Syllabus

of

Ayurvedic Moulic Siddhanta

(Basic Principles of Ayurved)

For
The Course of B.A.M.S Medical Students of Bangladesh

Published by
University of Dhaka
Bangladesh

Ayurvedic Moulic Siddhanta
(Basic Principles of Ayurved)

Objectives: At the end of the course in Ayurvedic Moulic Siddanta (Basic Principles of Ayurved) the Students should be able to:

- Equip themselves with adequate knowledge of Ayurvedic Moulic Siddanta (Basic Principles of Ayurved) both in general & clinical aspect.
- Understand code of medical ethics as well as philosophy & fundamental of Ayurved.
- Understand details knowledge of Ayurvedic padartha (Physics), Ayurvedic history and Ashtanga of Ayurved.
- Know brief knowledge of different systems of medicine.
- Perform and enterpret the methods of examination/diagnosis & treatment according to Ayurvedic and modern concept.
- Demonstrate knowledge and skill to precede higher studies and research in relation to needs of the country.
- Develop sound attitude towards the need for continuous self education/learning.
- Demonstrate knowledge of latest development activities regarding Ayurvedic in Bangladesh, overseas and WHO.

Total Papers:

- **Paper-I:** Ayurvedic Padartha & Darshan
- **Paper-II :** Ashtanga Sangraha

Total Marks & its distribution: 300

- **Paper-I: Marks 150**
    - Theory: 100 [Formative 10,Written 90 (MCQ 20 +SAQ 70)]
    - Practical: 50 (OSPE 10, Spotting 5, IA 5, Preparing Chart 5 and Oral 25)
- **Paper-II : Marks 150**
    - Theory: 100 [Formative 10,Written 90 (MCQ 20 +SAQ 70)]
    - Practical: 50 (OSPE 10, Spotting 5, IA 5, Preparing Chart 5 and Oral 25)

Total Teaching Hours: 260 hours

- **Paper-I: 130 hours**
    - Total Theory Lectures (100): 100 hours (per lecture 1 hour)
    - Total Practical/Clinical (15): 30 hours (per lecture 2 hours)
- **Paper-II: 130 hours**
    - Total Theory Lectures (100): 100 hours (per lecture 1 hour)
    - Total Practical/Clinical (15): 30 hours (per lecture 2 hours)

Paper-I: Ayurvedic Padartha & Darshan

Theory **Marks 100**

Learning objectives	Contents	Teaching/learning strategy	Teaching aids	Hours/days	Assessment
The students will be able to know *Ayurvedic Padartha & Darshan especially philosophical background of fundamentals of Ayurved with their significance, definition, different types, aim, objectives, properties, Charak's opinion etc	• **Ayurveda Nirupana**: Definition and lakshana of ayu, composition of ayu; definition and lakshana of Ayurveda; definition and types of siddhanta; introduction of basic principles of Ayurveda and their significance • **Ayurveda darshana nirupana**: Philosophical background of fundamentals of ayurveda, meaning of the word "darsan" and its omnipresence; evolution of darsana, their Numbers and classification; general introductions of schools of Indian Philosophy with an emphasis on nyaya, vaisheshik and sankhya Darsana. Ayurveda as unique and independent school of thought (philosophical individuality of ayurveda), definition of padartha, lakshana of padartha. Division and number of padarthas; bhava and abhava padartha; charak's opinion regarding these; introduction & description of karana-padarthas mentioned by charak • **Dravya Vigyaniyam**: Definition, lakshana and number of dravya, panchabhutas; origin of panchamahabhuta, parasparanupravesha (mutual conglomeration), types of panchikaran; lakshana and types of prithvi, lakshana and types of tejas; lakshan and types of jala ,lakshana and types of vayu, lakshan of akasha and its aupadhika types; kala nirupana, etymological derivation, definition and lakshana of the word 'kala'; aupadhik types of kala, significance of kala in ayurveda; dig-nirupanam, significance of dig and aupadhik types, lakshana of atma, description of purusha mentioned in ayurveda- Ativahika purusha/	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and others reading • Text book • Poster and diagram.	***Lecture** and Seminar 100 hours * **Practical**/ Clinical 30 hours	*__Written__ (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) ***I. Assignment** * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial Class/ Exam.**

	sukshma sharir/ rashi purusha/ chikitsiya purusha/ karma purusha/ saddhatvatmak purusha, initiation of atma towards perception of knowledge (atmanahjnana pravritti), mano nirupanam; lakshana,synonyms of manas, mana as substratam of diseases(manasah vyadhyashryatram); guna (qualities), Vishaya (subject), karma (functions), ubhayaindriyatva and seat of mana; contribution of panchamahabhuta and triguna in physical constitution(dehaprakriti) and mental faculty; disapproval of dravyatva of tamas, practical study/application of dravya in ayurveda. • **Guna Vigyaniyam**: Etymological derivation, definition and number of gunas, vaisesika guna (sartha)-shabda, sparsha, rupa, rasa, gandha; adhyatma gunah- budhi, Sukha, dukha, ichha, dwesa, prayatna; paradi guna, gurvadi guna- their introduction and clinical application. • **Karma Vigyaniyam**: Definition, lakshana and types of karma, types of karma mentioned in nyaya, Description of karma in ayurveda, practical study/ application of karma in Ayurveda. • **Samanya Vigyaniyam**: Definition, lakshan, types of samanya, practical study/ application of Samanya in reference to dravya, guna and karma. • **Vishesha Vigyaniyam**: Definition, lakshna and types of vishesa, detailed description of the verse "pravrittirubhayasyata", practical study of vishesa for clinical application in Ayurveda. • **Samavaya Viyaniyam**: Definition and lakshana of samavaya, practical study of samavaya for clinical application in ayurveda. • **Abhava Vigyaniyam**: Definition and lakshana of abhav padartha, classification of abhav- description of pragbhava, pradhwansabhava, atyantabhava,anyuanyabhav; clinical significance of abhava in ayurveda.				

Praman/ Pariksha Vigyaniyam (Epistemology)	• **Pariksha nirupana (means of getting knowledge)**: Definition, significance and necessity of pariksha. Two types of anubhav-prama and aprama. Lakshan and types of prama and prameya. Lakshna, causes and types of smriti(memory). Significance and importance of praman. Enumeration of pramana according to different school of philosophy. Four types of methods of examination according to ayurveda (chaturvidha pariksha vidhi). Pramana in ayurveda. Incorporation of different pramans into three pramans. Use of word pariksha in reference to pramana in classics of ayurveda. Practical application of methods of examination (pariksha vidhi) in treatment (chikitsa). • **Aptopdesha pariksha/ pramana nirupana (Authoritative instruction/ spiritual testimony)**: Definition of aptopdesha, lakshana of apta, lakshana of sabda, and its types, sabdavritti - abhidha, lakshana, vyanjana, tatparyakhya; shaktigraha hetu, vyakya Characteristic ; vakyartha jnanahetu- akanksha, yogyata, sannidhi. • **Pratyaksha pariksha/ pramana nirupana (direct observation or perception)**: Definition and lakshana of pratyaksha. Types of origin of pratyaksha jnana. Types of pratyaksha-nirvikalpak- savikalpaka with description; description of laukika and alaukika types and their further classification. Sannikarsa Characteristic, six types of sannikarsa, characteristics of sense organs (indriyanam Characteristic lakshanam). Classification of Indriya and enumeration. Description of panchapanchaka, establishment of origin of Indriya by panchamahabhuta (bhautikatwa of Indriya) and similarity in sources (tulyayonitva) of Indriya. Dominance of antahkaran. Hindrances indirect perception				

	(pratyaksha anuplabdhikaran), detailed description of direct perception (pratyaksha) by various instruments/ equipments; necessity of other pramans in addition to pratyaksha. Practical study/ application of pratyaksha in physiological, diagnostic, therapeutics and research grounds. • **Anumana pariksha/pramana nirupanam (inference)**: Definition and lakshan of anuman. Introduction of anumiti, paramarsha, vyapti, hetu, sadhya, paksha, dristanta etc. Types of anuman mentioned by Charak Samhita & nyaya darsana. Characteristic and types of vyapti, Characteristic and types of hetu, description of ahetu and hetwabhasa. Characteristic and significance of tarka. Practical study/ application of anumana pramana in physiological, diagnostic, therapeutics and research grounds. • **Yukti pariksha/ pramana (epistemology of reasoning)**: Definition and lakshana of yukti pariksha, discussion on yukti pramana. Importance & characteristic of yukti pariksha in ayurveda. Practical study and utility of yukti pariksha in therapeutics and research. • **Upamana pramana nirupanam(analogy)**: Definition and lakshana of upamana. Application of upamana in therapeutics and research. • **Karya- Karan siddhanta nirupanam (cause and effect theory)**: Definition and lakshana of karya and karana. Types of karan. Significance of karya and karan in ayurveda. Different opinions regarding manifestation of karya from karan- satkaryavada, asatkaryavada, parinam vada, arambhavad, paramanuvada, vivartavada, kshanabhangurvada, pilupaka, pitharpaka, anekantavada, swabhavoparamvada. • **Srishti-nirupanam:** Srishti-laya nirupanam (evolution and devastation of universe), Description of tatvotpatti, Tatva-nirupanam, classification of tatva. Evolution of universe				

