEASES OF THE BREAST (normal anatomy and histology reviewed, congenital anomalies and the terminology used, inflammation – mastitis, mammary duct ectasia, fibrocystic disease, and tumors of the breast: fibroadenoma, phyllodes tumor, intraductal papilloma, and carcinoma (incidence, clinical features, histological characteristics, and paget's disease of the nipple)); DISEASES OF THE SKIN (inflammatory lesions (the clinical setting, appearance and course) and the microscopic appearance: psoriasis, pemphigus, pemphigoid, erythema multiforme, systemic lupus, leukocytoclastic vasculitis, urticaria and angioedema, and allergic contact dermatitis, the causes of the majority of: nevus, melanomas, verrucae, actinic keratoses, and squamous cell carcinomas arising in the skin, clinical and microscopic appearance of a melanocytic nevus including the lentigo, junctional nevus, compound nevus and dermal nevus, common appearance characteristics that differ from that of a melanoma, clinical appearance of a melanoma and histologic and prognostic difference between radial growth phase, levels of invasion I and II, and vertical growth phase, levels of invasion III and IV, clinical appearance of verrucae, or warts, and the major causative agent, typical clinical appearance of seborrheic keratosis and its most common clinical setting, typical clinical appearance of actinic keratosis, and its causative agents as well as its association with squamous cell carcinoma of the skin, common clinical appearance of squamous cell carcinoma and its relation to actinic keratosis and its common clinical course, and listed keywords); DISEASES OF THE ENDOCRINE SYSTEM (contrast of acromegaly with gigantism, major features of hypothyroidism: etiology and clinical signs and symptoms of cretinism and myxedema, major causes of thyrotoxicosis, major signs and symptoms of Graves' disease, etiology of endemic goiter, most common form of thyroiditis and identify its cause, most common type of thyroid carcinoma, a well-established carcinogenic factor for thyroid cancer, major features of hyperparathyroidism: etiology, primary versus secondary, clinical features, laboratory findings, and oral manifestations, major features of hypoparathyroidism, several causes and the major clinical features of cushing's syndrome, several causes and major clinical features of Addison's disease, major features of pheochromocytomas: tissue of origin and sequelae, most common anatomic sites and tissue of origin of neuroblastomas, and major features of multiple endocrine neoplasia (MEN) syndrome IIb: oral manifestations); DISEASES OF THE MUSCULOSKELETAL SYSTEM (major features of osteoporosis: definition, epidemiology, and etiologic associations, major features of rickets and osteomalacia: etiology, major features of osteitis fibrosis cystica, eponym, oral manifestations, and compare to renal osteodystrophy, major features of osteomyelitis: types, etiology, and role of sequestrum, major features of osteitis deformans: eponym, clinical, radiographic, and laboratory features, malignant potential, and oral manifestations, major features of fibrous dysplasia of bone: eponyms and types, distinguish between monostotic and polyostotic types, clinical features, and oral manifestations, major features of giant cell tumors of bone: radiographic appearance and relationship to

other giant cell lesions, major features of osteo-, chondro-, and Ewing's sarcoma: epidemiology, clinical features (age of patients, anatomic sites, symptoms), and metastatic potential, major features of osteoarthritis: epidemiology, etiology, distinguish from rheumatoid arthritis, and clinical course, bursitis, muscular dystrophy, major features of myasthenia gravis: definition, pathogenesis, clinical signs and symptoms, and oral manifestations, major features of trichinosis: major vector and tissues affected, soft tissue tumors: lipoma – liposarcoma, fibroma – fibrosarcoma, rhabdomyoma – rhabdomyosarcoma, and leiomyoma – leiomyosarcoma); DISEASES OF THE NERVOUS SYSTEM (hydrocephalus, major features of meningitis: types, most common cause, and clinical signs and symptoms, three routes by which microorganisms can develop a cerebral abscess, major features of viral encephalitis: viral etiologic and in rabies, major features of cerebrovascular disease: general etiologic categories, clinical signs and symptoms, sequelae, and location of the berry aneurysm, major types of traumatic injuries to the brain, the most frequent type of primary tumor of the central nervous system, major features of Alzheimer's disease, major features of Parkinsonism, major pathologic feature of multiple sclerosis, vitamin deficiencies which affect the central nervous system, peripheral nerve tumors, Landry-Guillain-Barry Syndrome (Acute Idiopathic Polyneuropathy), and major features of Motor Neuron Disease (amyotrophic Lateral Sclerosis)). **(Lecture/Lab hrs: 195 & Credits: 13)**

## **12.2 Pharmacology (IUSOM—BO—MD—04—02)**

Pharmacology course required during the fourth semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—04—02) is cited below **(Lecture/Lab hrs: 195 & Credits: 13)**:

### **12.2.1 Purpose**

The purpose of this Pharmacology course is to provide the student with the necessary knowledge essential to understanding and appreciating drugs, their uses and effects on the human body.

### **12.2.2 Goal**

The course goal is to provide students, through Lecture Presentations, a solid foundation in the basic and applied pharmacology relevant to the general practice of high quality medicine.

### **12.2.3 Objectives**

The Objectives of this Pharmacology course are that upon completion of this course, medical students should be able to: 1. Understand the mechanism of action, site of action, routes of administration of drug, effects, adverse effects, drug interactions, metabolism and excretion of drug. 2. Have understanding that what body does to the drug and what drug does to the body. 3. Understand how & why to select particular drug in given case. 4. Have adequate knowledge of non-pharmacological line of management. 5. Be aware of recent advances in the therapeutics.

### **12.2.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Medical Biochemistry, Human Physiology, Anatomy, Histology, Molecular Cell Biology, and General Pathology attended in the previous semesters of M.D. program are prerequisites.

### **12.2.5 Format**

The course materials in the form of lectures/discussions shall be presented and tested in a traditional format using modern audiovisual equipments, like LCD projectors, MS PowerPoint presentations, and overhead transparencies. Additionally, students will be provided with the opportunity to participate in group discussions, journal reports and case presentations.

### **12.2.6 Pharmacology Textbooks**

The following textbooks and support materials are required / recommended for this Pharmacology course:

#### Required:

1. LIPPINCOOT'S ILLUSTRATED REVIEWS: PHARMACOLOGY (2009) by Richard A. Harvey (Editor) and Pamela C. Champe (Editor), Publishers: Lippincott Williams & Wilkins, 4<sup>th</sup> Edition, ISBN-10: 0781771552 or ISBN-13: 978-0781771559.

#### Recommended:

2. KATZUNG AND TREVOR'S PHARMACOLOGY: EXAMINATION AND BOARD REVIEW (2010) by Anthony J. Trevor, Bertram G. Katzung, and Susan B. Masters, PublisherS: McGraw-Hill Medical, 9<sup>th</sup> Edition, ISBN-10: 0071701559 or ISBN-13: 978-0071701556.
3. BASIC AND CLINICAL PHARMACOLOGY (LANGE BASIC SCIENCE) (2009) by Bertram G. Katzung, Susan B.Masters, and Anthony J. Trevor, Publishers: McGraw-Hill Medical, 11<sup>th</sup> Edition, ISBN-10: 0071604057 or ISBN-13: 978-0071604055.
4. CLINICAL PHARMACOLOGY MADE RIDICULOUSLY SIMPLE (2010) by James Olson, Publishers: MedMaster, 4<sup>th</sup> Edition, ISBN-10: 1935660004 or ISBN-13: 978-1935660002.

### **12.2.7 Description of the Pharmacology Course Contents**

The subject matter to be covered in the Pharmacology course (IUSOM—BO—MD—04—02) is as follows:

GENERAL PHARMACOLOGY (routes of drug administration: drug transport across membranes (advantages, disadvantages, and selection of particular routes), drug absorption: factors affecting drug absorption (effect of P<sup>H</sup> of medium on absorption), food-drug interactions, drug-drug interactions, and clinical relevance, drug distribution: volume of distribution, plasma protein binding, barriers, effect of volume of distribution and plasma protein binding on drug action, importance of barriers, and congenital birth defects, drug metabolism: biotransformation reactions, microsomal and non-microsomal enzyme systems, enzyme induction and inhibition, metabolism

in neonates and elderly, and toxicities/ sub therapeutic levels because of enzyme inhibition or induction: importance of  $P^H$  in overdose toxicities, drug excretion: various ways of excretion of drug, advantage and disadvantage, and  $P^H$  of urine, excretion: adverse effects because of excretion by particular route, pharmacokinetics: expressions for volume of distribution, dosage calculation, loading dose, maintenance dose, steady-state concentration, half-life of a drug, drug clearance, percentage protonation, first-order and zero-order kinetics, half life of a drug, dose calculation, examples of first-order and zero-order kinetics, and duration of drug action, and pharmacodynamics: receptors, types of receptors, secondary messenger system, types of antagonisms, agonists, antagonists, efficacy, potency, dose-response curves, drug interactions, drug tolerance, and withdrawal); AUTONOMIC NERVOUS SYSTEM (divisions of autonomic nervous system, acetylcholine and norepinephrine: pathways for their synthesis, release and degradation, muscarinic, nicotinic, alpha & beta receptors and their effects on second messenger, and organs innervated by ANS and responses to stimulation, examples of cholinergic agonists: classification (direct and indirect: inhibition of AChE), mechanism of action, effects, important uses and adverse effects, examples of cholinergic antagonists: mechanism of action, effects, important uses and adverse effects, ganglion-blockers: mechanism of action, effects, important uses & adverse effect, clinical importance: drugs acting at various steps, glaucoma, paralytic ileus, antidotes for poisoning, urinary retention, myasthenia gravis, organophosphate poisoning and management, Alzheimer's disease, management of organophosphorus poisoning, bronchial asthma, motion sickness, and Parkinson's disease, mydriasis adrenergic agonists: drugs having selective and non-selective action, the sites of action, routes of administration, effects, mechanism of action, uses, and important adverse effects, and dopamine receptor agonists, clinical importance: treatment of cardiogenic shock, anaphylactic shock, nasal decongestant, bronchial asthma, bedwetting, hypertension, local anesthesia, and ophthalmologic examination, adrenergic blockers: classification (selective & nonselective), receptors and second messengers: the sites of action, routes of administration, effects, mechanism of action, uses, important adverse effects, and clinical importance: hypertension, pheochromocytoma, raynaud's disease, prostatic hypertrophy, angina, cardiac arrhythmias, glaucoma, migraine, and familial tremor); CENTRAL NERVOUS SYSTEM (CNS) (introduction to CNS: excitatory and inhibitory neurotransmitters of the CNS, the ways through which neurotransmitters act, role of blood-brain barrier, and neurotransmitters that affect ion channel, anesthetics: examples of local anesthetics and their mechanism of action, metabolism, uses and important adverse effects, clinical uses of local anesthetics, importance of  $P^K$  of local anesthetic, and pre-anesthetic medication, clinical correlation: local anesthetic and epinephrine, stages of anesthesia: minimum alveolar concentration, factors affecting induction / duration of anesthesia, blood gas partition coefficient, and advantage of one anesthetic agent over the other, clinical correlation: assessment of patient before anesthesia, clinical conditions where anesthetic agents are required, anesthetics in specific conditions like during labour, children, malignant hyperthermia and its treatment, succinylcholine apnea, neuroleptic anesthesia, and dissociate anesthesia, skeletal muscle relaxants: classification (central & peripheral acting), depolarizing and non-depolarizing, clinical correlation: insomnia, anxiety relief, pre-anesthetic

agent, anterograde amnesia, overdose poisoning and management, mechanism of action, effects, important uses and adverse effects, sedative and hypnotics: patterns of sleep, and difference between sedative and hypnotic, anxiolytic agent: the sites of action, routes of administration, effects, mechanism of action, metabolism, uses, and important adverse effects, drug interactions, tolerance, dependence and withdrawal, alcohol: absorption, distribution, metabolism, effects, drug interactions of ethanol, dependence on ethanol, withdrawal syndrome, enzyme inhibition / induction, important adverse effects, methanol and ethylene glycol poisoning and treatment, and alcoholism, clinical correlation: alcohol de-addiction, treatment of alcohol overdoses, and fetal alcohol syndrome, antiepileptic drugs in children and during pregnancy and Fetal hydantoin syndrome, Parkinson's disease: clinical presentation, pathology, drugs used in treatment of Parkinson's disease, mechanism of action, effects, important side-effects, drug interactions, contra-indications, limitations of therapy, new drugs in Parkinson's disease, and drugs for the treatment of other movement disorders, antipsychotic drugs: pathophysiology of schizophrenia, receptors on which Antipsychotic drugs act, effects, important side-effects of anti-psychotic drugs, treatment of bipolar disorders, and important drug interactions, clinical correlation: clinical problems on long term therapy and patient compliance, antidepressant drugs: types of depression, pathology in depression, classification of antidepressant drugs, advantage of one class over the other, mechanism of action, important side effects, uses and drug interactions, serotonin syndrome, and electroconvulsive therapy, opioid analgesics: opioid receptors, endogenous opioid peptides, opioid agonists-full, partial and mixed action, effects, toxicities, dependence, withdrawal, and uses of opioid analgesics, clinical correlation: treatment of opioid withdrawal, treatment of opioid addiction, opioids in treatment of diarrhea, and opioids as antitussives, and drug abuse: major drugs of abuse, routes of administration, and effects, withdrawal and management); **CARDIOVASCULAR SYSTEM** (drugs used in treatment of hypertension: neuronal-hormonal mechanism of blood pressure control and therapeutic goal in treatment of hypertension, classification of antihypertensive drugs: sympathomimetics, drugs that act on the ganglion, drugs acting on the postganglionic neuron, adrenergic blockers, vasodilators, calcium channel blockers, ACE inhibitors, diuretics, the sites of action, routes of administration, effects, mechanism of action, metabolism, uses, important adverse effects, and drug interactions, clinical correlation: types of hypertension, non-pharmacological line of treatment, hypertension during pregnancy, and treatment of emergency hypertension, anticoagulants, antiplatelet and fibrinolytic drugs: steps in clotting cascade, the cofactors required for each step, mechanism of clot lysis, drugs used as anticoagulants, antiplatelets and for lysis of clot, routes of administration, effects, mechanism of action, metabolism, uses, important adverse effects, and drug interactions, clinical correlation: myocardial infarction, antiplatelet and fibrinolytic drugs: steps in clotting cascade, the cofactors required for each step, mech angina: types of angina, routes of administration, effects, mechanism of action, metabolism, uses, important adverse effects, and drug interactions, mechanism of clot lysis, drugs used as anticoagulants, antiplatelets and for lysis of clot, routes of administration, effects, mechanism of action, metabolism, uses, important adverse effects, and drug interactions, clinical correlation: myocardial infarction, cardiac

arrhythmias: physiology of cardiac contraction, correlation with ECG, classification of antiarrhythmic drugs, routes of administration, effects, mechanism of action, metabolism, uses, important adverse effects, and drug interactions, clinical correlation: causes of arrhythmias, diuretics: classification of diuretic drugs, routes of administration, mechanism of action, uses, important adverse effects, drug interactions, electrolyte imbalance, and metabolic acidosis and alkalosis, clinical correlation: cardiovascular and other indications of diuretic therapy, vasoactive peptides: substances acting as vasoactive peptides, location, properties and actions of vasoactive peptides, nitric oxide: synthesis in the body, substances involved in the synthesis, stimulus for synthesis, various forms of nitric oxide, effects in the body, approved indications, and indications under research anemias: microcytic and macrocytic anemias, colony stimulating factors, and sickle cell anemia, clinical correlation: clinical presentation in various types anemia, and vitamins: uses and overdose toxicity); AUTOCOIDS (role of autocooids as local hormones, synthesis of histamine, serotonin in the body, actions of autocooids, agonist and antagonist drugs, and clinical uses, clinical correlation: allergy, hay fever motion sickness, and causes of vomiting and treatment); RESPIRATORY SYSTEM (treatment of asthma: pathophysiology of asthma, various types bronchodilator drugs used in treatment and mechanism of action of drugs, glucocorticoids in asthma, prophylactic treatment of asthma, routes of administration, effects, mechanism of action, uses, important adverse effects, drug interactions, newer drugs affecting leukotrine synthesis and blocking leukotrine receptors, and treatment of status asthmaticus, clinical correlation: clinical features, aggravating factors, and childhood asthma, antitussives and mucolytic agents: mechanism of action and uses, and clinical correlation: causes and treatment of cough); NONSTEROIDAL ANTI-INFLAMMATORY AGENTS (NSAIDS) (synthesis of prostaglandins and other mediators of inflammation, pain pathway, and aspirin & other NSAIDS: effects, mechanism of action, metabolism, uses, important adverse effects, and drug interactions, newer selective drugs, and advantage of newer agents over old drugs, clinical correlation: various conditions requiring NSAIDS & their selection); TREATMENT OF RHEUMATOID ARTHRITIS (pathology in rheumatoid arthritis, clinical presentation of the patient, use of NSAIDS, when to start steroids, role of disease modifying agents, gold salts, and immuno-potentiating drugs: effects, mechanism of action, uses, important adverse effects, and drug interactions); TREATMENT OF GOUT (synthesis and metabolism of uric acid in body, tophi formation, clinical presentation in gout, drugs useful in acute gouty attack, drugs increasing excretion of uric acid, drugs decreasing formation of uric acid, effects, mechanism of action, uses, important adverse effects, drug interactions, and drugs useful in specific conditions like renal insufficiency); DRUGS HAVING ACTION ON GASTROINTESTINAL TRACT (drugs useful in peptic ulcer: physiology of acid secretion, receptors involved in acid secretion, drugs blocking cholinergic receptors, drugs blocking H<sub>2</sub> receptors, proton pump inhibitors, acid neutralizing agents, mucosal protecting agents, H. pylori eradication, effects, mechanism of action, uses, important adverse effects, and drug interactions, clinical correlation: causes & clinical presentation, in peptic ulcer, and laxatives: agents used as laxatives, effects, mechanism of action, uses, important adverse effects, and drug interactions, clinical correlation: causes and treatment relevant to cause,



