

# FOUNDATION-I MODULE STUDY GUIDE

## FIRST YEAR MBBS SESSION 2023-24



**NSHS**  
NUST School of  
Health Sciences

*Prepared by  
Dept. of Medical Education*

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## A. ABBREVIATIONS

<b>CBL</b>	Case based learning
<b>CBME</b>	Community based medical education
<b>COME</b>	Community oriented medical education
<b>CSW</b>	Clinical skills workshop
<b>DME</b>	Department of Medical Education
<b>NSHS</b>	Nust School of Health Sciences
<b>OSIS</b>	Outcome-based, systems-based, Integrated & Spiral
<b>EMQ</b>	Extended Matching Question
<b>LGF</b>	large group format/ lecture
<b>ILO</b>	Institute Learning outcome
<b>ELO</b>	Educational Learning outcome
<b>PLOs</b>	Program Learning outcome
<b>CLOs</b>	Course Learning outcome
<b>MCQ</b>	Multiple Choice Question
<b>OSCE</b>	Objective structured clinical examination
<b>OSPE</b>	Objective structured practical examination
<b>PAL</b>	Peer assisted learning
<b>PBL</b>	Problem based learning
<b>RP</b>	Resource person
<b>SAQ</b>	Short Answer Question
<b>SDL</b>	Self-Directed learning
<b>SGD</b>	Small group discussion
<b>FC</b>	Flipped classroom
<b>TOS</b>	Table of specifications

## **B. VISION**

Imparting affordable higher education while being an SDG engaged, fourth generation entrepreneurial university, with its knowledge- based ecosystem firmly founded on Research and Innovation. Producing graduates who contribute to the national growth through wealth creation, while becoming job creators instead of job seekers.

We do this by entering into effective partnerships with Government, Industry and the Society with due cognisance to the environment, while following the Penta Helix model.

In doing so we firmly uphold merit in everything that we do, enunciating a culture of professional excellence. The cornerstone of our education methodology resting on personality development and grooming, thereby comprehensively preparing our graduates to confront the societal challenges with confidence

## **C. MISSION**

In pursuance of NUST vision, strive to achieve following mission goals:

- To develop NUST as a Comprehensive, Academic and Research led university with a focus on Creativity, Innovation and Entrepreneurship so as to amicably negotiate Social, Economic and Environmental challenges faced by the country.
- With foundations based on principles of Merit, Transparency and Fair Play, nurture talent by providing equal opportunity to all segments of polity.
- Empower students to develop their full potential, acquiring leadership and social skills, to act as agents of change within the society.
- Improve global visibility by enhancing mutually beneficial linkages with international organizations and partner universities.
- Strengthen NUST financially to enable the university to achieve its goals by raising awareness amongst local and international Pakistani diaspora including Alumni base around the world.
- Ensure conducive learning and working environment for students and staff at par with international standards

## D. NSHS- VISION

To be a leader in graduating doctors who will make a difference in our communities by expanding educational excellence and scientific innovation while enhancing health care through strong ethical and evidence-based practice

## E. NSHS-MISSION

To produce physicians for the twenty-first century who uphold the standards of science, are compassionate, research oriented, knowledgeable, skilled, life-long learners and devoted to both their profession and society.

## F. OUTCOMES

By the end of MBBS program, the graduates of Nust School of Health Sciences will be able to,

Program Learning Outcomes	These are the yearly learning outcomes specific for this year
PLO 1	Medical Knowledge: Acquire a broad and in-depth understanding of the basic and clinical sciences related to medicine, including anatomy, physiology, biochemistry, pharmacology, pathology, microbiology, and clinical medicine
PLO 2	Clinical Skills: Develop clinical skills necessary for the assessment, diagnosis, and management of patients. This includes history-taking, physical examination, diagnostics reasoning, communication skills, and professionalism
PLO 3	Patient Care: Demonstrate competence in providing compassionate, patient-centered care. Develop the ability to formulate appropriate management plans, perform procedures, interpret diagnostic tests, and manage common medical conditions.
PLO 4	Professionalism and Ethics: Understand and adhere to the highest standards of medical ethics, professionalism, and integrity. Develop an understanding of legal and ethical responsibilities in patient care, maintain patient confidentiality, and demonstrate respect for cultural and individual differences.
PLO 5	Communication Skills: Communicate effectively and sensitively with patients, their families, and other healthcare professionals. Develop skills in explaining medical conditions, treatment options, and prognosis in a clear and understandable manner.
PLO 6	Critical Thinking and Problem-Solving: Develop the ability to think critically, analyze complex medical information, and make evidence-based decisions. Apply problem-solving skills to diagnose and manage medical conditions effectively.
PLO 7	Lifelong Learning: Cultivate a commitment to continuous learning and professional development. Develop the skills necessary to critically evaluate medical literature, stay updated with advancements in medical science, and adapt to changes in healthcare practices.
PLO 8	Teamwork and Collaboration: Collaborate effectively with stakeholders including other healthcare professionals, such as nurses, pharmacists, and allied health