	(life) according to charak, sushruta (srishti-vikaskrama); Ashtaprakriti, Shodashvikara and their description. Similarity and dissimilarity between kshetra-kshetragya, vyakta-avyakta, prakriti-purush. Triguna nirupanam, Description of theories of rebirth and salvation (punarjanma & moksha) • **Shastrartha Bodhaka:** Shastra Lakshana, tantra guna, tantra dosha, detailed description of tantrayukti, Brief description of tachhilya and arthashrya.				
Itihas (History of Ayurveda)	• Etymological derivation (vyutpatti), syntactical derivation (niruktti) and definition of the word itihas, necessity of knowledge of history, its significance and utility. means and method of gaining knowledge viz. historical person (vyakti), subject (vishaya), time period, (kala), happening (ghatna) and their impact on ayurveda. • Decent of Ayurveda, chronology of ayurveda according to different schools, introduction of eight branches of ayurveda and concerned renowned texts. Introduction of the authors of these texts. • Eternity of ayurveda (shashvatvam and anaditavam). • Status of ayurveda in Vedic period, progression of ayurveda upto tantra kala. Knowledge about available topics of ayurveda in puranas and tantras etc. • Introduction of authors of classical texts during Samhita kala and their contribution especially Atreya, Dhanwantri, Kashyapa, Agnivesha, Sushruta, Bhela, Harita, Charaka, Dridhbala, Vagbhatta, Nagarjuna, Jivaka – introduction and contribution. • Chronological development of charaka samhita, sushruta samhita and kashyapa samhita. • Introduction and establishment of time period of commentators of classical samhitas – bhattar				

	harishchandra, Jejjata, Chakrapani, Dalhana, Nishchalakara, vijayarakshita, Gayadas, Arundatta, Hemadri, Gangadhara, Yonginderanath sen, Haranchandra Chakravorty. • Introduction and time period of authors of compendium (granthasamgraha kala) – Acharya Bhavmishra, Sharangdhara, Vrinda, madhavkara, Shodhala, Govind Das (Author of bhaisjya ratnawali), Vasavraja etc. • Origin of ras shastra and its development, introduction and time period of promoters of ras shastra. • Vrikshayurveda vijnana (Ayurveda for plant kingdom), pashu chikitsa vijnana (ayurveda for animal kingdom), promoters of ashva, gaja chikitsa Vijnana; shalihotra, palkapya, varahmir, nakula, ashvaghosh. • Introduction of authors of modern era –Gan Nath sen, Yamimi bhushan, Yadavji tikramji acharya, Ghanekar, Damodar Sharma Gaur, Priyavrat Sharma, Swami Laksmiram, Dr. P. M. Mehta, Daji Shastri Pade etc. • Globlaisation of ayurveda – Sumera, Babilonia, Asiria, Misra (Egypt), China, Persia, Arabia, Kamobja, Sri Lanka, Nepal, Thailand, Mauritius, Myanmar (Burma) etc. – expansion of ayurveda in above mentioned civilisations. • Impact of ayurveda on Hippocratus (Father of Allopathy), Invitation to Indian physicians by yavans and translation of ayurvedic text into Arabian language, visit to Greece by Indian scholars, relation between Greece and india in ancient period (made by Alexandar), expansion of ashvavaidyaka in Greece. • Post independence research, development and higher education of Ayurvedic in Bangladesh, abroad and World Health Organization (WHO) as well as globalization of Ayurved. • Historical background and current situation of				

	Allopathic, Unani, Homeopathic, Herbal, Traditional, Complementary and Alternative medicine on the basis of WHO. • Developmental actions for ayurveda in post-independence period, development in educational trends, establishment of different committee, their recommendations, central council of Indian medicine, central council for research and ayurveda and siddha, foundation of department of AYUSH, its introduction and activities, drug and cosmetic act, Ayurvedic pharmacopoeia Committee formation and activities of organisations and institutions like Rashtriya Ayurveda Vidyapeeta etc. Activities in field of research in ayurveda according to different subjects. Initiation for writing down a text, different councils of vaidya and their activities. Publications of Ayurveda journals and magazines, WHO, status of Ayurveda on international grounds in present era.				

Paper-II: Ashtanga Sangraha

Theory **Marks 100**

Learning objectives	Contents	Teaching/learning strategy	Teaching aids	Hours/days	Assessment
The students will be able to know: Introduction to Ashtanga Sangraha/Hridaya: Basic concept, Eight specialised branches, mythological origin of Ayurved and its Manifestation into humanity, universal nature, unique features, aims of Ayurvedic.	**Core:** Basic knowledge about Ashtanga Sangraha/hridaya. **Introductory study for sutrasthan of** • Ashtanga Sangraha chapter no.: 12 to16, 22, 23 and 25 to 40. • Ashtanga Hridaya chapter no.:15, 25, 26, 28 and 29. **Through/detailed study for sutrasthan of** • Ashtanga Sangraha chapter no. : 1 to 11, 17 to 21and 24 • Ashtanga Hridaya chapter no. : 1 to 14, 16 to 24, 27 and 30. • **Introduction of Ayu & Ayurveda**: Meaning, synonym, types, sense organ, eight specialised branches, mythological origin of Ayurved, universal nature, unique features, aims of Ayurveda. • **Basic concept of Atma, Indriya & Mana.** • **Details of Panchamahabhuta**. • **Details knowledge of Tridosha concept**. • **Details of Shapthadatu & Malas**. • **Details of Agni and Ama**. • **Details of Srotaja Vigyana** • **Details of Chikitsa Chatushpada** • **Basic concept of Roga** • **Details of Trisutra Vigyana** • **Basic concept of Chikitsa** • **Concept of Panchanidana** • **Concept of Prakriti** • **Basic concept of Dincharya, Ritucharia & Nidra** • **Concept of Sadvittapanchak.** • **Understanding of Trividha, Churvida & Astavidha pariksa.**	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and others reading • Text book • Poster and diagram.	***Lecture** and Seminar 100 hours * **Practical**/ Clinical 30 hours	***Written** (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) ***I. Assignment** * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial Class/ Exam.**

Practical and Oral Examination

Note: Practical/Clinical & Oral Examination of Paper-I and Paper-II will be taken together in two boards with four examiners (two internal two external).

Practical:

- Panchabhautika nirupanam of karya dravya and their introduction.
- Examination of bhautika/samanaya guna and introduction.
- Examination of patient (Tribidh/Chaturbidh Pariksha/ Chikitsha Chatuspad
- Examination of physical constitution composed by panchamahabhuta (deha prakriti) and mental temperament composed by triguna (amanas prakriti).
- Exposition or display of process of indriyarth snnikarsha in establishment of dravya and roga (dravya and rogavinishchaya).
- Importance/significance of pariksha/pramana in examination of dravya, rog and rogi (Disease and patient).
- Allotment of practical work according to syllabus.

Preparing Chart:

- Origin of Ayurvedic according to Asthanga Sasngraha/Hridaya, Eight branches of Ayurved, Agni, Prakriti Kostha, Tridosha, functions of Dhatus, Rasa, Guna, Virja, Vipaka and Prabhava of Dravyas, Ritu charjja, Din charjja, Vega vidharana, chikitsa Chatuspada, Sadhyasadhyata, different classification of dravyas jala-shuka-shimbi-Ikshu barga, Dhanaya varga etc. Roga and its types, dosha samsodhana kala, Vriddhi & Kshyaya lakshanas of dosha, dhatu, malas. Dosha prakopa according to Ritu (season), Saptavidhahara kalpana, aharatimatra janya roga, viruddhahara, traya upasthambhas, roga and rogi pariksha.

Internal Assessment: The internal Assessment can be followed by the Colleges. They are

- Credit for preparation and presentation of seminars by students.
- Preparation of Clinical case for presentation.
- Clinical case study/problem solving exercises.
- Participation in project for health care in the Community.
- Proficiency in conducting a small research project or assignment
- Multiple Choice questions (MCQ) test after the Completion of a chapter /System

Oral:

- **Oral Examination should be structured according to the syllabus of Ayurvedic Moulic Siddanta and Darshan (Basic Principles of Ayurved) Paper-I**.& II

Recommence Books:

(1) A handbook of Ayurveda by Vaidya Bhagwan Dash, Acarya Manfred M. Junius (2) Charak Samhita by Prof. PV Sharma, Prof. R K Sharma ,(3) PadarthaVijnana by Prof. Dr. Yogesh Chandra Mishra (4) Astanga Hridaya & A .Samgraha by Baghavat (5). A Concise text book of Astanga Samgraha by PR Bhat, (6) Astanga Sangraha by Kaviraj Shriniketan Chakrabarty (7) Basic Principle of Ayurvedic Medicine by Dr. Rahima Akter Khatoon , (8) Basic Principle of Ayurvedic by VB Athavale, (9) The Basic Principles of Ayurvedic by Dr. Swapan Kumar Datta, (10) History of Indian Medicine, J. Jolly (11) Hindu Medicine Zimmer (12) Indian Medicine and classical , PV Sharma, (13), Science and Philosophy of Indian Medicine, KN Uddupa,(14) Ayurved Shastrer Ittihas by Kaviraj Shriniketan Chakrabarty.

Syllabus

of

SHARIR RACHANA
(Anatomy)

For
The Course of B.A.M.S Medical Students of Bangladesh

Published by
University of Dhaka
Bangladesh

Sharir Rachana (Anatomy)

Departmental Objectives:

At the end of the Anatomy course, the students should be able to:

- Mention, identify, show, draw and describe the structural components of the body
- Responsible for carrying out normal body functions;
- Use the above knowledge to understand, correlate and appreciate the other preclinical, para-clinical and clinical medical subjects;
- Apply the knowledge of Anatomy with the knowledge of other medical subjects to
- Provide optimum health services in the country and abroad.

List of Competencies to acquire:

- Adequate knowledge of the structural components of the body & correlate it with normal body functions.
- Using the above knowledge to understand, correlate and appreciate the other subjects to be taught in the para-clinical and clinical medical courses.
- Applying the knowledge of Anatomy with the knowledge of other medical subjects to provide optimum health services in the country and abroad.