gastroesophageal reflux, antiemetic drugs: physiology of vomiting, antiemetic agents, effects, mechanism of action, uses, important adverse effects, and drug interactions, clinical correlation: causes and treatment relevant to cause, antidiarrhoeal drugs: agents used as laxatives, effects, mechanism of action, uses, important adverse effects, and drug interactions, clinical correlation: causes and treatment relevant to cause); ANTIBIOTICS (antibacterial drugs: differences between bacterial and human cell –the cell wall, protein synthesis, metabolism, DNA synthesis, mechanism of bacterial resistance, and advantage of combination therapy, agents inhibiting cell wall synthesis, agents inhibiting bacterial protein synthesis, agents inhibiting bacterial metabolism, agents inhibiting DNA gyrase, mechanism of action, uses, important adverse effects, and drug interaction, clinical importance: antibacterial spectrum and drugs of choice in particular condition, antifungal agents: differences between fungal and mammalian cell, antifungal agents for topical & systemic use, newer antifungal agents, mechanism of action, metabolism, uses, Important adverse effects, and drug interactions, clinical importance: clinically important fungal infections and presentation, antimalarial drugs: life cycle of malarial parasites, agents acting on erythrocytic phase of malarial parasite, drugs useful in resistant malaria, agents preventing relapse, drugs useful as prophylactic therapy for travelers, mechanism of action, metabolism, uses, Important adverse effects, and drug interactions, clinical importance: clinical presentation in malaria and laboratory diagnosis, antimalarial drugs: agents used to treat nematodes and trematodes, mechanism of action, metabolism, uses, important adverse effects, and drug interactions, clinical importance: clinical presentation and diagnosis, antiprotozoal drugs: agents used to treat luminal and systemic amoebic infections, agents used to treat giardiasis & trichomoniasis, gents used to treat trypanosomiasis, mechanism of action, metabolism, uses, and important adverse effects and drug interactions, clinical importance: modes of transmission, antiviral agents: agents inhibiting various stages of viral replication, mechanism of action, metabolism, uses, Important adverse effects, drug interactions, newer agents in treatment, combination therapy, clinical importance: influenza, herpes, and HIV infections, cancer chemotherapy: difficulties in treatment of neoplasm, cell cycle, palliative treatment, classification of anticancer drugs, mechanism of action, metabolism, uses, Important adverse effects, drug interactions, hormonal agents in treatment of cancer, and combination therapy, clinical importance: hodgkin's lymphoma, breast cancer, prostatic cancer, Burkitt's lymphoma, and squamous cell carcinoma); ENDOCRINOLOGY (androgens and estrogens: hormones involved in ovarian function, feedback mechanisms, natural estrogens, androgens, and their functions, synthetic estrogens, progesterone and androgen preparations, adverse effects and contraindications for therapy, oral contraceptives, and antagonists at estrogen, progesterone, and steroid receptors, clinical correlation: methods of contraception, preparations available, breast cancer, hirsutism, and anabolic steroids drugs acting on the uterus: uterine relaxants, drugs increasing uterine contraction, and drugs used in postpartum hemorrhage, clinical correlation: preterm labor and problems during labor, treatment of diabetes mellitus: types of diabetes mellitus, physiological role of insulin and its relationship to diabetes mellitus, types of insulin and their pharmacokinetic properties, problems associated with insulin therapy, oral hypoglycemic agents, mechanism of action, adverse effects,

and drug interactions with oral hypoglycemic agents, clinical correlation: role of diet in diabetes mellitus and clinical presentation and requirement of the specific therapy, drugs affecting calcium levels in body: agents used for treatment of hypercalcemia and agents used to treat hypocalcaemia, clinical correlation: tetany, postmenopausal requirement of calcium and osteoporosis, treatment of hypothyroidism and hyperthyroidism: the importance of thyroid hormone replacement preparations, mechanism of action of antithyroid drugs, and drugs used to treat hyper and hypothyroidism, clinical correlation: symptoms of hypo and hyperthyroidism, hyperthyroidism during pregnancy, and thyroid storm); and TOXICOLOGY (environmental factors causing health problems, relation to occupation, how to diagnose & treat the problem, long-term effects of major chemicals, toxic gases and heavy metals on health, and treatment of toxicity with heavy metals). (**Lecture/Lab hrs: 195 & Credits: 13**)

### **12.3 Medical Genetics (IUSOM—BO—MD—04—03)**

Medical Genetics course required during the fourth semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—04—03) is cited below (**Lecture/Lab hrs: 60 & Credits: 4**):

#### **12.3.1 Purpose**

The purpose of this course is to familiarize the medical students with the necessary knowledge essential to understanding and appreciating the molecular origins of human life. This Medical Genetics course endeavors to assist students in their understanding of human variability and heredity.

#### **12.3.2 Goal**

The course goal is to provide a solid foundation in the basic and applied Medical Genetics relevant to the general practice of high quality medicine.

#### **12.3.3 Objectives**

The objectives of this Medical Genetics course are that upon completion of this course, medical students should be able to: 1. Understand various concepts which serve as a foundation leading toward a greater understanding of the new and insightful methods of predicting, diagnosing and studying a diverse number of disease states, heredity, and human development. 2. Acquire understanding of the foundations of medical gene analysis and that of the tools required in medical practice. 3. Understand the studies of Darwin, Mendel, Watson & Crick, which are utilized as a basic foundation on which modern methods of molecular patterns of inheritance, DNA analysis, genetic pathology, immuno-pathology and genetic counseling are understood.

#### **12.3.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with General Pathology, Medical Microbiology, Medical Biochemistry, Physiology, Anatomy, Histology and Molecular Cell Biology attended in the previous semesters of M.D. program are prerequisites.

### 12.3.5 Format

A traditional lecture/discussion format will be used to present course materials with the support of MS PowerPoint slides and LCD projectors. Additionally, students will be provided with the opportunity to participate in regularly scheduled laboratory sessions designed to permit first hand experience in the field of Medical Genetics.

### 12.3.6 Medical Genetics Textbooks

The following textbooks and support materials are required / recommended for this Medical Genetics course:

Required:

1. THOMPSON AND THIOMPSON: GENETICS IN MEDICINE (2007) by Robert L. Nussbaum, Roderick R. McInnes, and Huntington F. Willard, Publishers: WB Saunders, 7<sup>th</sup> Edition, ISBN-10: 1416030808 or ISBN-13: 978-1416030805.

Recommended

2. PRINCIPLES OF GENETICS (2008) by D. Peter Snustad and Michael J. Simmons, Publishers: John Wiley and Sons, 5<sup>th</sup> Edition, ISBN-10: 0470388250 or ISBN-13: 978-0470388259.

### 12.3.7 Description of the Medical Genetics Course Contents

The subject matter to be covered in the Medical Genetics course (IUSOM—BO—MD—04—03) is as follows:

THE ROLE OF GENETICS IN MEDICINE (classification of genetic disorders); THE CHROMOSOMAL BASIS OF HEREDITY (the human chromosomes, the life cycle of the somatic cell, meiosis, and human gametogenesis and fertilization); THE HUMAN GENOME (DNA structure, the central dogma: DNA → RNA → protein, gene expression, human chromosomes, organization of the human genome, variation of gene expression); ANALYSIS OF INDIVIDUAL DNA AND RNA SEQUENCES (methods of nucleic acid analysis, the polymerase chain reaction, hybridization to chromosomes, DNA sequence analysis, and methods of protein analysis); GENETIC DISORDER OF CLASSICAL MENDELIAN INHERITANCE (autosomal recessive inheritance, patterns of autosomal dominant inheritance, X-linked inheritance, and patterns of pseudoautosomal inheritance); MOLECULAR BASIS OF MUTATIONS AND THEIR DETECTION (human genetic diversity, inherited variation and polymorphism in DNA, and use of polymorphism in medical genetics); GENETIC VARIATION IN POPULATIONS (phenotypes, genotypes, and Hardy-Weinberg law); CYTOGENETICS (chromosome abnormalities, parent-of-origin effects, studies of chromosomes in human meiosis, mendelian disorders with cytogenetic effects, and cytogenetic analysis in cancer); AUTOSOMAL DISORDERS (the sex chromosomes and their pathology, hemoglobinopathies, molecular pathology, and biochemical pathology); NEURODEGENERATIVE DISORDERS (pharmacogenetic disorders, the treatment of genetic disease, major histocompatibility complex, immunoglobulins, T-Cell antigen receptors, single-gene disorders of the immune system, genetics and cancer); and PRENATAL DIAGNOSIS (genetic counseling for

prenatal diagnosis, methods of prenatal diagnosis, and genetic counseling and risk). (**Lecture/Lab hrs: 60 & Credits: 4**)

## **12.4 Physical Diagnosis (IUSOM—BO—MD—04—04)**

Physical Diagnosis course required during the fourth semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—04—04) is cited below (**Lecture/Lab hrs: 150 & Credits: 10**):

### **12.4.1 Purpose**

The purpose of this course is to familiarize the medical students with the basic concepts, principles and skills that they must possess to prepare them for the clinical rotation, when they need to perform physical examination on their patients.