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	personnel, to provide comprehensive patient care. Understand the importance of interprofessional teamwork and communication.
<b>PLO 9</b>	Research Skills: Develop an understanding of research methodology and the ability to critically appraise medical research. Acquire basic skills in conducting research, interpreting research findings, and applying evidence-based medicine principles to clinical practice.
<b>PLO 10</b>	Health Advocacy: Recognize the social determinants of health and advocate for equitable healthcare delivery. Understand the importance of public health, health promotion, disease prevention, and community engagement
<b>PLO 11</b>	Professional Development: Develop self-awareness, emotional intelligence, and resilience to cope with the challenges of medical practice. Engage in reflective practice, receive and provide constructive feedback, and demonstrate commitment to ongoing personal and professional growth.

## G. WHAT IS A STUDY GUIDE?

A study guide is beneficial for both educators and learners as it encompasses all the module details. It aids in effectively arranging and allocating time for various activities. Additionally, it provides clear explanation regarding assessment procedures, as well as rules and regulation.

Among other elements, the study guide comprises the following

1. Contact information for the module committee
2. A compilation of abbreviations used within guide
3. Clearly defined objectives that students are expected to achieve at the end of module
4. The teaching and learning methodologies employed to facilitate the attainment of various objectives
5. A table of specification that outlines the learning activity, teaching methods and assessment procedures
6. A time table specifying the learning venues
7. An inventory of recommended learning resources for further references

## H. CURRICULAR FRAMEWORK

Students will experience *OSIS Outcome based, system based, integrated and spiral curriculum*.

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## OSIS

**Outcome-based curriculum.** This curriculum model focuses on defining learning outcomes that students should achieve at the end of undergraduate medical program. The curriculum is designed backwards from these outcomes. It encompasses the knowledge, skills and attitude necessary for medical practice. The curriculum is organized around these outcomes, teaching and assessment methods are aligned to ensure that students meet desired outcomes and competencies.

**System-based integrated curriculum.** In system-based curriculum the medical education program is organized around different body system and themes rather than traditional discipline based curriculum. The system integrate basic sciences and clinical sciences within each system(module)& theme. The interconnectedness of various concepts is emphasized to promote holistic understanding of patient care. The ability of students to apply their knowledge in clinical practice is enhanced, by learning about a system from multiple perspective.

**Spiral curriculum:** A spiral curriculum is characterised by the repeated revisiting of core topics and themes over different levels of program. The curriculum is structured in a way that it allows students to encounter key concepts multiple times, each time at increasing level of complexity and depth. This approach recognises that learning is iterative process and reinforce and build upon previously acquired knowledge and skills

## I. LEARNING & ASSESSMENT STRATEGIES

The following learning and teaching methods are used to promote better understanding:

Serial No.	Teaching and learning strategies	Assessment strategies
1	<b>Interactive Lectures:</b> are used to provide students entrance to topic needing much effort by the student to understand subject matter.	MCQs:Multiple choice questions
2	<b>Small Group discussion</b> encourages students to social learning bring their concepts and learning to be discussed and schemas corrected and refined.	OSPEs:Objective structured Practical Exams SAQs:Short answer questions
3	<b>Problem Based Learning</b> to integrate basic and clinical sciences, and give a learning experience that is contextual, realistic, and relevant.	SEQs: Short Essay questions
4	<b>Case-Based Learning</b> sessions are employed to prepare students for clinical practice, through the use of authentic clinical cases. using inquiry-based learning methods. Both the students and faculty are allowed to prepare in advance and guidance is provided during the sessions.	
5	<b>Self-Directed Learning</b> is where student take responsibility of his/her own learning through individual study, sharing and discussing with peers/tutors, seeking information from learning resource centre.	
6	<b>Flipped classroom</b> : Studetns are intrtroduced to new reading materialbefore coming to class. Then	



	in class they are engaged in more interactive teaching activities like PBL debates.
7	<b>Community Based Medical Education</b> is the delivery of health or medical education in a social context, where the students learn the medical problems while in a community.
8	<b>Practical / Lab work</b>