Sharir Rachana (Anatomy)

Paper –I **Marks –100**

Learning objectives	Contents	Teaching/learning strategy	Teaching aids	Hours/days	Assessment
Student will be able to **General Anatomy** • Define anatomy, explain the subdivisions of anatomy • Describe the anatomical terminology, planes & positions • Define bone. Describe the composition, blood supply, functions & ossification of bones. • Describe composition characteristics, location and functions of different types of cartilages. • Define & classify joints, the characters, stability & movements of joints and correlate with the clinical conditions • Classify muscles, their properties and functions and also classify skeletal muscle morphologically & functionally • Define & classify blood vessels, • Describe the systemic, portal & pulmonary circulation. • Describe different types of vascular anastomosis with their functional & clinical implications. • Describe components, functions & the general plan of lymphatic drainage of the whole body. • Classify & describe the functions of	**CORE**: • **Definition**, subdivisions of Anatomy and its importance in the study of medicine. • **Anatomical terminology** and anatomical planes & positions. • **Skeletal system**-Bones–classification, composition, functions, parts of a developing long bone, blood supply, periosteum & endosteum. Ossification-definition, centers, processes. Factors affecting growth of bone. • **Cartilages**-composition, types , characters ,locations and functions • **Joint**: classification, characteristics of each type & movements, stability of the joints. Clinical conditions associated with joints. General plan of blood supply & nerve supply of joints. • **Muscular system**: Classification, characteristics and functions. • **Skeletal muscle** -classification • **Blood vascular system**: component parts. General plan. Structure, classification, differences between different types of vessel. Nutrition & innervations of vessels • **Circulation :** types, characteristic features of each type • **Lymph vascular system** : components, characteristic features of lymph capillaries .Differences with blood capillary .Lymphoid organs: classification & functions	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and others reading • Text book • Poster and diagram.	***Lecture** and Seminar 100 hours * **Practical/** Clinical 30 hours	*__Written__ (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) *__I. Assignment__ * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial Class/ Exam.**

lymphoid organs					
Cell Biology • Define and describe the human cell & its constituents, structure & functions of cell membrane. • Describe the structure & functions of nucleus. • Describe the structure & functions of organelles & inclusions • Describe the features of different types of cells: protein secreting, iron transporting, steroid secreting, mucus secreting, antibody producing cell.	**CORE:** • Human Cell-Basic organization, types constituents, cell membrane, nucleus, cytoplasm & organelles and inclusions • Functional correlation of different types of cell with their particular-nuclear, cytoplasmic, membrane and surface feature				
Human Genetics • Define terms related to human genetics • Describe the different basic features of chromosomes explain structure, function, basis of protein synthesis of DNA & RNA • Define allele homozygous, Heterozygous karyotyping explain Mendel's Law of inheritance & Lyon's hypothesis	**CORE:** • Terms & definitions: Gene, Gene locus, genome, genotype, phenotype, genetic trait etc. • Chromosomes: Structure, types, bio-chemical nature, & chromosomal disorders • DNA and RNA: Structure, function, basis of protein synthesis • Allele, homozygous, Heterozygous Karyo typing • Additional: -Mendels law of inheritance & Lyon's hypothesis -Outline of recent advances in Genetics -Principles of genetic engineering -Principles of cloning				
General Histology • Define and classify the basic tissues in the body • Describe the different types, characters; distribution and the functions of epithelial tissue describe the cell Surface specialization & Junctional complexes. • Describe the composition, characters, distribution and the functions of connective tissue.	**Definition, Classification, Components, Characters, Distribution and Functions of** • Epithelium -Surface epithelium -Glandular epithelium • Connective tissue - Proper - Special • Muscular tissue -Smooth -cardiac				

• Describe the structure & functions of different types of connective tissue cell. • Describe the histological structures of smooth muscle, cardiac muscle & skeletal muscle. Describe the mechanism of muscle contraction. • Describe the structure & functions of neuron & neuroglia	-skeletal • Nervous tissue -Neurons -Neuralgia				
Systemic Histology: Students will be able to describe the histological structures of different parts of body system	**Histological structures of** • Respiratory system • Vascular system • Lymphoid organs • Digestive system & associated Glands • Exocrine glands (salivary) • Urinary system • Endocrine glands • Male reproductive system • Female reproductive system • Integomentory system • Special sense organs				
General Embryology • Define terms related to embryology • Explain the significance of study of embryology • Explain proliferation, growth, differentiation, inductors, evocators and organizer • Describe different types of cell division • Describe chromosomal changes during cell division with anomalies • Describe oogenesis and spermatogenesis • Describe the process of fertilization • Describe the events of 1st week of development. • Describe the events 2nd week of	**CORE:** • Introduction: Terms and Definition Significance of study of embryology • Basic process of development : proliferation, growth, differentiation, inductors, evocators and organizer • Cell division: Types • Gametogenesis and maturation of Germ cells. • Fertilization: Events, factors influencing the fertilization. Progress in 1st week of development • Progress in 2nd week of development. • Progress in 3rd week of development. • Derivatives of germ layers: ectoderm, mesoderm & endoderm. • Foetal membranes: Placenta, Chorion, Amnion, Umbilical cord, Yolk sac etc.				

development. • Describe the events 3rd week of development. • Describe the development & derivatives of ectoderm, mesoderm & endoderm. • Explain the development of foetal membranes. • Explain the development of twins & their types. • Describe the causes & types of congenital anomalies • Explain the process of human evocation • Eescribe the Molecular regulation & cell signaling pathways	• Twins: Teratology • **Additional:** -Human Evolution -Concepts of medical biotechnology in relation to Embryology -Molecular regulation &cell signaling				
Systemic Developmental Anatomy • Describe the process of development of different body system • Describe the developmental anomalies of different body system • Mentiongeneral outline of development of: Thoracic duct, Cysterna chyli, Inferior Vena Cava, Superior Vena Cava, Portal Vein, Brachiocephalic veins, & Renal veins.	**CORE:** **Development and their Anomalies of** • Skeletal system & vertebral column • Muscular system • Upper and lower limb • Digestive system with associated glands • Respiratory system • Cardiovascular System & aortic arches • Coelomic cavity & the diaphragm • Skin & mammary gland • Urinary system • Male and female Reproduction system • Pituitary & suprarenal gland • Face & neck & their associated organs • Nervous System • Eye & Ear **Additional:** Development of • Lymphatic System • Vascular System				
Neuroanatomy • Classify nervous system. Describe composition of grey matter and white	**CORE:** • Introduction to Nervous system, • Nerve fibres: Structure classifications &				

matter • Explain the structure, process of myelination, degeneration & regeneration of nerve fibers. • Define & classify synapse, receptors .describe the structure & functions of receptor & synapse • Define autonomic nervous system, describe the different parts of autonomic nervous system .nerve plexuses & ganglia Pia, arachnoid and dura mater . Extension, folds, spaces, nerve supply & blood supply • Explain blood brain & blood CSF barrier • Describe the formation, composition, circulation, absorption & functions of CSF • Describe the ventricles of brain • Describe the different lobes, Gyri, sulci and important functional areas with effects of lesion .Explain the mode of blood supply of cerebrum • Describe Pyramidal & extrapyramidal system & effects of their lesion • Describe functional lobes, nuclei, peduncles, blood supply, functions & clinical conditions of cerebellum • Describe location,, parts, blood supply, functions & clinical conditions of basal nuclei • Classify cranial nerves, explain functional components and cranial nerve nuclei, and describe the course of III, IV,V,VI,VII, IX, X, XI, XII cranial nerves .Explain & define dermatome & axial line • Describe the ascending tracts with	functions, myelination degeneration, regeneration • Receptors: structure classifications location & functions • Synapse: structure classifications & functions. Autonomic nervous system, autonomic nerve plexuses & ganglia • Coverings of brain and spinal cord, Pia, arachnoid and dura mater Extension, folds, spaces, nerve supply & blood supply • Cerebrospinal fluid (CSF) • Ventricles of brain • Motor system • Cerebrum: Lobes: gyri, sulci Functional Areas, Blood supply • Pyramidal & extrapyramidal system • Cerebellum: parts, functions , blood supply, clinical conditions • Basal nuclei : locations, parts , functions artery supply & clinical conditions • Motor & mixed cranial nerves • Sensory system: Dermatome & axial line • Ascending tracts of spinal cord • Diencephalon : parts & functions • Sensory cranial nerves & Smell, visual & auditory pathway • Spinal Cord: Length, extension, Enlargement ,Blood supply, Cross-sections at different level • Brain stem : blood supply, cross sections at different levels • Reticular formation • Limbic system				

effects of lesions • Describe the thalamus, hypothalamus • Explain functional components nuclei, and course of I, II, VIII, cranial nerves. Explain the smell, visual & auditory pathway • Describe the length, extension, enlargements sections of spinal cord at different level • Describe the parts, blood supply and significance of brain stem. • Describe the cross sections of midbrain , pons & medulla oblongata at different level • Describe the arrangement & functions reticular formation • Describe the parts & functions of limbic system					

Paper – II **Marks –100**

Learning objectives	Contents	Teaching/learning strategy	Teaching aids	Hours/days	Assessment
Thorax	**Thorax** • Counting of ribs and costal cartilages. • Heart-apex and borders • Lung-borders and apex • Trachea & Bronchi • Esophagus • Triangle of auscultation • Jugular notch • Sternal angle • Area of Superficial Cardiac dullness • Common carotid and subclavian artery, Internal thoracic artery	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and others reading • Text book • Poster and diagram.	***Lecture** and Seminar 100 hours * **Practical/** Clinical 30 hours	***Written** (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) ***I. Assignment** * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial Class/ Exam.**
Superior extremity	**Superior extremity** • Nerves: Radial, Ulnar, Median nerve, Axillary nerve • Arteries: Brachial, Radial, Ulnar artery, Superficial and deep palmar arch • Veins: cephalic, basilic & Median cubital vein • Flexor retinaculum • Anatomical snuff box • Medial humeral epicondyle				
Abdomen	**Abdomen** • Trans-pyloric plane, Trans tubercular plane, Subcostal plane, mid clavicular line • Regions of abdomen • Superficial & deep inguinal ring, Inguinal canal • Abdominal aorta & inferior vena cava • Stomach, Duodenum, Pancreas, Liver, Gall bladder, Bile duct, spleen, Kidney from back				

	& Mac Burney's point. • Transverse colon, ureter from front and back, celiac trunk, splenic artery, Root of the mesentery.				
Inferior extremity	**Inferior extremity** • Common peroneal nerve, Tibial nerve • Popliteal artery • Anterior & posterior tibial artery • Arteria dorsalis pedis • Great Saphenous vein • Small Saphenous vein • Adductor tubercle • Lateral and Medial Malleolus • Greater trochanter of femur • Anterior superior iliac spine • Femoral nerve, sural nerve, Medial and lateral plantar artery, plantar arch.				
Head and neck	**Head and neck** • Facial artery , Facial vein • Internal jugular vein, External jugular vein • Common Carotid artery & its bifurcation • Facial Nerve & their branches • Vagus nerve in the neck • Parotid gland and its duct • Frontal and maxillary air sinuses • Thyroid gland • Tip of the coracoid process • Inferior angle of scapula • Tip of the 7^{th} cervical spine • Middle meningeal artery				
Anatomy of Radiology & Images	**CORE** • Radio opaque structures • Radio-lucent structures • Plain X-ray of the -chest PA view -abdomen AP view -pelvis AP view -arm including proximal & distal				