### **12.4.2 Goal**

The course goal is to provide students a solid foundation in fundamental Physical Diagnosis.

### **12.4.3 Objectives**

The major objective of this Physical Diagnosis course is to provide medical students with an overview of this field focusing four major areas, namely: 1. Physician-patient relationship. 2. Laboratory diagnosis. 3. Interpretation of lab data. 4. History and physical examination of the patients.

### **12.4.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with General Pathology, Medical Microbiology, Medical Biochemistry, Physiology, Anatomy, Histology and Molecular Cell Biology attended in the previous semesters of M.D. program are prerequisites.

### **12.4.5 Format**

A traditional lecture/discussion format will be used to present course materials making use of MS PowerPoint. Additionally, students will be provided with the opportunity to perform actual physical examination procedures, with themselves as patients.

### **12.4.6 Physical Diagnosis Textbooks**

The following textbooks and support materials are required / recommended for this Physical Diagnosis course:

#### Required:

1. BATE'S POCKET GUIDE TO PHYSICAL EXAMINATION AND HISTORY TAKING (2008) by Lynn S. Bickley, Publishers: Lippincott Williams & Wilkins, 10<sup>th</sup> Edition, ISBN-10: 0781780586 or ISBN-13: 978-0781780582.

#### Recommended:

2. **TEXTBOOK OF PHYSICAL DIAGNOSIS: HISTORY AND EXAMINATION** (2010) by Mark H. Swartz, Publishers: WB Saunders, 6<sup>th</sup> Edition, ISBN-10: 1416062033 or ISBN-13: 978-1416062035.
3. **CURRENT MEDICAL DIAGNOSIS AND TREATMENT** (2011) by Stephen J. McPhee (Editor), Maxine A. Papadakis (Editor), and Michael W. Robow (Associate Editor), Publishers: McGraw-Hill Medical, 50<sup>th</sup> Edition, ISBN-10: 0071700552 or ISBN-13: 978-0071700559.

#### **12.4.7 Description of the Physical Diagnosis Course Contents**

The subject matter to be covered in the Physical Diagnosis course (IUSOM—BO—MD—04—04) is as follows:

INTRODUCTION (introduction to hospital hierarchy and typical day on the wards, physician-patient relationship, introduction to the history and physical examination; writing a proper admission notes; charting and laboratory notes, and SOAP notes); LABORATORY DIAGNOSIS (approaching the x-rays and Introduction to EKG interpretation); GENERAL SURVEY; SKIN DISEASES; HEAD AND NECK DISEASES; THROAX LUNGS DISEASES; BREASTS AND AXILLA DISEASES; CARDIOVASCULAR SYSTEM DISEASES; HEMATOLOGY; ABDOMEN, MALE GENITALIA AND HERNIA DISEASES; FEMALE GENITALIA DISEASES; PREGNANT WOMAN DISEASES; ANUS, RECTUM, AND PROSTATE DISEASES; PERIPHERAL VASCULAR SYSTEM DISEASES; MUSCULOSKELETAL SYSTEM DISEASES; NERVOUS SYSTEM DISEASES; GASTROINTESTINAL DISEASES; RESPIRATORY DISEASES; REANAL DISEASES; RHEUMATOLOGICAL DISEASES; ENDOCRINE DISORDERS; PSYCHIATRY; NEUROLOGICAL DISEASES; ER AND TRAUMA PROTOCOL; INFECTIOUS DISEASES; ASSESSING CHILDREN: INFANCY THROUGH ADOLESCENCE; AND CLINICAL REASONING, ASSESSMENT, AND PLAN.  
(Lecture/Lab hrs: 150 & Credits: 10)

### **13. Courses for the Fifth Semester of M.D. DEGREE (IUSOM—BO—MD—05--00)**

At IUSOM, the courses required for the fifth semester of M.D. degree (IUSOM—BO—MD—05—00) are mentioned below in full details (**Total Lecture/Lab hrs: 600 & Total Credits: 40**).

#### **13.1 Introduction to Clinical Medicine (IUSOM—BO—MD—05—01)**

Introduction to Clinical Medicine course required during the fifth semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—05—01) is cited below (**Lecture/Lab hrs: 225 & Credits: 15**):

##### **13.1.1 Purpose**

The purpose of this Introduction to Clinical Medicine course, which is a lecture and skills practice course, is to assist the medical students relate the knowledge learned in basic sciences to future clinical practice.

##### **13.1.2 Goal**

To provide a comprehensive coverage of clinical medicine together with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

### **13.1.3 Objectives**

The objectives of this course are that upon its completion, a student should be able to:

1. Not only succeed for USMLE Step 1 but also undergo smooth transition into clinical medicine, for instance, in the United States.
2. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training in the United States.

### **13.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Biochemistry, Physiology, Anatomy, Histology, Molecular Cell Biology, General Pathology, Systemic Pathology, Pharmacology, Medical Genetics, and Physical Diagnosis attended in the previous semesters of M.D. program are prerequisites.

### **13.1.5 Format**

A traditional lecture/discussion format will be used to present course materials using MS PowerPoint slide presentation techniques. Additionally, Students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

### **13.1.6 Introduction to Clinical Medicine Textbooks**

The following textbooks and support materials are required / recommended for this Introduction to Clinical Medicine course:

#### Required:

1. HARRISON'S PRINCIPLES OF INTERNAL MEDICINE (2008) by Anthony S. Fauci (Editor), Eugene Braunwald (Editor), Dennis L. Kasper (Editor), Stephen L. Hauser (Editor), Dan L. Longo (Editor), J. Larry Jameson (Editor), and Joseph Loscalzo (Editor), Publishers: McGraw-Hill Professional, 17<sup>th</sup> Edition, ISBN-10: 0071466339 or ISBN-13: 978-0071466332.

#### Recommended:

2. CECIL: TEXTBOOK OF MEDICINE (2008) by Lee Goldman (Editor) and Dennis Ausiello (Editor), Publishers: W.B. Saunders, 23<sup>rd</sup> Edition, ISBN-10: 1416028056 or ISBN-13: 978-1416028055.

### **13.1.7 Description of the Introduction to Clinical Medicine Course Contents**

The subject matter to be covered in the Introduction to Clinical Medicine course (IUSOM—BO—MD—05—01) is as follows:

A lecture and skills practice course designed to help the student relate the knowledge learned in basic sciences to future clinical practice. Students study the clinical diagnosis and treatment of major systemic disease processes. Students are given supervised patient care assignments and attend local hospital rounds and clinics. They

are required to perform history and physical exams, write procedure notes and give oral presentations of patients and selected topics. Each student must present a complete discussion of an assigned topic using a poster presentation or lecture format using MS PowerPoint program. Students are given oral examinations in addition to written examination. Oral examinations are given on the same material covered in the written examination. Such examinations are divided among the faculty teaching the course and are rotated so that each student is examined by each professor over the course of the semester. In addition, under supervision of the Bonaire island physicians and IUSOM medical staff, medical students enrolled in Introduction to Clinical Medicine will be allowed to participate in the assessment and treatment of Antillean patients. One clinic will be established on IUSOM campus and staffed by the island government appointed physicians and IUSOM medical staff. The purpose of the clinic is to provide services to local citizens of Bonaire as well as provide a training facility for IUSOM students in their pre-clinical coursework. **(Lecture/Lab hrs: 225 & Credits: 15)**

### **13.2 Medical Board Review (IUSOM—BO—MD—05—02)**

Medical Board Review course required during the fifth semester of M.D. degree at IUSOM (Code: IUSOM—BO—MD—05—02) is cited below **(Lecture/Lab hrs: 375 & Credits: 25)**:

#### **13.2.1 Purpose**

The purpose of this Medical Board Review course is to provide the students with the essential key elements in each subject area of medicine.