## J. ASSESSMENT POLICY

The approved NSHS in line with PMDC regulations states that 75% attendance is mandatory to appear in exams and the distribution of marks will be as follows,

### Weightage of assessments

Continuous internal assessment	20%
Final examination	80%
<b>Total</b>	<b>100 %</b>

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## K. NAME OF MODULE: FOUNDATION MODULE

### INTRODUCTION

Upon entering a medical school, student necessitate an orientation and an introductory understanding of medical sciences pertaining to health and diseases. Furthermore, students require guidelines to navigate their journey towards becoming accomplished physician while upholding ethical principles.

*Module name:* Foundation

*Year:* One

*Duration:* 6.5 weeks

*Timetable hours:* Allotted to Lectures, Case-Based Learning (CBL), PBL, Self-Study, Practical, Skills, Demonstrations

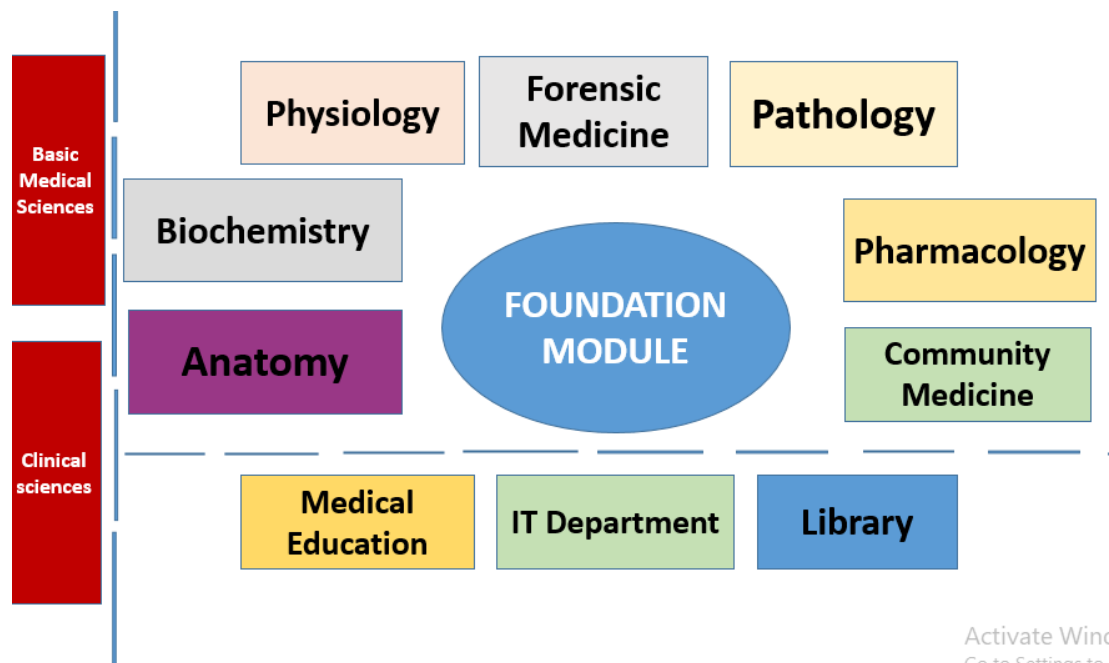


Figure 1: Integration of basic medical sciences and clinical sciences around module

## L. MODULE COMMITTEE

NAMES	
Module In-charge	
Module Coordinator	

## M. DEPARTMENTS & RESOURCE PERSONS FACILITATING LEARNING

DEPARTMENT	RESOURCE PERSON
Anatomy	
Physiology	
Biochemistry	
Pathology	
Pharmacology	
Forensic Medicine	
Community Medicine	
Medical Education	
It skills	
Library	

## N. GENERAL LEARNING OUTCOMES

Upon completion of this module, students would be able to acquire knowledge, skills and attitude related to:

Sr. No	Learning outcomes of module
<b>Cognitive Domain: Knowledge based</b>	
1	Familiarize with the MBBS system-based curriculum
2	Recognize the role of different disciplines in studying human body and its diseases.
3	Describe the structure, function and biochemical composition of cell.
4	Describe the cell division, its types and genetic material along with its clinical correlation.
5	Describe the basic organization of human body.
6	Explain the maintenance of homeostatic mechanism.
7	Describe the various stages of pre embryonic human development and correlate them with various malformations.
8	Describe the importance of buffer and PH system.
9	Describe various cellular adaptations during cell growth, differentiation and cell injury
<b>Psychomotor domain</b>	
10	Describe the basic laboratory techniques and use of microscope.
11	Follow the basic laboratory protocols.
12	Perform biochemical analysis of carbohydrates.
<b>Affective Domain</b>	
13	Follow the basic laboratory protocols.
14	Participate in class and practical work efficiently.
15	Maintain discipline of the college.
17	Demonstrate professionalism and ethical values in dealing with patients, cadavers, colleagues and teachers.
18	Communicate effectively in a team with colleagues and teachers.
19	Demonstrate the ability to reflect on the performance.

## O. ASSESSMENT PLAN FOR THE MODULE

- Formative Assessments: Fortnightly Class tests  
End of Module Assessment
- Summative Assessments: Block Assessment

## THEMES FOR THE FOUNDATION MODULE

SNO	Theme	Duration
1	Orientation	3days
2	Cell	2 week
3	Growth & Development of Human Body	2weeks
4	Human Body tissues, bones & joints	2 weeks

<b>THEME 1</b>			
<b>ORIENTATION</b>			
<b>SUBJECT</b>	<b>TOPIC</b>	<b>S.NO</b>	<b>LEARNING OBJECTIVES</b>
ANATOMY	Anatomy and its sub branches	1	Define anatomy and its branches
		2	Describe purpose of study of anatomy and its branches
PHYSIOLOGY	Physiology and its subbranches	1	Enumerate the branches of physiology
BIOCHEMISTRY	Introduction to biochemistry and its implication in medicine	1	Define biochemistry
		2	Discuss the role of biochemistry in medicine.
PATHOLOGY	Introduction to pathology and its implication in medicine	1	Define pathology
		2	Enumerate the different branches of pathology.
		3	Identify different sampling and processing techniques in different branches of pathology.
COMMUNITY MEDICINE	Introduction to community Medicine and its implication	1	Describe Role of community medicine/public health in health care system.
FORENSIC MEDICINE	Introduction to Forensic Medicine and Toxicology	1	Define Forensic Medicine, forensic pathology and state Medicine.
		2	Identify the Branches of Forensic Medicine.
		3	Describe the History of Forensic Medicine.
		4	Discuss the scope of Forensic Medicine.
		5	Identify the essential facilities for medico legal investigation.
		6	Define Medical Jurisprudence (not included for assessment in foundation module first year MBBS)
	Pakistan Medical Commission, Consent.	7	Describe the structure and functions of Pakistan Medical Commission.
MEDICAL EDUCATION	Curriculum structure Teaching learning strategies	1	Discuss the curriculum and modules.
		2	Describe the use of study guides. (not to be assessed)
		3	Differentiate between various teaching & learning strategies.
		4	Enlist various assessment tools & assessment policy. (Not to be assessed).
IT SKILLS	Importance of IT skills	1	Define IT and its importance

	MS word skills PowerPoint skills Excel sheet	2	Prepare the assignment on MS word
		3	Prepare the presentation on power point
		4	Use the excel sheet
LIBRARY	Literature search and library resources	1	Literature search skills
PRIME	Professional identity formation	1	Students' roles in terms of professional identity
	Introduction to professionalism	2	Define Professionalism, and its attributes