	• Joints AP & lateral view -forearm including proximal & distal • Joints AP & lateral view -hand including proximal & distal • Joints -thigh including proximal & distal • Joints AP & lateral view -leg including proximal & distal • Joints AP & lateral view -foot including proximal & distal • Joints AP & lateral view -Head & neck (cervical spine) AP & lateral view -Paranasal sinuses OM view • Common normal Ultrasonographs, Isotope scan, • Magnetic Resonance Images (MRI), CT Scan • Coronary Angiograph				
Clinical Anatomy	**Thorax** • Pleurisy / Pleural effusion • Pneumothorax • Coronary artery disease • Pericarditis/ pericardial effusion • Flail chest • Paralysis of the diaphragm **Abdomen** • Portal vein obstruction • Hydrocele • Hernia • Peritonitis, Ascites • Gastric ulcer • Duodenal ulcer • Gall stone/Cholecystitis • Appendicitis • Benign hyperplasia of prostate, Prostatic cancer • Cystocele • Stress incontinence • Rupture urethra • Salphingitis				

	• Ectopic pregnancy • Prolapse of uterus / vagina • Haemorrhoids • Undescended testis • Psoas abscess • Ischiorectal abscess **Head & Neck** • Fracture of the skull bones • Scalp injury • Piriform fossa and foreign body • Otitis media • Sinusitis • Epistaxis • Tonsillitis • Swelling of thyroid gland • Mumps • Cavernous vein thrombosis • Cervical rib • CNS & Eyeball • Injury to brain /eye ball / spinal cord/cranial nerves • Meningitis • Hydrocephalus • Cerebral ischaemia • Iintracranial haemorrhage (extradural,subarachnoid, cerebral), papilledema • Horner syndrome **Superior extremity** • Dislocation of shoulder joint • Brachial plexus & injury to its nerves • Carpal tunnel syndrome • Colle's fracture • Breast abscess & breast cancer **Inferior extremity** • Varicose vein • Deep vein thrombosis • Nerve injury • Dislocation of hip joint				

	• Rupture of menisci & cruciate ligament, Bursitis • Deformities of foot • **Others**: -Arterial pulsation -Intravenous injections -Intramuscular injection -Apex beat, mitral ,tricuspid, aortic & pulmonary areas -Sternal puncture -Pleural effusion -Pericardial effusion -Coronary angiogram -Bronchoscopy -Laryngoscopy -Paracentesis /peritoneal dialysis -Liver abscess -Vasectomy -Tubal ligation - Nasogastric intubation -Palpation of Cervical lymph node -Lumbar puncture -Epidural/spinal anaesthesia -Pudendal block - Fundoscopy				

Regional Anatomy: THORAX CARD
(DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	Contents	Teaching hours
Students will be able to: • Demonstrate the boundary & identify the contents of thoracic wall, thoracic cavity mediastinum & inter costal space • Identify & demonstrate the gross features of bones & joints of thorax • Describe the formation , course ,branches & distribution of Spinal nerve / intercostal nerve • Identify & demonstrate the surfaces, borders, parts, chambers-including structures within the chambers of the heart • Explain blood supply & nerve supply of heart • Identify & demonstrate the layers of pericardium • Identify & demonstrate the surfaces, borders, fissures, lobes, hilus & bronchopulmonary units of the lung • Identify & demonstrate the layers & parts of pleura. • Explain the blood supply, lymphatic drainage& nerve supply of lung & pleura. • Identify & demonstrate the trachea bronchus & bronchial tree. • Explain blood supply & nerve supply of trachea & bronchial tree. • Explain the blood supply, nerve supply & lymphatic drainage of thoracic wall. • Identify & demonstrate the surfaces, parts openings, attachments of the diaphragm. • Explain the blood supply & nerve supply of the diaphragm. • Explain the significance of the orifices of the diaphragm. • Explain & demonstrate the extension ,parts ,relations & constrictions of oesophagus • Explain the blood supply, lymphatic drainage & nerve supply of the oesophagus. • Correlate clinical conditions associated with structures of thorax (Heart with its vessels, lung, trachea, bronchus, bronchial tree & the Diaphragm)	**Thoracic wall formation, thoracic cavity, intercostal space and mediastinum.** • Bones and joints of the thorax • Spinal nerve / intercostal nerve • Heart with pericardium. • Lung with pleura, trachea and bronchus. **Blood vessels, nerves and lymphatics of the thorax**. • The diaphragm. • Oesophagus • Clinical Anatomy	**49hrs.**

Regional Anatomy: SUPERIOR EXTREMITY CARD
(DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	Contents	Teaching hours
Students will be able to: • identify & demonstrate muscles, vessels, nerves of pectoral region including attachment of muscles • describe the parts of mammary gland & its blood supply, lymphatic drainage & nerve supply • demonstrate the boundary & identify the contents of axilla, Quadrangular & triangular spaces, & cubital fossa • demonstrate the attachments of muscles, and identify vessels, nerves, lymphatics & lymph nodes of different parts of superior extremity • demonstrate the gross features of bones & joints of superior extremity and muscles acting on joints • correlate clinical conditions associated with structures (nerves, vessels, bones, joints) of superior extremity	Pectoral region with mammary gland • Axilla • Superficial dissection of the upper limb, back and scapular region including quadrangular & triangular space Front of the arm , forearm and palm • Back of the arm, forearm and dorsum of the hand • Blood supply, lymphatic drainage, cutaneous innervation & dermatome of superior extremity • Bones & joints of the upper limb • Removal of the limb • Clinical Anatomy	42 hrs.

Regional Anatomy: ABDOMEN CARD
(DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	Contents	Teaching hours
Students will be able to: • demonstrate the different layers of anterior abdominal wall & hernial region • explain clinical types of hernia • demonstrate the different parts of GI Tract & its peritonium • explain their mode of blood supply, lymphatic drainage & nerve supply • demonstrate the features of liver, pancreas, supra renal gland & different parts of biliary system • explain blood supply, lymphatic drainage & nerve supply of them. • demonstrate the features of kidney, ureter, urinary bladder, & urethra • explain their blood supply, lymphatic drainage & nerve supply • demonstrate the features of different parts of male & female reproductive system. • explain their blood supply, lymphatic drainage & nerve supply. • demonstrate the muscles and identify the vessels, nerves & lymphatics of posterior abdominal wall • demonstrate the parts and identify the contents of the pelvis	Anterior wall of the abdomen with hernial region. • Stomach, abdominal part of the oesophagus; coeliac artery. • Duodenum, pancreas and spleen. • The mesentery and mesenteric vessels, jejunum and ileum. • Large intestine. rectum &anal canal • Liver with the biliary appartus including gall bladder; portal vein. • Kidney, suprarenal gland and ureter. • Muscles, blood vessels, lymphatics and nerves of the posterior abdominal wall. • Muscles, blood vessels lymphatics, nerves and the pelvis; urinary bladder. • Ovary, uterus, uterine tube, female external organs and perineum. • Vas deferens, seminal vesicle, prostate and male external genital organs.	**103 hrs.**

• differentiate between male & female pelvis • demonstrate the gross features & joints of lumbar vertebra & bony pelvis and muscles acting on joints • Correlate with clinical conditions associated with different organs of the abdomen	• Lumbar vertebra, bony pelvis &joints • Clinical Anatomy	

Regional Anatomy: INFERIOR EXTREMITY CARD
(DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	**Contents**	**Teaching hours**
Students will be able to: • demonstrate muscles attachments and identify vessels & nerves of different parts of inferior extremity • demonstrate the boundary and identify the contents of femoral triangle, adductor canal, popliteal fossa & sole of the foot • demonstrate the features of bones, joints, & muscles acting on joints • explain the Venous drainage, lymphatic drainage, & dermatome of inferior extremity • Correlate the clinical conditions associated with structures (nerves, vessels, bones, joints) of inferior extremity	Front and medial side of the thigh • Gluteal region and back of the thigh • Front of the leg and dorsum of the foot • Lateral side, medial side and back of the leg including the popliteal fossa sole of the foot • Bones & joints of lower limb • Arches of the foot • Removal of lower limb • Blood supply, lymphatic drainage, cutaneous innervation & dermatome of inferior extremity • Clinical Anatomy	41 hrs.

Regional Anatomy: HEAD & NECK CARD
(DISSECTION, DEMONSTRATION & TUTOR IAL)

Learning Objectives	**Contents**	**Teaching hours**
Students will be able to: • identify and demonstrate the different parts of bones of head & neck , joints, & muscles acting on joints • state the gross features & attachments of skull bones including baseof skull & cervical vertebrae. • demonstrate movements of joints of Head & Neck • demonstrate the layers of scalp identify the contents of temporal region • demonstrate the boundary of face and identify muscles and sensory supply of face • identify parotid gland & duct & explain the structures within the parotid gland • demonstrate the boundary and identify contents of anterior triangle, posterior triangle, suboccipital triangle & sub-mandibular region • demonstrate the boundary and identify contents of mouth cavity • demonstrate the gross features & nerve supply of tongue	Bones & joints of head and neck • Scalp and temporal region • Face and orbit • Anterior triangle and submandibular region including thyroid gland • Posterior triangle • Mouth and tongue • Pharynx • Nose and paranasal sinuses • Larynx • Vertebral column and deep dissection of the • Organs of hearing and equilibrium.	88 hrs.

• explain Auditory pathway (VIII –cranial nerve) • demonstrate the parts of pharynx with their extension & muscles of pharynx the walls of nose and paranasal air sinuses the extension, cartilages& muscles of larynx • identify structures present in the internal surface of the larynx • demonstrate the region of vertebral column and attachments of muscles of the back • demonstrate the different parts of external, middle & internal Ear • correlate important clinical conditions associated with structures in Head & Neck (Thyroid gland, parathyroid gland, air sinuses, Larynx, scalp, ear, face etc.)		