#### **13.2.2 Goal**

The course goal is to prepare students, through Lecture and Audiovisual Presentations, for the USMLE examinations and / or for similar ones.

#### **13.2.3 Objectives**

The Objectives of this Pharmacology course are that upon completion of this course, medical students should be able to: 1. Succeed in the USMLE examinations and / or in similar ones. 2. Relate the knowledge learned in basic sciences to future clinical practice.

#### **13.2.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Biochemistry, Physiology, Anatomy, Histology, Molecular Cell Biology, General Pathology, Systemic Pathology, Pharmacology, Medical Genetics, and Physical Diagnosis attended in the previous semesters of M.D. program are prerequisites.

#### **13.2.5 Format**

The course materials in the form of lectures/discussions shall be presented and tested in a traditional format using modern audiovisual equipments, like LCD projectors, MS PowerPoint presentations, and overhead transparencies. Additionally, students

will be provided with the opportunity to participate in group discussions and journal.

### **13.2.6 Medical Board Review Textbooks**

The following textbooks and support materials are required / recommended for this Medical Board Review course:

Required:

1. KAPLAN MEDPASS ® PROGRAM

Recommended:

2. NORTHWESTERN MEDICAL REVIEW

### **13.2.7 Description of the Medical Board Review Course Contents**

The subject matter to be covered in the Medical Board Review course (IUSOM—BO—MD—05—02) is as follows:

IUSOM offers the Kaplan MedPass ® program as part of the medical board review course. Students are presented with the essential key elements in each subject area by experienced faculty, guest lectures, and problem based computer modules. In addition, students are given practice exams, previously used shelf boards, and structured curriculum review materials to enhance their test-taking skills.

**(Lecture/Lab hrs: 375 & Credits: 25)**

## **14. Clinical Science Program for the M.D. Degree**

Once students have successfully completed the Basic Medical Sciences program, they are eligible to enter the Clinical Science portion of their M.D. degree program. The Clinical Science (Clinical Rotation and/or Clinical Clerkship) curriculum is a joint program between IUSOM and its affiliated hospitals located in Dutch Caribbean (Formerly Netherlands Antilles), in United States of America (via a Branch Campus of IUSOM, namely, International University School of Medicine (IUSOM) – Michigan Clinical Campus at Ark Medical Center (AMC) and at AMC-Affiliated Hospitals), in Canada, in India (at MIOT Hospitals in Chennai, Tamil Nadu) and / or in The Netherlands.. In the clinical program, students spend in total 72 weeks rotating through the various medical subspecialties in selected teaching hospitals. Students will work directly with physicians, residents, and other hospital staff, conducting physical exams, assisting in surgical procedures, learning to take medical histories, delivering babies, attending workshops, analyzing labs data, and working with patients of all ages.

The 72-weeks Clinical Science program, to be completed during next six semesters, is divided into 48 weeks of "Core" or "required" Clinical hospital Rotations (cited in Sections 15-18) and 24 weeks of "Elective" hospital Rotations (cited in Sections 19-20). The Core, required Rotations include Internal Medicine, General Surgery, Obstetrics / Gynecology, Family Medical Practice, Pediatrics, and Psychiatry. Elective Rotations may be in any of the various 24 medical subspecialties of Elective Medicine (see Section 19) as well as in any of various 14 medical subspecialties of Elective Surgery (see Section 20), depending upon the student's future goals.



An overview of the Clinical part of this curriculum is documented in TABLE 1 described on pages 6 and 7.

## **15. Program for the Sixth Semester of M.D. Degree (IUSOM—BO—MD—06--00)**

At IUSOM, the Clinical Science (Clinical Rotation and/or Clinical Clerkship) curriculum as one of the requirements for the Core Clinical Rotations, to be completed in an IUSOM-Affiliate Hospital located in the USA, Canada, The Netherlands, or Netherlands Antilles, during the sixth semester of M.D. degree program (IUSOM—BO—MD—06—00), is cited below in full details (**Total Duration: 12 weeks**).

### **15.1 Internal Medicine Program (IUSOM—BO—MD—06—01)**

As a part of Core Clinical Rotations, the Internal Medicine program required during the sixth semester of M.D. degree (Code: IUSOM—BO—MD—06—01), to be followed at an IUSOM-Affiliate hospital, is cited below (**Duration: 12 weeks**):

#### **15.1.1 Purpose**

The purpose of this Internal Medicine program, which is a Core Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences to future clinical practice focusing internal medicine.

#### **15.1.2 Goal**

To provide a comprehensive hands-on patient experience covering Internal Medicine together with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

#### **15.1.3 Objectives**

The objectives of this Core Clinical Rotation are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into clinical medicine, for instance, in the United States. 3. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

#### **15.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites.

#### **15.1.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

### **15.1.6 Internal Medicine Textbooks**

The following textbooks and support materials are required / recommended for this Internal Medicine program:

#### Required:

1. ANDREOLI AND CARPENTER'S CECIL: ESSENTIALS OF MEDICINE (2010) by Thomas E. Andreoli (Editor-in-Chief), Ivor J. Benjamin (Editor), Robert C. Griggs (Editor), and Edward J. Wing (Editor), Publishers: W.B. Saunders, 8<sup>th</sup> Edition, ISBN-10: 1416061096 or ISBN-13: 978-1416061090.
2. PRACTICAL GUIDE TO THE CARE OF THE MEDICAL PATIENT (2011) by Fred F. Ferri (Editor), Publishers: Mosby International, 8<sup>th</sup> Edition, ISBN-10: 0323071589 or ISBN-13: 978-0323071581.
3. THE WASHINGTON MANUAL OF MEDICAL THERAPEUTICS (2010) by Corey Foster, Neville Mistry, Parvin F. Peddi, and Shivak Sharma, Publishers: Lippincott, Williams, and Wilkins, 33<sup>rd</sup> Edition, ISBN-10: 1608310035 or ISBN-13: 978-1608310036.

#### Recommended:

4. RAPID INTERPRETATION OF EKG'S (2000) by Dale Dubin, Publishers: Cover Publishing Co., 6<sup>th</sup> Edition, ISBN-10: 0912912065 or ISBN-13: 978-0912912066.
5. KOCHAR'S CONCISE TEXTBOOK OF MEDICINE (2003) by Kesavan A. Kutty (Editor), Ralph M. Schapira (Editor), Jerome J. Van Ruiswyk (Editor), and Mahender S. Kochar (Consulting Editor), Publishers: Lippincott, Williams, and Wilkins, 4<sup>th</sup> Edition, ISBN-10: 0781729424 or ISBN-13: 978-0781729420.
6. KOCHAR'S CLINICAL MEDICINE FOR STUDENTS (2009) by Dario M. Torre (Editor-in-Chief), Geoffery C. Lamb (Editor), Jerome J. Van Ruiswyk (Editor), Ralph M. Schapira (Editor), and Mahender S. Kochar (Consulting Editor), Publishers: Lippincott, Williams, and Wilkins, 5<sup>th</sup> Edition, ISBN-10: 0781766990 or ISBN-13: 978-0781766999.
7. OFFICE AND BEDSIDE PROCEDURES (1992) by Mark S. Chestnut, Thomas N. Dewar, and Richard M. Locksley, Publishers: Prentice-Hall, 1<sup>st</sup> Edition, ISBN-10: 0838510957 or ISBN-13: 978-0838510957.
8. A PRIMER OF WATER, ELECTROLYTE AND ACID-BASE SYNDROMES (1996) by Jeffery N. Brensilver and Emanuel Goldberg, Publishers: Oxford University Press, 8<sup>th</sup> Edition, ISBN-10: 0803600542 or ISBN-13: 978-0803600546.
9. BAUM'S TEXTBOOK OF PULMONARY DISEASES (2004) by James D. Crapo (Editor), Jeffrey L. Glassroth (Editor), Joel B. Karlinsky (Editor), and Talmadge E. King (Editor), Publishers: Lippincott, Williams, and Lipkins, 7<sup>th</sup> Edition, ISBN-10: 0781737273 or ISBN-13: 978-0781737272.
10. TEXTBOOK OF PULMONARY VASCULAR DISEASE (2011) by Jason X.-J. Yuan (Editor), Joe G.N. Garcia (Editor), Charles A. Hales (Editor), Stuart Rich

(Editor), Stephen L. Archer (Editor), and John B. West (Editor), Publishers: Springer, 1<sup>st</sup> Edition, ISBN-10: 0387874283 or ISBN-13: 978-0387874289.