## THEME 2

### CELL

SUBJECT	TOPIC	S.NO	LEARNING OBJECTIVES
ANATOMY	Cell structure and its Organelles	1	Describe the cell as a living unit of body
		2	Describe the structure of cell and its organelles.
		3	Describe the structure of cytoplasmic organelles of the cell & correlate it with their functions.
	Nuclear structure & components	4	Describe the structure of the nucleus, nucleolus & chromosome and their functions in cell integrity.
	Cell division Mitosis	5	Explain the process of cell division.
		6	Describe mitotic cell division with its stages.
	Meiosis	7	Explain the process of Meiosis
		8	Describe karyotyping.
		9	Explain the non-disjunction of chromosomes.
		10	Correlate the process of non-disjunction with chromosomal abnormalities
PHYSIOLOGY	Cell membrane physiology	1	Explain Intra cellular and extra cellular environment.
		2	Correlate cytoplasmic organelles with their functions.
	Homeostasis	3	Define homeostasis.
		4	Describe the Homeostatic mechanism of major functional systems.
		5	Describe the characteristics of control systems with examples
	Membrane potential	6	Define membrane potential
		7	Describe ionic conc. differences across cell membrane

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		8	Explain the Nernst equation.
		9	Explain origin of normal resting membrane potential
	Movements of cell	10	Explain the amoeboid movement of cells.
		11	Describe the ciliary movements
	Depolarization & Repolarization	12	Explain the role of voltage gated Na <sup>+</sup> and K <sup>+</sup> channels in action potentials.
		13	Discuss the changes in conductance of Na and K channels with changes in membrane potentials
BIOCHEMISTRY	Biochemical structure of cell & Mitochondria	1	Explain the Bio-chemical composition of cell organelles and cytoplasm
		2	Describe the chemical structure of mitochondrial membrane.
		3	Explain the biochemical importance of mitochondrial membrane.
	Nuclear membrane	4	Describe Bio-chemical structure of nuclear membrane and its functions.
	RNA & DNA	5	Define and explain nucleotides and nucleosides.
		6	Describe the components of nucleotides
		7	Describe the functions of Nucleotides
		8	Describe the types of nucleic acids
		9	Differentiate between RNA and DNA..
	Buffer	10	Define Buffer and its role in maintenance of body PH
		11	Define colloidal state and Henderson Hasselbalch equation.
		12	Define adsorption and how it occurs.
		13	Explain ion exchange resin
	Cellular membrane transport mechanism	14	Explain membrane transport.
		15	Discuss passive diffusion, active transport, and facilitated transport via a channel or carrier.
		16	Describe and evaluate the role of ion gradients, co transporters, and ATP in active transport mechanisms.
PATHOLOGY	Cell injury	1	Describe the various causes of cell injury.
		2	Describe the response of a normal cell to stimuli.
		3	Describe the mechanisms of cell injury.
		4	Describe the different types of cellular adaptations.
PHARMACOLOGY	Routes of administration of drugs	1	Enlist the route of administration of a drug.
	Transmembrane drug transport	2	Explain how drugs are transported across cell membrane and factors affecting it
	Receptor and cellular basis	3	Enlist the types of drug receptors



PRIME	Dynamics of professionalism	1	Dynamics of trust in health professional-patient relationship
	PIF	2	Identifies his own strengths and weaknesses
	PDP	3	Prepare personal development plan & reflective portfolios
<b>Skill and Effective Domain</b>			
ANATOMY	The Microscope	1	Identify parts of microscope.
		2	Demonstrate operation of microscope.
		3	Describe the method of focusing slide at different magnifications.
		4	Follow the specified norms of lab work.
PHYSIOLOGY	Lab Equipment	1	Introduction to lab techniques
		2	Identify the equipment used in lab work
BIOCHEMISTRY	PH and Buffer solutions	1	Define normal solution
		2	Define standard solution.
		3	Prepare 0.1N solution of NaOH.
		4	Prepare 0.1N solution of HCL.
		5	Measure the PH of given solution (practical).

### THEME 3

#### Growth And Development Of Human Body

SUBJECT	TOPIC	S.NO	LEARNING OBJECTIVES
EMBRYOLOGY	Introduction to Embryology	1	Describe the developmental stages.
		2	Describe the embryologic terminology.
		3	Explain significance of embryology.
	Spermato-Genesis	4	Describe the process of spermatogenesis.
		5	Differentiate between spermiogenesis and spermatogenesis.
		6	Describe the morphological changes during maturation of gametes.
	Oogenesis	7	Describe oogenesis and its correlation with meiosis.
		8	Compare the male and female gametes.
	Transport Of Gametes	9	Explain the transport of gametes.
		10	Describe the transport of sperms.
		11	Describe the oocyte transport.
		12	Explain the maturation of sperms.
	Female reproductive cycle	13	Describe the ovarian cycle.
		14	Discuss the process of follicular development
		15	Explain the process of ovulation.
		16	Correlate ovulation with the phases of menstrual cycle.
	Fertilization – Events	17	Define fertilization.
		18	Describe the process of fertilization.