Regional Anatomy: CENTRAL NERVOUS SYSTEM & EYEBALL CARD
(DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	**Contents**	**Teaching hours**
Students will be able to: • demonstrate • the boundary & contents of cranial cavity & orbit • the different parts of brain & cranial nerves attached to brain • the layers of meninges-Pia, arachnoid, and durameter • explain the processes of dura & its contents • explain the blood supply & nerve supply of the meninges • demonstrate the boundary of different lobes of cerebrum, sulci, gyri & important functional areas • explain the blood supply of cerebrum including the formation of Circle Willis • demonstrate the parts & describe the functions & connections of • diencephalon, pituitary gland, basal nuclei, • internalcapsule, extra pyramidal system & • limbic system, brain stem • locate &describe • the nuclei, course, functional components & distribution of cranial nerves • the boundary & parts of ventricles circulation of CSF through ventricles • gross features of spinal cord and its meninges and spinal nerves attached to it • the coats of eyeball & the course of optic nerve • explain Refractive Media explain the effects of lesion and loss of blood supply to different parts of nervous system.	Introduction to the nervous system, cranial cavity and orbit. • General examination of the brain • Superficial attachments of cranial nerves • meninges of the brain Cerebrum.:lobes of cerebrum, sulci gyri & important functional areas blood supply formation of Circle Willis. Diencephalon: Thalamus, hypothalamus, metathalamus, epithalmus and pituitary gland • Basal nuclei, internal capsule, extra pyramidal system and limbic system • Brain stem and reticular formation • Cranial nerves • Ventricles and cerebrospinal fluid Spinal cord& spinal nerves • Visual apparatus including the eyeball • Clinical Anatomy.	**40 hrs.**

Cell Biology & Histology Tutorial & Practical (Card I)

Learning Objectives	Contents	Teaching hours
Students will be able to: • demonstrate different parts of microscope & how to handle it • state the principles of tissue preparation • explain cell division • identify different types of tissue on slide under microscope	Microscope: Parts & how to handle, Principles of different types of microscopy • Principles of tissue preparation and staining: Fixation, embedding, sectioning & routine staining • Cell and cell division • Epithelium: Simple squamous, cuboidal, columnar • Pseudo stratified Stratified squamous, cuboidal Stratified columnar • Transitional • Connective tissue:: General, special ,bone, cartilage • Muscular tissue: Smooth, skeletal & cardiac muscle • Nervous tissue in general	**17 hrs.**

Cell Biology & Histology Tutorial & Practical (Card II)

Learning Objectives	Contents	Teaching hours
Students will be able to identify different structures of the Following systems on slides under microscope: • Respiratory system. • Cardiovascular system • Digestive system and & associated Glands. • Urinary system • Male reproductive system and associated glands • female reproductive system and associated glands	• Respiratory system: Larynx, trachea, bronchial tree and Lung • Large artery, medium sized artery, large vein • Digestive system & associated glands, Tongue, pharynx, oesophagus, stomach, small intestine & large intestine (including vermiform appendix), Liver and gall bladder, Pancreas • Urinary system: Kidney, ureter, urinary bladder, urethrae • Male reproductive system and associated glands: Testis, epididymis, vas deferens, • seminal vesicle, prostate • Female reproductive system and associated glands: Ovary, fallopian tube, uterus, vagina • Mammary gland , placenta	**17 hrs.**

Cell Biology & Histology Tutorial & Practical (Card III)

Learning Objectives	Contents	Teaching hours
Students will be able to identify following structures on slides under microscope: • Lymphatic system • Salivary glands • Nervous system • Endocrine system • Special sense organs • Skin	• Lymphatic system • Lymph node, tonsil, spleen & thymus • Exocrine glands (salivary glands} • Nervous system: spinal cord, cerebrum, cerebellum, peripheral nerve (including the optic nerve) • Endocrine gland (Pituitary, Thyroid, Parathyroid, Adrenal • and Islet's of Langerhans • Special sense organs: Eyeball (cornea, retina), internal ear • Thick skin & thin skin	**17 hrs.**

Time allocation in Anatomy

Lecture & Review - 115 hours

Term	General Anatomy Hours	Cell Biology Hours	General Histology Hours	Systemic Histology Hours	General Embryology Hours	Systemic Embryology Hours	Neuro anatomy Hours.	Human Genetics Hours.	Total Hours
First Term	12	06	08	02	13	-	01	04	**46**

DEPARTMENT OF ANATOMY

GOVERNMENT UNANI AND AYURVEDIC MEDICAL COLLEGE

THORAX CARD

(ITEM EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

Year	
Session	
Roll No.	
Batch	

Card no.	
Cadaver no.	
Total marks	
Pass marks	

Name of the student				
Period of placement	**From :**		**To :**	

Part for dissection (item)	**Date of beginning**	**Date of examination**	**Marks obtained**	**Remarks and Signature of the Lecturer**
1.Thoracic wall, Intercostal space, thoracic Cavity and mediastinum.				
2.Bones and joints of the thorax				
3. Heart with pericardium.				
4. Lung, Pleura, trachea and bronchus.				
5.The Diaphragm & esophagus				
6.Blood vessels, nerves and lymphatic's of the thorax.				
7. Clinical & Functional anatomy				
8. Living Anatomy.				
9.Anatomy of Radiology & Images				

No. of attendance in the practical classes of the card		**Out of**	
Mark obtained			
Remarks			
Signature of the Lecturer			
Signature of Head of the Department			

DEPARTMENT OF ANATOMY

GOVERNMENT UNANI AND AYURVEDIC MEDICAL COLLEGE

SUPERIOR EXTREMITY CARD

(ITEM EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

Year				**Card no.**	
Session				**Cadaver no.**	
Roll No.				**Total marks**	
Batch				**Pass marks**	
Name of the student					
Period of placement	**From :**			**To :**	

Part for dissection (item)	**Date of beginning**	**Date of examination**	**Marks obtained**	**Remarks and Signature of the Lecturer**
1. Bones and introduction to the joints of the superior extremity				
2. Pectoral region with mammary gland.				
3. Axilla.				
4. Superficial dissection of the upper limb, back and scapular region.				
5. Front of the arm , forearm & palm				
6 .Back of the arm, forearm & dorsum of the hand.				
7. Blood vessels, nerves and lymphatics of the superior extremity				
8. Removal of the limb; shoulder joint, acromioclavicular joint, elbow joint,wrist joint				
9. Clinical & Functional Anatomy.				
10. Living Anatomy				
11. Anatomy of Radiology & Images				

No. of attendance in the practical classes of the card		**Out of**	
Mark obtained			
Remarks			
Signature of the Lecturer			
Signature of Head of the Department			

DEPARTMENT OF ANATOMY

GOVERNMENT UNANI AND AYURVEDIC MEDICAL COLLEGE

ABDOMEN CARD

(ITME EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

Year	
Session	
Roll No.	
Batch	

Card no.	
Cadaver no.	
Total marks	
Pass marks	

Name of the student				
Period of placement	**From :**		**To :**	

Part for dissection (item)	Date of beginning	Date of examination	Mark obtained	Remarks and Signature of the Lecturer
1.Bones and joints of abdomen & pelvis				
2.Anterior wall of the abdomen with hernial region.				
3.Stomach, abdominal part of the oesophagus; coeliac trunk				
4.Duodenum, pancreas and spleen.				
5.The mesentery and mesenteric vessels, jejunum and ileum.				
6. Large intestine.				
7. Rectum and anal canal				
8.Liver with the biliary apparatus including gall bladder; portal vein.				
9.Kidneys, suprarenal gland, ureters. urinary bladder ,Urethrae				
10.Muscles, blood vessels, lymphatics and nerves of the posterior abdominal wall.				
11.Muscles, blood vessels, lymphatics, nerves of the pelvis				
12.Ovaries, uterus, uterine tubes,vagina,female external genital organs and perineum.				
13.Perineum pelvic diaphragm.urogenital diaphragm,perineal pouches,ischiorectal fossa				
14.Vas deferens, seminal vesicles, prostate, testes and male external genital organs.				
15.Clinical & Functional anatomy				
16. Living Anatomy.				
17Anatomy of Radiology & Images				

No. of attendance in the practical classes of the card		**Out of**	
Mark obtained			
Remarks			
Signature of the Lecturer			
Signature of Head of the Department			

DEPARTMENT OF ANATOMY

GOVERNMENT UNANI AND AYURVEDIC MEDICAL COLLEGE

INFERIOR EXTREMITY CARD

(ITME EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

Year	
Session	
Roll No.	
Batch	

Card no.	
Cadaver no.	
Total marks	
Pass marks	

Name of the student				
Period of placement	**From :**		**To :**	

Part for dissection (item)	Date of beginning	Date of examination	Marks obtained	Remarks and Signature of the Lecturer
1. Bones and introduction to the joints of the inferior extremity				
2. Front and medial side of the thigh.				
3. Gluteal region and back of the thigh.				
4. Hip joint and removal of the lower limb.				
5. Front of the leg and dorsum of the foot.				
6. Lateral side, medial side and back of the leg including the popliteal fossa.,Sole of the foot				
7. Blood vessels, nerves and lymphatics of the inferior extremity				
8. Knee, tibiofibular joints and ankle joint				
9. Joints and arches of the foot.				
10. Clinical & Functional Anatomy.				
11. Living Anatomy				
12. Anatomy of Radiology & Images				

No. of attendance in the practical classes of the card		**Out of**	
Mark obtained			
Remarks			
Signature of the Lecturer			
Signature of Head of the Department			

DEPARTMENT OF ANATOMY

GOVERNMENT UNANI AND AYURVEDIC MEDICAL COLLEGE

HEAD AND NECK CARD

(ITME EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

Year	
Session	
Roll No.	
Batch	

Card no.	
Cadaver no.	
Total marks	
Pass marks	

Name of the student				
Period of placement	**From :**		**To :**	

Part for dissection (item)	Date of beginning	Date of examination	Mark obtained	Remarks and Signature of the Lecturer
1. Bones of head and neck.				
2. Joints of head and neck.				
3. Scalp and temporal region.				
4. Face and orbit.				
5. Anterior triangle and submandibular region.				
6. Posterior triangle.				
7. Mouth and tongue.				
8. Pharynx.				
9. Nose and Paranasal sinuses.				
10. Larynx.				
11. Vertebral column and deep dissection of the back.				
12. Blood vessels, nerves and lymphatics of the Head & Neck				
13. Exocrine & Endocrine Glands of Head & neck				
14. Organs of hearing and equilibrium.				
15. Clinical & Functional Anatomy.				
16. Living Anatomy.				
17. Anatomy of Radiology & Images.				