### **15.1.7 Description of the Internal Medicine Program Contents**

The subject matter to be covered in the Internal Medicine program (IUSOM—BO—MD—06—01) is as follows:

During this Clinical Rotation/Clerkship students learn to function as an integral part of an interdisciplinary ward team. Students are expected to obtain, record, and present accurate and concise histories, and perform physical examinations. The students will also become familiar with the pathophysiology, diagnosis, and treatment of common diseases which occur in adult patients. In addition, the students shall participate in general Internal Medicine areas, undergoing exposure to the diagnostic and treatment process as it unfolds. The students shall eventually develop competence in evaluating broad clinical problems and patient management skills. "Hands-on" patient experience shall be supplemented by tutorials and didactic sessions. (**Duration: 12 weeks**)

## **16. Program for the Seventh Semester of M.D. DEGREE (IUSOM—BO—MD—07--00)**

At IUSOM, the Clinical Science (Clinical Rotation and/or Clinical Clerkship) curriculum as one of the requirements for the Core Clinical Rotations, to be completed in an IUSOM-Affiliate Hospital located in the USA, Canada, The Netherlands, or Netherlands Antilles, during the seventh semester of M.D. degree program (IUSOM—BO—MD—07—00), is cited below in full details (**Total Duration: 12 weeks**).

### **16.1 General Surgery Program (IUSOM—BO—MD—07—01)**

As a part of Core Clinical Rotations, the General Surgery program required during the seventh semester of M.D. degree (Code: IUSOM—BO—MD—07—01), to be followed at an IUSOM-Affiliate hospital, is cited below (**Duration: 12 weeks**):

#### **16.1.1 Purpose**

The purpose of this General Surgery program, which is a Core Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences to future clinical practice focusing general surgery.

#### **16.1.2 Goal**

To provide a comprehensive hands-on patient experience covering General Surgery along with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

#### **16.1.3 Objectives**

The objectives of this Core Clinical Rotation are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into General Surgery, for instance, in the United States. 3.

Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

#### **16.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites.

#### **16.1.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

#### **16.1.6 General Surgery Textbooks**

The following textbooks and support materials are required / recommended for this General Surgery program:

##### Required:

1. GREENFIELD'S SURGERY: SCIENTIFIC PRINCIPLES AND PRACTICE (2010) by Michael W. Mulholland (Editor), Keith D. Lillemoe (Editor), Gerald M. Doherty (Editor), Ronald V. Maier (Editor), Diane M. Simeone (Editor), and Gilbert R. Upchurch, Jr. (Editor), Publishers: Lippincott, Williams, and Wilkins, 5<sup>th</sup> Edition, ISBN-10: 1605473553 or ISBN-13: 978-1605473550.
2. ESSENTIALS OF SURGERY (1994) by David C. Sabiston, Jr. and H. Kim Lyerly (Eds.), Publishers: W.B. Saunders, 2<sup>nd</sup> Edition, ISBN: 07-216-5019-8.
3. The WASHINGTON MANUAL OF SURGERY (2007) by Mary E. Klingensmith (Editor), Lee Ern Chen (Editor), Sean C. Glasgow (Editor), Trudie A. Goers (Editor), and Spencer J. Melby (Editor), Publishers: Lippincott, Williams, and Wilkins, 5<sup>th</sup> Edition, ISBN-10: 0781774470 or ISBN-13: 978-0781774475.

##### Recommended:

4. SCWARTZ PRINCIPLES OF SURGERY (2009) by F. Charles Brunicaardi (Editor-in-Chief), Dana K. Andersen (Associate Editor), Timothy R. Billiar (Associate Editor), David L. Dunn (Associate Editor), John G. Hunter (Associate Editor), Jeffrey B. Matthews (Associate Editor), and Raphael E. Pollock (Associate Editor), Publishers: McGraw-Hill Professional, 9<sup>th</sup> Edition, ISBN-10: 007154769X or ISBN-13: 978-0071547697.
5. THE SURGICAL CLINICS OF NORTH AMERICA, a Periodical, Publishers: W.B. Saunders, ISSN 1558-3171 0039-6109.
6. A MANUAL OF LABORATORY AND DIAGNOSTIC TESTS (2008) by Frances T. Fischbach and Marshall B. Dunning, III, Publishers: Lippincott,

Williams, and Wilkins, 8<sup>th</sup> Edition, ISBN-10: 0781771943 or ISBN-13: 978-0781771948.

### **16.1.7 Description of the General Surgery Program Contents**

The subject matter to be covered in the General Surgery program (IUSOM—BO—MD—07—01) is as follows:

The students begin by learning how to perform a complete physical examination, clinical history, and surgical management of a patient. Under supervision, medical students learn a problem solving approach to surgery by studying patients, attending staff rounds and lectures with physicians, and participating in operations on patients. In addition, the students develop skills needed by the general physician as well as those unique to surgery. The students further develop abilities in data synthesis and solving, and become oriented to the clinical setting related to surgery. Ideally, students follow the patient from admission through discharge. Students are expected to participate in all aspects of patient care: assisting in the operating room, emergency room, and acute care units. (**Duration: 12 weeks**)

## **17. Program for the Eighth Semester of M.D. DEGREE (IUSOM—BO—MD—08--00)**

At IUSOM, the Clinical Science (Clinical Rotation and/or Clinical Clerkship) curriculum as one of the requirements for the Core Clinical Rotations, to be completed in an IUSOM-Affiliate Hospital located in the USA, Canada, The Netherlands, or Netherlands Antilles, during the eighth semester of M.D. degree program (IUSOM—BO—MD—08—00), is cited below in full details (**Total Duration: 12 weeks**).

### **17.1 Obstetrics and Gynecology Program (IUSOM—BO—MD—08—01)**

As a part of Core Clinical Rotations, the Obstetrics and Gynecology program required during the eighth semester of M.D. degree (Code: IUSOM—BO—MD—08—01), to be followed at an IUSOM-Affiliate hospital, is cited below (**Duration: 06 weeks**):

#### **17.1.1 Purpose**

The purpose of this Obstetrics and Gynecology program, which is a Core Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences to future clinical practice focusing obstetrics and gynecology.

#### **17.1.2 Goal**

To provide a comprehensive hands-on patient experience covering Obstetrics and Gynecology together with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

#### **17.1.3 Objectives**

The objectives of this Core Clinical Rotation are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into Obstetrics and Gynecology, for instance, in the

United States. 3. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

#### **17.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites.

#### **17.1.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

#### **17.1.6 Obstetrics and Gynecology Textbooks**

The following textbooks and support materials are required / recommended for this Obstetrics and Gynecology program:

##### Required:

1. HACKER AND MOORE'S ESSENTIALS OF OBSTETRICS AND GYNECOLOGY (2010) by Neville F. Hacker (Editor), Joseph C. Gambone (Editor), and Calvin J. Hobel (Editor), Publishers: W.B. Saunders, 5<sup>th</sup> Edition, ISBN-10: 1416059407 or ISBN-13: 978-1416059400.
2. OBSTETRICS AND GYNECOLOGY (2009) by Charles R.B. Beckmann, Frank W. Ling, Barbara M. Barzansky, William N. Herbert, Douglas W. Laube, and Roger P. Smith, Publishers: Williams and Wilkins, 6<sup>th</sup> Edition, ISBN-10: 0781788072 or ISBN-13: 978-0781788076.

##### Recommended:

3. POCKET GUIDE TO FETAL MONITORING AND ASSESSMENT (2009) by Susan Martin Tucker, Lisa A. Miller, and David A. Miller, Publishers: Mosby Year-Book, Inc., 6<sup>th</sup> Edition, ISBN: 0323056709 or ISBN-13: 978-0323056700.
4. GYNECOLOGY AND OBSTETRICS (2006) by Paul D. Chan and Susan M. Johnson, Publishers: Laguna Hills: Current Clinical Strategy, ISBN-10: 1929622643 or ISBN-13: 978-1929622641.
5. POCKET COMPANION TO OBSTETRICS: NORMAL AND PROBLEM PREGNANCIES (2007) by Steven G. Gabbe (Editor), Jennifer R. Niebyl (Editor), Joe Leigh Simpson (Editor), Henry Galan (Associate Editor), Eric R.M. Jauniaux (Associate Editor), Laura Goetzl (Associate Editor), and Mark B. Landon (Associate Editor), Publishers: Churchill Livingstone, 5<sup>th</sup> Edition, ISBN-13: 978-0443069307.

#### **17.1.7 Description of the Obstetrics and Gynecology Program Contents**

The subject matter to be covered in the Obstetrics and Gynecology program (IUSOM—BO—MD—08—01) is as follows:

Through this program, the students gain experience by caring for women with a wide variety of gynecological problems, as well as normal and abnormal pregnancies. The students will attend lectures and seminars, participate in ward rounds and assist in newborn deliveries and surgical procedures. The students are assigned to obstetrical and gynecological patients for evaluation and follow-up. Participation in normal deliveries is stressed. The students are expected to follow patients through completion of delivery or surgery. Ambulatory obstetrical and gynecological care is stressed and patient contact is supplemented with conferences and didactic teaching sessions.