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		19	Explain assisted reproductive technologies like In-vitro fertilization (IVF), assisted IVF and intra cytoplasmic sperm injection (ICSI).
Fertilization – Clinical Correlates Cleavage & Blastocyst Formation		20	Discuss the clinical correlation of the fertilization.
		21	Describe the process of cleavage of zygote.
		22	Discuss the formation of blastocyst.
		23	Summarize the events of first week of development.
Implantation & Its Abnormalities		24	Describe the process of implantation.
		25	Enumerate the sites of implantation.
		26	Explain the clinical correlations of the implantation process.
Amniotic cavity		27	Describe the formation of amniotic cavity
		28	Describe the development of embryonic disc
		29	Describe the development of umbilical vesicle.
		30	Explain the development of Chorionic sac.
Events Of 2 <sup>nd</sup> Week of Development		31	Summarize the events of second week of development.
		32	Explain the clinical correlates of the second week of development.
Formation of Notocord		33	Explain the process of formation of Notocord
Events of 3 <sup>rd</sup> Week of Development		34	Describe the process of gastrulation.
		35	Explain the process of Neurulation.
		36	Explain the development of somites.
		37	Describe the development of intra-embryonic coelom.
Derivatives of germ layers		38	Describe briefly derivatives of germ layers, Ectoderm, Mesoderm and Endoderm
Further development of Trophoblast and Neuralation		39	Describe the process of development of Trophoblast and neurulation
Fetal membranes		40	Describe the formation of fetal membranes
4 <sup>th</sup> week: Folding of embryo		41	Describe the process and types of folding of embryo
Highlights of 4-8 weeks		42	Enlist the events occurring in 4-8 weeks of development
BIOCHEMISTR Y	Chemistry of Acids and Bases	1	Define acids, bases
		2	Describe strong acids and weak acids.
		3	Describe strong bases and weak bases.

		4	List different types and sources of acids and bases in our body
		5	Describe the mechanism of their normal balance and biochemical importance
	Importance of surface tension and viscosity in our body	6	Explain surface tension, viscosity, vapor pressure, normal boiling point and capillary action
	Carbohydrates -I	7	Describe carbohydrates and give their Bio-chemical importance.
		8	Classify Carbohydrates
		9	Explain carbohydrate and its Bio-chemical structure.
		10	Describe the different isomers of monosaccharides. e.g. Galactose, mannose, fructose, dextrose.
		11	Describe the role of dextrose in I/V infusion.
		12	Describe the role of mannitol in cerebral edema.
		13	Describe the structure of disaccharides and oligosaccharides.
		14	Relate the structure of polysaccharides with its clinical importance.
		15	List the functions of carbohydrates in cell membrane, energy provision and nutrition supply to different parts of body.
COMMUNITY MEDICINE		Determinants of health	1
	2		Describe the Determinants of Health
	Disease causation	3	Describe Spectrum of Disease
		4	Explain Natural History of Disease
		5	Explain Theories of Disease Causation.
		6	Differentiate between Disease Elimination and Eradication.
	Chain of infection	7	Describe reservoirs of infection & chain of infection
	Levels of prevention	8	Discuss /describe Levels of Prevention
PRIME	Bio ethics	1	Discuss Bioethics Describe different types of Bio-ethics
	Behavioral sciences	2	Describe Attitudes in health professionals Describe factors affecting it.
	Behavioral sciences	3	Define attention and concentration. What factors affect them?
	Behavioral sciences	4	Define personality. What factors affect personality development?
<b>Skill and Effective Domain</b>			

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BIOCHEMISTRY	Sterilization	1	Explain the process of sterilization
		2	Enumerate the different methods of sterilization
		3	Observe the process of autoclaving in the laboratory
	Capillary Blood Sampling	4	Obtain capillary blood sample for hematological investigations through prick method
		5	Identify the sites for obtaining blood sample with different methods and list the indications for their use.
	Detection of Monosaccharides	6	Define Monosaccharides
		7	Discuss structure and types
	Detecting of Reducing and non-reducing Sugars		Perform the sequence of tests to identify the monosaccharides in a given solution.
		8	Define reducing sugars, types.
		9	Discuss structure and types of reducing sugars
	Detection of Polysaccharides in a given Solution	10	Perform Benedicts test
		11	Define Polysaccharides.
		12	Discuss structures and types of Polysaccharides
	13	Perform the sequence of tests to identify the polysaccharides in a given solution.	