No. of attendance in the practical classes of the card		**Out of**	
Mark obtained			
Remarks			
Signature of the Lecturer			
Signature of Head of the Department			

Syllabus

of

SHARIR KRIYA
(Physiology)

For
The Course of B.A.M.S Medical Students of Bangladesh

Published by
University of Dhaka
Bangladesh

Sharir Kriya (Physiology)

Departmental Objectives:

At the end of the course in Sharir Kriya (Physiology) students will be able to:

- Understand the normal function of human body and utilize it as a background for Clinical studies.
- Explain normal reactions to environment and homeostatic mechanism.
- Interpret normal function with a view to differentiate from abnormal function.
- Demonstrate knowledge and skill to proceed to higher studies and research in physiology in relation to needs and disease profile of the country.
- Perform and interpret physiology laboratory tests & procedure.
- Develop sound attitude towards the need for continuing self-education

Organization of the Course:

The course is offered in 3 terms (1st, 2nd & 3rd) total 1&1/2 year for BAMS Course.
Allocation of total teaching hours: 380 hours.

i. Lecture - 120 hours
ii. Tutorial - 120 hours
iii. Practical - 120 hours
iv. Integrated Teaching - 20 hours
v. Total- 380 hours

Sharir Kriya (Physiology)

Paper –I **Marks –100**

Learning objectives	Contents	Teaching/learning strategy	Teaching aids	Hours/days	Assessment
Student will be able to **Cellular physiology** • Goal of physiology • Principles of homeostasis • Functional organization of the human body & cell physiology. cell membrane transport. • Membrane potential, resting membrane potential and action potential. • Muscle physiology • Neuromuscular junction.	**CORE**: Physiology: definition, goal & importance of physiology Homeostasis: definition, major functional systems, control systems and regulation of the body function. The cell: functions of cell membrane and cell organelles. The cell membrane transport: active & passive transport, exocytosis & endocytosis, intercellular communication. Membrane potential: definition, basic physics of membrane potential. Resting membrane potential. Action potential: definition & propagation of action potential. Mechanism of skeletal muscle contraction & relaxation. Neuromuscular junction: transmission of impulse from nerve ending to muscle fibre	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and others reading • Text book • Poster and diagram.	***Lecture** and Seminar 100 hours * **Practical**/ Clinical 30 hours	***Written** (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) ***I. Assignment** * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial Class/ Exam.**
Blood Describe the composition & functions of blood. Demonstrate knowledge about plasma proteins. demonstrate knowledge about the formation , Morphology, types & functions of RBC, WBC & platelets. Describe synthesis & breakdown of haemoglobin. Demonstrate knowledge about the blood grouping & Blood transfusion. Describe about hemostasis & coagulation. describe about the bleeding disorders	**CORE**: Blood: composition & functions. Plasma proteins: origin, normal values, properties, separation, functions & effect of hypoproteinaemia Development and normal values of formed elements of blood. RBC: Morphology, total count, properties & erythropoiesis Hemoglobin: synthesis, types, functions & fate of hemoglobin. Red blood cell indices, Anaemia, Polycythemia & Jaundice: definition & classification. WBC: Classification, morphology, properties & functions, leucocytosis, leucopenia. Platelet: morphology & functions. Hemostasis: definition & events.				

	Coagulation: definition, mechanism, Clotting factors & fibrinolysis Blood grouping: ABO & Rh system Medico legal importance of blood groups. Hazards of blood transfusion & Rh incompatibility. Blood coagulation and anticlotting system. Transfusion of blood and related Materials. **Additional/Applied Physiology** Bleeding disorder: thrombocytopenic purpura & hemophilia, tests for bleeding disorder. Resistance of the body to infection; Immunity, allergy and inflammation				
Cardiovascular describe the physiology of cardiac muscle describe the rhythmical excitation of the heart. demonstrate knowledge about events of cardiac cycle. explain about the heart sounds. explain about a normal ECG. describe about hemodynamics. describe local & humoral control of blood flow by the tissues. describe the microcirculation, capillary fluid & interstitial fluid describe about cardiodynamics: cardiac output, venous return & peripheral resistance. explain about the heart rate & radial pulse. describe the regulation of blood pressure. demonstrate knowledge about the coronary circulation. demonstrate knowledge about shock describe the circulatory changes during exercise.	**CORE**: Cardiac muscle: physiological anatomy, properties. Junctional tissues of the heart: generation of cardiac impulse & its conduction. Cardiac cycle: events, pressure & volume changes during different phases Heart sounds: types & characteristics. ECG: principles, characteristics & interpretations Functional classification of blood vessels & microcirculation Interrelationship among pressure, flow & resistance. Local & humoral control of blood flow by the tissue. Exchange of fluid through the capillary membrane SV, EDV, ESV: definition & factors affecting them. Cardiac output: definition, measurement, regulation and factors affecting cardiac output. Venous return: definition & factors affecting. Peripheral resistance: definition & factors affecting. Heart rate: definition, normal values, factors affecting & regulation. Radial pulse: definition & characteristics. Blood pressure: definition, types, measurement				

	&. regulation of arterial blood pressure. **Additional /Applied Physiology** Circulatory adjustment during exercise. Coronary circulation Cardiac arrhythmias: tachycardia, bradycardia & heart block Shock: definition, classification. Physiological basis of compensatory mechanism of circulatory shock.				
Respiratory define pulmonary & alveolar ventilation. explain the mechanism of respiration describe pulmonary volumes and capacities, describe pulmonary circulation summaries the diffusion of gases through the respiratory membrane. describe the oxygen & carbon dioxide transport. describe the respiratory centers & regulation of respiration. define & classify hypoxia and cyanosis.	**CORE**: Physiological anatomy of respiratory system. Respiration: definition, mechanism. Pulmonary & Alveolar ventilation. Pulmonary volumes and capacities (spirometry). Dead space: definition & types. Pulmonary circulation- pressure in pulmonary system effect of hydrostatic pressure in lungs, pulmonary capillary dynamics. Composition of atmospheric, alveolar, inspired and expired air. Respiratory unit and respiratory membrane. Diffusion of Gases through the respiratory membrane. Transport of Oxygen & Carbon dioxide in blood & body fluid. Oxy-hemoglobin dissociation curve. Bohr effect, Haldane effect & chloride shift mechanism. Respiratory centers: name, location & functions. Nervous & chemical regulation of respiration. Lung function tests: name, significance Hypoxia: definition, types, Cyanosis: definition & types. Definition of Dyspnea, Hypercapnea & Periodic breathing. **Additional/Applied Physiology** Oxygen therapy in hypoxia Ventilation - perfusion ratio. Regulation of respiration during exercise				
Gastrointestinal Physiology At the end of the course the students will be able to: describe the general principles of gastrointestinal function. describe the movements of GIT	**CORE**: Phygiological anatomy of gastrointestinal (GI) tract. Enteric nervous system. Local hormones of GIT: name, function & regulation of secretion. Hormonal control of GI function.				

	Movements of the GIT. GI reflexes. Additional / Applied Physiology Peptic ulcer diseases Diarrhoea, Vomiting				

Paper –II **Marks –100**

Learning objectives	Contents	Teaching/learning strategy	Teaching aids	Hours/days	Assessment
At the end of the course the students will be able to: describe the structure & function of nephron. describe the mechanism of urine formation. GFR, tubular reabsorption, tubular secretion. describe the mechanism of water balance and osmotic diuresis. explain physiological mechanism of micturition.	**CORE**: Kidney: functions Nephron: types, parts, structure & functions Renal circulation: peculiarities & functional importance Urine formation: basic mechanism GFR: definition, determinants, control of GFR & regulation of renal blood flow Reabsorption and secretion by the renal tubules Definition of T_m, Renal threshold, tubular load & plasma load and diuresis. Mechanism of formation of concentrated urine & diluted urine. Micturition reflex **Additional /Applied Physiology** Abnormalities of micturition	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and others reading • Text book • Poster and diagram.	***Lecture** and Seminar 100 hours * **Practical/** Clinical 30 hours	***Written** (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) ***I. Assignment** * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial Class/ Exam.**
Endocrine Physiology **At the end of the course the students will be able to**: describe types, hormonal receptors & general mechanism of action of hormone. describe functions, mechanism of action & regulation of secretion of individual hormone. describe disorders in relation to: pituitary gland thyroid and parathyroid gland adrenal gland endocrine pancreas	Endocrine glands : name & name of their hormones. Hormone: definition, classification, mechanism of action, assessment of hormone level. Hypothalamic hormones, releasing & inhibitory hormones: name and functions. Pituitaty Gland: physiological anatomy. Pituitary hormones (anterior & posterior): name, functions, mechanism of action and their control by the hypothalamus and disorders (dwarfism, gigantism, acromegaly & hypopituitarism and diabetes insipidus). Thyroid Gland: physiological anatomy. Thyroid hormones: biosynthesis, transport, functions, mechanism of action, regulation of secretion, disorders (hypo and hyperthyroidism, cretinism,				

	myxoedema and goitre) Parathyroid Gland: physiological anatomy. Parathyroid hormone: functions, mechanism of action & regulation of secretion. Adrenal Gland: physiological anatomy. Adrenocortical hormones: name, functions , mechanism of action , regulation of secretion & disorders (Addison's disease, Cushing's Syndrome, Conn's disease) Islets of Langerhan are of pancreas - hormones: functions, mechanism of action & regulation of secretion & disorders.				
Physiology of Reproduction **At the end of the course the students will be able to :** describe male & female reproductive organs & their hormones. describe spermatogenesis explain about functions of testosterone, oestrogen and progesterone describe ovulation, ovarian & menstrual cycle demonstrate knowledge about puberty demonstrate knowledge about contraception describe physiology of pregnancy explain about lactation	Introduction to reproductive physiology, sex determination & sex differentiation. Puberty. Functional anatomy of male reproductive system Secondary sex characteristics of male Testes: functional structure and functions Testosterone: function. Spermatogenesis: steps & hormonal control. Functional anatomy of female reproductive system. Secondary sex characteristics of female. Ovaries functional structure and functions. Functional structure of uterus Menstrual cycle: definition, phages and hormonal control. Ovarian cycle: phages and hormonal regulation. Ovulation: definition, mechanism & hormonal control. Indicators of ovulation. Definition of menstruation, menarche & menopause. Ovarian hormones Functions of oestrogen and progesterone. Placental hormones: name & functions.				