**(Duration: 06 weeks)**

## **17.2 Family Medicine Practice Program (IUSOM—BO—MD—08—02)**

As a part of Core Clinical Rotations, the Family Medicine Practice program required during the eighth semester of M.D. degree (Code: IUSOM—BO—MD—08—02), to be followed at an IUSOM-Affiliate hospital, is cited below **(Duration: 06 weeks)**:

### **17.2.1 Purpose**

The purpose of this Family Medicine Practice program, which is a Core Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences to future clinical practice focusing general family medicine practice.

### **17.2.2 Goal**

To provide a comprehensive hands-on patient experience covering Family Medicine Practice along with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

### **17.2.3 Objectives**

The objectives of this Core Clinical Rotation/Clerkship are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into Family Medicine Practice, for instance, in the United States. 3. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

### **17.2.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites.

### **17.2.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

### **17.2.6 Family Medicine Practice Textbooks**

The following textbooks and support materials are required / recommended for this Family Medicine Practice program:

Required:

For Family Medicine Practice textbooks, see required textbooks cited in Subsections 15.1.6, 16.1.6, 17.1.6, 18.1.6 and 18.2.6.

Recommended:

For Family Medicine Practice textbooks, see recommended textbooks cited in Subsections 15.1.6, 16.1.6, 17.1.6, 18.1.6 and 18.2.6.

### **17.2.7 Description of the Family Medicine Practice Program Contents**

The subject matter to be covered in the Family Medicine Practice program (IUSOM—BO—MD—08—02) is as follows:

This introductory Clinical Rotation/Clerkship exposes students to a wide range of clinical problems managed by Family Physicians in the hospital setting. Clinical core competencies and learning targets are to perform complete histories and physical examination on admitted patients, write problem focused progress notes on patient charts, understand the process of ordering and interpreting laboratory tests, radiology and ancillary testing, participate in the development of diagnostic investigations and medical management of medical problems, become skilled in oral presentation of patient cases, and learn the role of ethics in patient care. **(Duration: 06 weeks)**

## **18. Program for the Ninth Semester of M.D. Degree**

### **(IUSOM—BO—MD—09--00)**

At IUSOM, the Clinical Science (Clinical Rotation and/or Clinical Clerkship) curriculum as one of the requirements for the Core Clinical Rotations, to be completed in an IUSOM-Affiliate Hospital located in the USA, Canada, The Netherlands, or Netherlands Antilles, during the ninth semester of M.D. degree program (IUSOM—BO—MD—09—00), is cited below in full details **(Total Duration: 12 weeks)**.

### **18.1 Pediatrics Program (IUSOM—BO—MD—09—01)**

As a part of Core Clinical Rotations, the Pediatrics program required during the ninth semester of M.D. degree (Code: IUSOM—BO—MD—09—01), to be followed at an IUSOM-Affiliate hospital, is cited below **(Duration: 06 weeks)**:

#### **18.1.1 Purpose**

The purpose of this Pediatrics program, which is a Core Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences to future clinical practice focusing pediatrics.



**18.1.2 Goal**

To provide a comprehensive hands-on patient experience covering Pediatrics together with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

**18.1.3 Objectives**

The objectives of this Core Clinical Rotation are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into Pediatrics, for instance, in the United States. 3. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

**18.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites.

**18.1.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

**18.1.6 Pediatrics Textbooks**

The following textbooks and support materials are required / recommended for this Pediatrics program:

Required:

1. NELSON: ESSENTIALS OF PEDIATRICS (2011) by Karen J. Marcadante, Robert M. Kliegman, Hal B. Jenson, and Richaed E. Behrman, Publishers: W.B. Saunders, 6<sup>th</sup> Edition, ISBN-10: 1437706436 or ISBN-13: 978-1437706437.
2. PEDIATRIC PEARLS (2002) by Beryl J. Rosenstein, Patricia D. Fosarelli, and M. Douglas Baker, Publishers: Mosby, 4<sup>th</sup> Edition, ISBN-10: 0323014984 or ISBN-13: 978-0323014984.
3. HARRIET LANE HANDBOOK: A MANUAL FOR PEDIATRIC HOUSE OFFICERS (2005) by Jason Robertson (Editor) and Nicole Shilkofsky (Editor), Publishers: Mosby, 17<sup>th</sup> Edition, ISBN-10: 0323029175 or ISBN-13: 978-0323029179.

Recommended:

4. PEDIATRIC PRIMAR CARE: WELL-CHILD CARE (2001) by Raymond C. Baker, Publishers: Lippincott, Williams and Wilkins 1<sup>st</sup> Edition, ISBN-10: 0781728894 or ISBN-13: 978-0781728898.

5. PEDIATRICS PRIMARY CARE (2009) by Catherine E. Burns, Ardys M. Dunn, Margaret A. Brady, Nancy Barber Starr, and Catherine G. Blosser, Publishers: W.B. Saunders, 4<sup>th</sup> Edition, ISBN-10: 1416040870 or ISBN-13: 978-1416040873.

### **18.1.7 Description of the Pediatrics Program Contents**

The subject matter to be covered in the Pediatrics program (IUSOM—BO—MD—09—01) is as follows:

The students learn about the health problems of infants and children while working as part of a ward team, participating in patient care. The students also learn to take histories, perform physical examinations, and manage the diagnosis and treatment of common illnesses in younger patients. Moreover, the students receive a broad overview of general pediatrics. Experience will be gained with in-patient and ambulatory pediatric care. Pediatric intakes and ward rounds are the basis of inpatient care while ambulatory care experience is gained in general pediatric clinics evaluating patients with common complaints and disorders. **(Duration: 06 weeks)**

## **18.2 Psychiatry Program (IUSOM—BO—MD—09—02)**

As a part of Core Clinical Rotations, the Psychiatry program required during the ninth semester of M.D. degree (Code: IUSOM—BO—MD—09—02), to be followed at an IUSOM-Affiliate hospital, is cited below **(Duration: 06 weeks)**:

### **18.2.1 Purpose**

The purpose of this Psychiatry program, which is a Core Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences to future clinical practice focusing general psychiatric medicine practice.

### **18.2.2 Goal**

To provide a comprehensive hands-on patient experience covering Psychiatry along with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

### **18.2.3 Objectives**

The objectives of this Core Clinical Rotation/Clerkship are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into Psychiatry, for instance, in the United States. 3. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

### **18.2.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended

during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites.

### **18.2.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

### **18.2.6 Psychiatry Textbooks**

The following textbooks and support materials are required / recommended for this Psychiatry program:

#### Required:

1. KAPLAN & SADOCK'S COMPREHENSIVE TEXT BOOK OF PSYCHIATRY (2 VOLUME SET) (2009) by Benjamin J. Sadock (Editor), Virginia Alcott Sadock (Editor), and Pedro Ruiz (Editor), Publishers: Lippincott Williams & Wilkins, 9<sup>th</sup> Edition, ISBN-10: 0781768993 or ISBN-13: 978-0781768993.
2. DIAGNOSTIC CRITERIA FROM DSM IV-TR (2000), Publishers: American Psychiatric Association, 4<sup>th</sup> Edition, ISBN: 08-904-2027-0.
3. DSM- IV-TR IN ACTION (2010) by Sophia S. Dziegielewski, Publishers: Wiley, 2<sup>nd</sup> Edition, ISBN-10: 0470551712 or ISBN-13: 978-0470551714.

#### Recommended:

4. CLINICAL PSYCHIATRY FOR MEDICAL STUDENTS (1998) by Alan Stoudemire, Publishers: Lippincott, Williams and Willkins 3<sup>rd</sup> Edition, ISBN-10: 0397584601 or ISBN-13: 978-0397584604.
5. HANDBOOK OF PSYCHIATRIC DRUG THERAPY (2009) by Lawrence A. Labbate, Maurizio Fava, Jerrold F. Rosenbaum, and George W. Arana, Publishers: Lippincott, Williams, and Wilkins, 6<sup>th</sup> Edition, ISBN-10: 0781774861 or ISBN-13: 978-0781774864.

### **18.2.7 Description of the Psychiatry Program Contents**

The subject matter to be covered in the Psychiatry program (IUSOM—BO—MD—09—02) is as follows:

The students shall work in both inpatient and outpatient psychiatric treatment centers to learn how to diagnose and treat patients with a variety of mental disorders.

Working as part of a team, the students shall learn to identify and treat patients with such disorders as depression and affective disorders, schizophrenia, personality disorders, and organic mental illnesses. The students shall also learn how to conduct a psychiatric history and perform a mental status examination. In addition, the students shall build upon classroom knowledge gained during the first and second years.