### THEME 4

#### Human Body Tissues, Bones & Joints

SUBJECT	TOPIC	S.NO	LEARNING OBJECTIVES
ANATOMY	Organization of human body	1	Describe the levels of organization of human body
	Anatomical terms	2	Describe the anatomical terms for planes, position and movements
	Classification of Bones	3	Describe the structure and function of bone
		4	Classify bones on the basis of length and shape.
		5	Identify the markings on bone
	Cartilage	6	Describe cartilage
		7	Classify the types of cartilage
		8	Describe the types of cartilages
	Introduction to Joints	9	Classify joints on the basis of structure.
		10	Describe the mechanism of movements of joint
	Muscles	11	Describe various muscle types along with structure.
	Skin / Integumentary system	12	Discuss the anatomical structures of Skin(dermis & epidermis) Skin creases, Nails, Hairs, Glands (Sebaceous & sweat) / Integumentary system
	Lymphatic system	13	Describe the lymphatic system.
		14	Explain the functions of lymphatic system
		15	Describe the organization of lymphatic system

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		16	Explain the mechanisms for the movement of lymph in the body.
	Nervous system Divisions (central & peripheral and somatic & autonomic)	17	Define the organization of nervous system
		18	Describe the divisions of nervous system
		19	Describe the formation of spinal nerve and concept of dermatome and myotome
		20	Describe the formation of nerve plexus.
	Autonomic Nervous system Sympathetic. parasympathetic nervous system	21	Describe the organization of autonomic nervous system
		22	Differentiate between sympathetic and parasympathetic nervous system on the basis of structure.
	Membranes: Mucous membranes, Serous membranes	23	Describe the structure of membranes of human body
	Fascia, ligaments and raphe	24	Describe the anatomy and significance of fascia, ligaments and raphe.
	Radiological anatomy	25	Identify various anatomical landmarks on radiography.
		26	Describe commonly used radiographs.
27		Describe various view used for obtaining radiographs.	
HISTOLOGY	Basic Body tissue Definition of tissue Epithelial tissue Connective tissue Muscular tissue Nervous tissue	1	Define tissue
		2	Describe the basic tissues in human body
	Epithelial tissues Classification of epithelium General characteristics and Functions of epithelium	3	Classify epithelium
		4	describe the general features of epithelium
		5	explain the specialized functions of different types of epithelial cells
		6	Describe the structure of main types of cell junctions
	Glandular Epithelium	7	Enlist glandular epithelia
		8	Classify them on the basis of morphology, nature of secretion and mode of secretion

		9	Differentiate between exocrine & endocrine glands on the basis of structure and function.
	Epithelial Cell Surface Specialization	10	Describe the surface specialization of epithelia
		11	Correlate their structure, with their location and function
	Structure & Function of Basement Membrane	12	Describe the structure of basement membrane & correlate it with its function.
	Connective tissue	13	Define connective tissue.
		14	Classify connective tissues.
		15	Explain the different types of Connective tissues
PHYSIOLOGY	Autonomic Nervous system	1	Describe the functions of the autonomic nervous system. Compare and contrast the functions of sympathetic and para sympathetic nervous system. Classify autonomic receptors.
BIOCHEMISTRY	structure and function of GAGS	1	Describe the structure and function of GAGS and its clinical importance
PATHOLOGY	Necrosis	1	Discuss the Process of necrosis Explain the process of apoptosis Differentiate between apoptosis and necrosis
	Inflammation	2	Describe acute inflammation Describe events of acute inflammation Describe chronic inflammation Differentiate between acute and chronic inflammation.
FORENSIC MEDICINE	Death	1	Define death. Describe stages of death. Describe medico legal importance of stages of death.
PRIME	Bio ethics	1	Discuss Bioethics Describe different types of Bio ethics
	Behavioral sciences	2	Describe Bio-Psycho-Social model of health care
	Behavioral sciences	3	Correlate health with Behavioral sciences. Describe Important of behavioral sciences in health.
	Introduction	4	Differentiate between leadership and management
<b>Skills and Effective Domain</b>			
HISTOLOGY	Tissue Processing	1	Describe the process of tissue processing for histo-pathological examination.
	Anatomical terms	2	Demonstrate anatomical terms for planes, position and movements. Demonstrate standard anatomical position and its application.