	Mammogenesis: development and lactation. **Additional/Applied Physiology** Physiology of pregnancy Contraception				
Neurophysiology **Students will be able to:** explain organization of the nervous system explain the basic mechanism of synaptic transmission. describe the sensory system of the body. describe the organization and functions of the spinal cord. explain the cord reflexes. describe the motor control system- pyramidal and extra pyramidal systems. describe the functions of cerebellum. describe functions of basal ganglia, thalamus, reticular formation & limbic system describe functions of CSF and Blood brain barrier. describe functions of hypothalamus describe organization & function of autonomic nervous system	**CORE:** Functional organization of nervous system and functions of major levels of central nervous system (CNS). **Neuron:** definition, parts, types **Nerve fiber:** classification, properties, effects of injury/section to the nerve fiber **Synapse:** physiological anatomy, properties, types, synaptic transmission **Neurotransmitters:** definition, types, functions **Sensory receptor:** definition, classification, properties, receptor potential. **General/somatic senses:** definition, classification. **Ascending tracts/sensory pathways:** name & function. Spinothalamic tract, tract of Gall, tract of Burdach, spinocerebellar tract: origin, course, termination & function. **Cerebral cortex:** name & functions of the Brodmann's areas **Reflex:** definition, classification, properties, **Reflex arc:** definition, components Stretch reflex, withdrawal reflex, crossed extensor reflex, reciprocal innervation & planter response. **Muscle spindle**: definition, physiological anatomy, functions. **Muscle tone**: definition, function, maintenance **Descending tracts / motor pathways:** name & function. Pyramidal tract: origin, course, termination, function & effect of lesion.				

	Extrapyramidal tract: name, functions. Upper motor neuron and Lower motor neuron: definition, example, effect of lesion. Spinal cord: hemisection. **Cerebellum:** functional division, functions, error control mechanism of motor activity & cerebellar disorder. **Basal ganglia:** functional components, functions & effects of lesion. **Thalamus, Reticular formation, limbic system:** components & functions. **CSF:** Circulation, functions **Blood brain barrier:** function **Hypothalamus:** name of the nucleus and functions. **Autonomic Nervous system:** components and functions. **Additional/Applied Physiology** Pain: types, dual pathway for transmission of pain, referred Pain Spinal cord transaction Posture, equilibrium: definition, name of the areas controlling them. Sleep, memory: definition, name of the areas controlling them. Alarm or stress response				
Physiology of Body Temperature **At the end of the course the students will be able to:** describe the physiology & regulation of body temperature.	**CORE :** Normal body temperature, site of measurement, sources of heat gain, channels of heat loss, regulation of body temperature in hot and cold environment. **Additional/Applied Physiology** Heat stroke, hypothermia, frost bite, fever.				
Special Senses	**Vision:** physiological anatomy of eye, image formation in the eyes, visual				

At the end of the course the students will be able to: describe the neurophysiology of vision and visual pathway explain errors of refraction, accommodation reaction, light reflexes, dark and light adaptation explain mechanism of hearing and describe auditory pathway describe the physiology of smell and taste	receptors, visual pathway, common refractive errors, photochemistry of vision, accommodation reaction, light reflex, dark & light adaptation, Field of vision, color vision, color, blindness, visual acuity. **Hearing:** auditory apparatus, receptor, mechanism of sound wave transmission, auditory pathway. **Smell:** smell receptors, olfactory pathway. **Taste:** taste receptors, modalities of taste sensation, taste, and pathway. **Additional/Applied Physiology** Effects of lesion in visual pathway Visual acuity				

Physiology Practical

Learning Objectives	Contents	Hours / days
Cellular Physiology & Physiology of Blood **Students will be able to** Demonstrate knowledge on common laboratory equipments used for practical hematology. Perform common hematological tests. Interpret results for practical purpose.	**CORE:** Developing skill in using of microscope & common laboratory equipments. Collection & preparation of blood sample. Observation of osmotic behavior of RBC Determination of total count of RBC, Determination of total count of WBC Determination of differential count of WBC. Estimation of haemoglobin. Observation of osmotic fragility of RBC. Determination of ESR Determination of PCV. Determination of Blood grouping (ABO & Rh system) & cross matching. Determination of bleeding time & clotting time. Interpretation of Red Cell Indices	02 48
Cardiovascular Physiology **Students will be able to :** Examine the radial pulse & its application. Measure the blood pressure and effect of exercise on it. Auscultate 1st & 2nd heart sounds. Record & analysis of normal ECG. Interpret the effect of drug and temperature on frog's heart.	**CORE :** Measurement of Blood Pressure & effect of exercise on it. Auscultation of 1st & 2nd heart sounds. Examination of radial pulse. Recording & analysis of normal ECG (12 leads). **Additional/Applied Physiology** Interpretation of effect of worm and cold application on frog's heart (tracing provided). Interpretation of effect of drugs on frogs heart (tracing provided).	**18**

Learning Objectives	Contents	Hours / days
Respiratory Physiology **Students will be able to :** examine the Respiratory system perform lung function tests & interpret tests on clinical conditions. demonstrate the knowledge about breath sounds.	**CORE:** Examination of respiratory system (physiological aspect) Counting of respiratory rate. Auscultation of breath sounds. Determination of lung function tests including Spirometry. Determination of kymographic recording of respiratory movements & effect of breath holding, hyperventilation, speech, deglutition (tracing provided.)	08
Gastrointestinal Physiology Students will be able to: auscultate the intestinal sound	**CORE** Auscultation of intestinal sound	02
Renal Physiology Students will be able to: Determine the specific gravity of urine	**CORE** Determination of specific gravity of urine	02
Neurophysiology Students will be able to : Examine the sensory & motor functions of human body. elicit the reflexes & interpret its clinical importance.	**CORE :** Examination of motor & sensory functions. Elicitation of the reflexes & interpretation of its clinical importance. (knee jerk, biceps jerk, triceps jerks & planter response).	10
Physiology of Body Temperature Students will be able to record the body temperature	**CORE:** Recording of the body temperature. Observation of the effect of exercise on body temperature.	**02**
Physiology of Special senses Students will be able to : perform the light reflex & accommodation reaction perform visual acuity & color vision. conduct tests for hearing & interpret the result	**CORE:** Observation of Light reflex, Interpretation of visual acuity, color vision & Perimetry. Conduction and interpretation of Rinne test & Weber test.	08

Distribution of Teaching Hours

Systems	Lecture hours	Tutorial hours	Practical hours	Integrated teaching hours
1. Cellular Physiology	5	6	2	1
2. Physiology of blood	15	16	48	1
3. Cardiovascular Physiology	18	18	18	2
4. Respiratory Physiology	12	14	8	1
5. Gastrointestinal Physiology	10	8	2	1
6. Renal physiology	12	10	2	1
7. Endocrine Physiology & Physiology of Reproduction	20	20	2	1
8. Neurophysiology & Physiology of body temperature	20	20	10	1
9. Physiology of Special Senses	08	8	8	1
Total	120 (includes 2 hours IT)	120 (includes 2 hours IT)	100 (includes 2 hours IT)	10 (includes 2 hours IT)

Summative Assessment of Physiology
(First Professional Examination)

Assessment systems and mark distribution

Components	Marks	Total Marks	Contents
WRITTEN EXAMINATION Paper – I- Formative Assessment + MCQ +SAQ Paper – II- Formative Assessment + MCQ +SAQ	10+20+70 = 100 10+20+70 =100	200	**Paper – I** 1. Cellular physiology 2. Physiology of blood 3. Cardiovascular physiology 4. Respiratory physiology 5. Gastrointestinal physiology **Paper – II** 1. Renal physiology 2. Endocrine physiology & physiology of Reproduction 3. Neurophysiology & temperature regulation 4. Physiology of Special senses
PRACTICAL EXAMINATION OSPE Traditional practical methods and experiments Practical Note Book	 40 50 10	100	
ORAL EXAMINATION (Structured) 2 boards	Board – I = 50 Board – II = 50	100	
Grand Total		400	

Pass marks 60% in each of written, oral and practical.

Department of Physiology

Students In course Evaluation Card. (Card for card completion & Term final examination on Physiology for individual student)

Students name---------- **Roll no.----------**

Session ---------- Year---------- Batch----------

Date of starting ---------- **Date of ending ----------**

Components	Written		Oral		Practical		Remarks (Signature & Date)
	Full Marks	Marks Obtained	Full Marks	Marks Obtained	Full Marks	Marks Obtained	
Cellular physiology & Physiology of Blood	100		100				
Cardiovascular physiology	100		100				
Respiratory physiology	100		100				
Gastrointestinal Physiology & Renal physiology	100		100				
Endocrine physiology	100		100				
Physiology of Reproduction	100		100				
Neurophysiology Physiology of Special Senses	100		100				
1st Term	**100**		**100**		**100**		
2nd Term	**100**		**100**		**100**		
3rd Term	**100**		**100**		**100**		

Department of Physiology

Attendance Record

Components	Total Class held	Total Class attended	Percentage (attended/ Held)	Remarks (Signature & Date)
Lecture (120 hours)				
Tutorial (120 hours)				
Practical (100 hours)				
Integrated teaching (10 hours)				

Academic Calendar for Physiology

		1st Term		2nd Term		3rd Term	
Teaching /Learning Method	**Teaching hours including Examination**	20 Working weeks	**E V A**	20 Working weeks	**E V A**	18 Working weeks	**E V A**
Lecture	120 Hours	GP- 05 hours Blood—15 hours CVS—18 hours	**L U A**	Resp. Physiology—12 hours GIT—10 hours Renal- 12 hours.	**L U A**	Endocrine & Reproduction—20 hours Nervous system & Body temp.—20 hours. Special Senses-08 hours.	**L U A T**
Tutorial	120 hours	GP—06 hours. Blood –16 hours. CVS—18 hours.	**T I O N**	Respiration—14 hours. GIT—08 hours. Renal —10hours.	**T I O N**	Endocrine & reproduction—20 hours. Nervous system & Body temp. –20 hours Special Senses—08 hours.	**I O N**
Practical	100 hours.	GP—02 hours. Blood—36 hours.	**4 W E E K S**	Blood-- 12 hours CVS---18 hours. GIT—02 hours	**4 W E E K S**	Respiration- 08 hours Renal – 02 hours Endocrine—02 hours Neuro physiology -08 hours Body temp—**02** hours Special Senses--08 hours	**7 W E E K S**