Treatment of psychiatric patients in the in-patient setting comprises the majority of the rotation. The resources available for care of psychiatric patients are presented.

Skill in the evaluation and diagnosis of the psychiatric patients is developed through direct patient interviews and didactic sessions. **(Duration: 06 weeks)**

## **19. Program for the Tenth Semester of M.D. Degree (IUSOM—BO—MD—10—00)**

At IUSOM, the Clinical Science (Clinical Rotation and/or Clinical Clerkship) curriculum as one of the requirements for the Elective Clinical Rotations, to be completed in an IUSOM-Affiliate Hospital located in the USA, Canada, The Netherlands, or Netherlands Antilles, during the tenth semester of M.D. degree program (IUSOM—BO—MD—10—00), is cited below in full details (**Total Duration: 12 weeks**).

### **19.1 Elective Medicine Clinical Rotations Program (IUSOM—BO—MD—10—XX)**

As a part of the Elective Clinical Rotations, the Elective Medicine program required during the tenth semester of M.D. degree (General Code: IUSOM—BO—MD—10—XX), to be followed at an IUSOM-Affiliate hospital, is cited below (**Duration: 12 weeks**):

#### **19.1.1 Purpose**

The purpose of this Elective Medicine Clinical Rotations program, which is an Elective Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences together with in the Core Clinical Rotations to future clinical practice specializing in one of the elective medicine areas, after choosing one area of their interest from the list mentioned in Subsection 19.1.7.

#### **19.1.2 Goal**

To provide a comprehensive hands-on patient experience specializing in one of the fields of Elective Medicine chosen by a student together with to provide a foundation upon which to build the practitioner's knowledge of specific clinical medicine.

#### **19.1.3 Objectives**

The objectives of this Elective Clinical Rotation are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into specialist of a certain Elective Medicine, for instance, in the United States. 3. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

#### **19.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites. Additional prerequisite is the successful completion of all required Core Clinical Rotations.

**19.1.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

**19.1.6 Elective Medicine Clinical Rotations Program Textbooks**

The following textbooks and support materials are required / recommended for this Elective Medicine Clinical Rotations program:

Required:

Required books are to be announced by IUSOM-Affiliate hospitals.

Recommended:

Recommended books are to be announced by IUSOM-Affiliate hospitals.

**19.1.7 Description of the Elective Medicine Clinical Rotations Program****Contents**

The students can choose one or two of the twenty-four Elective Medicine Clinical Rotations depending upon their final goal. Such Elective Clinical Rotations along with their corresponding specific codes are described below:

CARDIOLOGY (Specific Code: IUSOM—BO—MD—10—001); PSYCHIATRY (IUSOM—BO—MD—10—02); NEUROLOGY (IUSOM—BO—MD—10—03); UROLOGY (IUSOM—BO—MD—10—04); DERMATOLOGY (IUSOM—BO—MD—10—05); GASTROENTROLOGY (IUSOM—BO—MD—10—06); PULMONOLOGY (IUSOM—BO—MD—10—07); ONCOLOGY (IUSOM—BO—MD—10—08); HEMATOLOGY (IUSOM—BO—MD—10—09); INFECTIOUS DISEASES (IUSOM—BO—MD—10—10); EMERGEN (IUSOM—BO—MD—10—11); RADIOLOGY (IUSOM—BO—MD—10—12); ALLERGY AND IMMUNOLOGY (IUSOM—BO—MD—10—13); AMBULATORY CARE (IUSOM—BO—MD—10—14); CRITICAL CARE (IUSOM—BO—MD—10—15); GERONTOLOGY (IUSOM—BO—MD—10—16); NEPHROLOGY (IUSOM—BO—MD—10—17); ENDOCRINOLOGY AND METHOLISM (IUSOM—BO—MD—10—18); OPHTHALANOLOGY (IUSOM—BO—MD—10—19); PREVENTIVE MEDICINE (IUSOM—BO—MD—10—20); PUBLIC CARE / HEALTH CARE SYSTEM (IUSOM—BO—MD—10—21); RHEUMATOLOGY (IUSOM—BO—MD—10—22); RURAL / INNER CITY HEALTH CARE (IUSOM—BO—MD—10—23); and REPRODUCTIVE ENDOCRINOLGY (IUSOM—BO—MD—10—24). (**Duration: 12 weeks**)

## **20. Program for the Eleventh Semester of M.D. DEGREE (IUSOM—BO—MD—11—00)**

At IUSOM, the Clinical Science (Clinical Rotation and/or Clinical Clerkship) curriculum as one of the requirements for the Elective Clinical Rotations, to be completed in an IUSOM-Affiliate Hospital located in the USA, Canada, The Netherlands, or Netherlands Antilles, during the eleventh semester of M.D. degree program (IUSOM—BO—MD—11—00), is cited below in full details (**Total Duration: 12 weeks**).

## **20.1 Elective Surgery Clinical Rotations Program**

### **(IUSOM—BO—MD—11—XX)**

As a part of the Elective Clinical Rotations, the Elective Surgery program required during the eleventh semester of M.D. degree (General Code: IUSOM—BO—MD—11—XX), to be followed at an IUSOM-Affiliate hospital, is cited below (**Duration: 12 weeks**):

#### **20.1.1 Purpose**

The purpose of this Elective Surgery Clinical Rotations program, which is an Elective Clinical Rotation (Clerkship) carried out at an IUSOM-Affiliate hospital, is to assist the medical students relate the knowledge learned in Basic Medical Sciences together with in the Core Clinical Rotations and in the Elective Medicine Clinical Rotation to future clinical practice specializing in one of the elective medicine areas, after choosing one area of their interest from the list mentioned in Subsection 19.1.7.

#### **20.1.2 Goal**

To provide a comprehensive hands-on patient experience specializing in one of the fields of Elective Surgery chosen by a student together with to provide a foundation upon which to build the practitioner's knowledge of specific clinical surgery.

#### **20.1.3 Objectives**

The objectives of this Elective Clinical Rotation are that upon its completion, a student should be able to: 1. Function as an integral part of an interdisciplinary ward team. 2. Undergo smooth transition into specialist of a certain Elective Surgery, for instance, in the United States. 3. Acquire valuable knowledge and a clear comprehension of the Health Care System and Post Graduate Medical Training.

#### **20.1.4 Prerequisites**

Biology, Botany, Zoology, General Chemistry and Organic Chemistry taken during Pre-Medical program together with Anatomy, Embryology, Histology, Molecular Cell Biology, Epidemiology and Biostatistics, Medical Biochemistry, Human Physiology, Neuroscience, Medical and Legal Ethics, General Pathology, Systemic Pathology, Medical Microbiology, Immunology, Behavioral Sciences, Pharmacology, Medical Genetics, Physical Diagnosis, and Introduction to Clinical Medicine attended during the five semesters covering Basic Medical Sciences courses in pursuit of M.D. degree program are prerequisites. Additional prerequisites are the successful completion of all required Core Clinical Rotations as well as an Elective Medicine Clinical Rotation.

#### **20.1.5 Format**

The students shall be given supervised patient care assignments and shall attend hospital rounds and clinics.

#### **20.1.6 Elective Surgery Clinical Rotations Program Textbooks**

The following textbooks and support materials are required / recommended for this Elective Surgery Clinical Rotation program:

Required:

Required books are to be announced by IUSOM-Affiliate hospitals.

Recommended:

Recommended books are to be announced by IUSOM-Affiliate hospitals.

**20.1.7 Description of the Elective Surgery Clinical Rotations Program Contents**

The students can choose one or two of the fifteen Elective Surgery Clinical Rotations depending upon their final goal. Such Elective Clinical Rotations along with their corresponding specific codes are described below:

OPHTHALMOLOGY (Specific Code: IUSOM—BO—MD—11—001); EAR, NOSE, AND THROAT (IUSOM—BO—MD—11—02); NEUROSURGERY (IUSOM—BO—MD—11—03); ORTHOPEDICS (IUSOM—BO—MD—11—04); THORATIC SURGERY (IUSOM—BO—MD—11—05); VASCULAR SURGERY (IUSOM—BO—MD—11—06); PLASTIC SURGERY (IUSOM—BO—MD—11—07); UROSURGERY (IUSOM—BO—MD—11—08); ANESTHESIOLOGY (IUSOM—BO—MD—11—09); PEDIATRIC SURGERY (IUSOM—BO—MD—11—10); PATHOLOGY (IUSOM—BO—MD—11—11); TRAUMA SURGERY (IUSOM—BO—MD—11—12); OBSTERTRICS (IUSOM—BO—MD—11—13); GYNECOLOGY (IUSOM—BO—MD—11—14); and PREVENTIVE CARDIOLOGY (IUSOM—BO—MD—11—15). **(Duration: 12 weeks)**