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	H& E staining	3	Perform H & E staining of tissue slides under supervision in the laboratory
	Simple Epithelia	4	Identify and describe simple epithelia under M/S.
	Stratified Epithelia	5	Identify and describe stratified epithelia under M/S.
	Glands	6	Identify different types of glands under M/S.
	Smear preparation	7	Prepare a blood smear.

## P. LIST OF RECOMMENDED BOOKS

### Gross Anatomy

1. Drake Gray's Anatomy for students 3rd edition 2014
2. Clinically oriented anatomy – Moore 7th Edition 2013
3. Clinical anatomy – Snell 8th Edition 2008.

### Embryology

4. The Developing Human – Moore and Persaud 9th Edition 2012
5. Langman's Medical Embryology – Sadler 9th Edition 2004
6. Human Embryology – Laiq Hussain 2nd Edition 2012 (Vol I and Vol II)

### SUGGESTED BOOKS

#### Gross Anatomy

7. Grant's Atlas of Anatomy – Agur 12th Edition 2009
8. Gross Anatomy – Chung 6th Edition 2008
9. Last's Anatomy – Regional and Applied – Sinnatamby 12th Edition 2011

#### Embryology

10. Human Embryology and Development Biology – Carlson 3rd Edition 2004
11. Human Embryology – W.J. Larsen 3rd Edition 2002
12. Basic Concepts in Embryology – Sweeney 1st Edition 1998

### RECOMMENDED BOOKS

#### Physiology

13. Physiology Practical handouts
14. Review of Medical Physiology by Ganong 24<sup>th</sup> edition 2012
15. Text Book of Medical Physiology – Guyton + Hall 12<sup>th</sup> edition 2012
16. Essentials of Medical Physiology – Sembulingum 6<sup>th</sup> edition 2012

### SUGGESTED (NICE TO KNOW) READINGS

17. Best and Taylor's Physiological Basis of Medical Practice – Brokbeck.
18. Essentials of Medical Physiology Vol.1 and Vol. 2 – Mushtaq.

#### Biochemistry

### RECOMMENDED (COVERING "MUST KNOW") READINGS

19. Text book of Biochemistry by M. N. Chatterjea 8th Edition 2011
20. Essentials of biochemistry By Mushtaq Ahmad 8<sup>th</sup> edition 2008
21. Harper's Illustrated Biochemistry 27th Edition
22. Text book of Biochemistry with Clinical Correlations 6th edition by Thomas M. Devlin
23. Practical handouts
24. Human Nutrition
25. Human Growth and Development

#### Pharmacology

### RECOMMENDED (COVERING "MUST KNOW") READINGS

26. Lippincott's Illustrated Reviews: Pharmacology, 6th Edition 2014

### SUGGESTED ("NICE TO KNOW") READING

27. Basic & Clinical Pharmacology 10th Edition by Bertram G. Katzung
28. Trevor's pharmacology examination and board review.
29. Step I USMLE; Kaplan Medical (Pharmacology)

*Prepared by*  
*Dept. of Medical Education*



30. Goodman's and Gilman's Manual of Pharmacology and Therapeutics (Portable edition)

**RECOMMENDED (COVERING "MUST KNOW") READINGS**

**PATHOLOGY**

31. Robbin and Cotran Pathologic Basis of Disease 9<sup>th</sup> edition 2013

**COMMUNITY MEDICINE**

32. Textbook of Community Medicine, 2013

**MEDICINE**

33. Kumar and Clark for Medicine 8<sup>th</sup> edition 2012

**PEDIATRICS**

34. Nelson's Textbook of Peadiatrics 20<sup>th</sup> edition 2017

**PSYCHIATARY**

35. New Oxford Textbook of Psychiatry, 2<sup>nd</sup> Edition, 2015

**Gynecology and Obstetrics**

36. Oxford Handbook of Obstetrics and Gynaecology 3<sup>rd</sup> Edition, 201