Continuous Assessment Card

Department of Physiology---------- Medical college----------
Students name---------- **Roll no.----------**
Session ---------- **Year ---------- Batch ----------**
Date of starting ---------- Date of ending ----------

Card 1: (Cellular Physiology & Blood)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Definition, goal & importance of physiology. Homeostasis: definition, major functional systems, control systems of the body	10		
2.	The cell: functions of cell membrane & cell organelles.	10		
3.	The cell membrane transport: active & passive transport, exocytosis & endocytosis. Intercellular communications	10		
4.	Membrane potential: definition and basic physics of membrane potential. Resting membrane potential Nerve Action potential & propagation of action potential.	10		
5.	Neuromuscular junction, muscle contraction & transmission of impulse from nerve ending to the muscle fibre.	10		
6.	Composition & functions of blood, Plasma proteins: Origin, normal values, properties & functions.	10		
7.	RBC: normal count, morphology, functions, erythropoiesis, fate of RBC. Hemoglobin: synthesis, types, functions. Red blood cell indices. Anaemia: definition & classification Polycythemia: definition & type. Jaundice: definition & classification	10		
8.	WBC: classification with normal count, morphology, development, properties & functions. leucocytosis, leucopenia .	10		
9.	Platelets: normal count, morphology, functions & development. Hemostasis: definition & events Coagulation: definition, blood clotting factors . Mechanism of coagulation & fibrinolysis. Anticoagulant: name, mode of action. Bleeding disorder: thrombocytopenic purpura & hemophilia. Tests for bleeding disorder: bleeding time, coagulation time and prothrombin time.	10		
10.	Blood grouping: ABO & Rh system, hazards of blood transfusion & Rh incompatibility.	10		

Signature of batch teacher : Signature of head of department :

Continuous Assessment Card

Department of Physiology---------- **Medical college----------**

Students name---------- **Roll no.----------**

Session ---------- **Year ----------** **Batch ---------**

Date of starting ---------- **Date of ending ----------**

Card 2: (Cardiovascular Physiology)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Properties of cardiac muscle. Junctional tissues of the heart. Generation of cardiac impulse & its conduction in the heart.	10		
2.	Cardiac cycle: definition, events, pressure & volume changes during different phases of cardiac cycle. Heart sounds : type, characteristics and their significances ECG : definition, principles and interpretations	10		
3.	Functional classification of blood vessels, interrelationship among pressure, flow & resistance. Local & humoral control of blood flow in the tissues. Exchange of fluid through the capillary membrane.	10		
4.	SV, EDV, ESV: definition & factors affecting them. Cardiac output : definition, measurement, regulation and factors affecting cardiac output. Venous return: definition & factors affecting. Heart rate: factors affecting & regulation. Pulse: definition, characteristics	10		
5.	Peripheral resistance: definition & factors affecting. Blood pressure: definition, types, measurement & regulation of arterial blood pressure.	10		
6.	Circulatory adjustment during muscular exercise Cardiac arrhythmias: tachycardia, bradycardia. Heart block: definition and types Shock: definition, classification. Physiological basis of compensatory mechanism of circulatory shock.	10		

Signature of batch teacher:

Signature of head of department:

Continuous Assessment Card

Department of Physiology---------- Medical college----------

Students name---------- **Roll no.**----------

Session ---------- **Year** ---------- **Batch** ----------

Date of starting ---------- Date of ending ----------

Card 3: (Respiratory Physiology)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Respiration: definition, mechanism. Pulmonary & Alveolar ventilation. Pulmonary volumes and Capacities (spirometry) Dead space: physiological & anatomical Lung function tests : name & significance	10		
2.	Composition of atmospheric, alveolar, inspired and expired air. Respiratory unit and respiratory membrane. Diffusion of Gases through the respiratory membrane. Peculiarities of pulmonary circulation Ventilation -perfusion ratio.	10		
3.	Transport of Oxygen & Carbon dioxide in blood. Oxy-hemoglobin dissociation curve. Bohr effect, Haldane effect & Chloride shift.	10		
4.	Respiratory centers: name, location & functions. Nervous & chemical regulation of respiration. Regulation of respiration during exercise.	10		
6.	Hypoxia: definition, types Cyanosis: definition & types. Definition of dyspnea, hypercapnea & periodic breathing.	10		

Signature of batch teacher:

Signature of head of department:

Continuous Assessment Card

Department of Physiology---------- **Medical college**

Students name---------- **Roll no.----------**

Session ---------- **Year ----------** Batch-

Date of starting ---------- **Date of ending ----------**

Card 4: (Gastrointestinal Physiology & Renal physiology)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (Signature & Date)
1.	Physiological anatomy of gastrointestinal (GI) tract. Enteric nervous system. Local hormones of GIT: name, functions & regulation of secretion Neural and hormonal control of GI function.	10		
2.	Movements of the GIT. GI reflexes.	10		
3.	Kidney: functions of kidneys. Renal circulation: peculiarities with functional importance.	10		
4.	Urine formation Glomerular filtration, determinants of GFR, Autoregulation of renal blood flow and GFR.	10		
5.	Reabsorption and secretion by the renal tubules Definition of T_m, Renal threshold, tubular load & plasma load and diuresis	10		
6.	Mechanism of formation of concentrated & dilute urine.	10		
7.	Micturition reflex Abnormalities of micturition	10		

Signature of batch teacher: Signature of head of department:

Continuous Assessment Card

Department of Physiology,---------- Medical college----------

Students name---------- **Roll no.----------**

Session ---------- **Year ---------- Batch ----------**

Date of starting ---------- Date of ending ----------

Card 5: (Endocrine Physiology)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks
1.	Endocrine glands: name Hormones: definition, classification, mechanism of action, regulation of secretion	10		
2.	Hypothalamic hormones. Pituitary hormones (anterior & posterior): name, functions and their control by the hypothalamus and disorders (Dwarfism, gigantism, acromegaly & hypopituitarism and diabetes insipidus)	10		
3.	Thyroid hormones: biosynthesis, transport, functions, regulation of secretion, disorders (Hypothyroidism hyperthyroidism, Cretinism, Myxoedema and goitre). .	10		
4.	Parathyroid hormone: functions, mechanism of action & regulation of secretion.	10		
5.	Adrenocortical hormones: name, functions , mechanism of action , regulation of secretion & disorders (Addison's disease, Cushing's Syndrome, Conn's disease).	10		
6.	Hormones of Islets of Langerhan's of pancreas: functions , mechanism of action, regulation of secretion & disorders	10		

Signature of batch teacher:

Signature of head of the department:

Continuous Assessment Card

Department of Physiology,---------- Medical college----------

Students name----------

Roll no.----------

Session ---------- Year ---------- **Batch ----------**

Date of starting ---------- Date of ending ----------

Card 6: (Physiology of Reproduction)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks
1.	Introduction to reproductive physiology, sex determination & sex differentiation. Puberty Functional anatomy of male reproductive system. Secondary sex characteristics of male Gonad :functional structure and functions of testes. Testosterone: functions, Spermatogenesis: steps & hormonal control.	10		
2.	Functional anatomy of female reproductive system. Secondary sex characteristics of female Gonad :functional structure and functions of ovaries. Functional structure of uterus Menstrual cycle: definition, hormonal control Ovarian and endometrial cycle with their hormonal regulation. Ovulation: definition, mechanism & hormonal control. Indicators of ovulation Definition of menstruation, menarche & menopause. Ovarian hormones Oestrogen and progesterone: functions	10		
3.	**Physiology of pregnancy & Lactation:** Pregnancy: physiological changes during pregnancy. Placental hormones: name & functions. Mammogenesis: hormonal influence for mammogenesis & lactation Physiology of contraception	10		

Signature of batch teacher:

Signature of head of the department:

Continuous Assessment Card

Department of Physiology---------- Medical college----------
Students name---------- **Roll no.----------**
Session ---------- **Year ----------** **Batch ---------**
Date of starting ---------- Date of ending ----------

Card 7: (Neurophysiology & special senses)

Sl. No	Name of item	Full Marks	Marks Obtained	Remarks & signature
1.	Functional organization and functions of major levels of central nervous System (CNS). **Neuron:** definition, parts, types **Nerve fiber**: classification, properties, effects of injury to the nerve fiber **Synapse**: physiological anatomy, type, properties & synaptic transmission **Neurotransmitters**: definition, types & functions	10		
2.	**Sensory systems of the body:** **Sensory receptor**: definition, classification, properties, receptor/generator potential. **Cerebral cortex:** Name and functions of the Brodmann's areas. **General/somatic senses:** definition and classification. **Ascendingtracts/sensory pathways** – name.(Tract of Gall & Burdach, spinothelamic tract, spinocerebellar tract): origin, course, termination, functions, and effect of lesions.	10		
3.	**Reflex:** définition, classification, properties. Reflex arc: définition, component stretch reflex, knee jerk, planter response and Withdrawal reflex- with reciprocal innervations & crossed extensor-pathway . **Muscle spindle, Golgi tendon organ:** definition, physiological anatomy and functions**. Muscle tone**: definition, function and maintenance.	10		
4.	**Descending tracts/ motor pathways-** name Pyramidal tract: origin, course, termination, function, effect of lesion. Extrapyramidal tract: name, functions. Upper motor neuron and lower motor neuron: definition, effect of lesion. **Spinal cord**: effect of hemisection.	10		
5.	**Cerebellum:** functional division, neuronal circuit, functions, error control mechanism of motor activity & cerebellar disorder,	10		
6.	**Basal ganglia:** functional components, functions & effects of lesions. **Thalamus, Reticular formation, Limbic system:** functional components and functions. **CSF:** circulation & functions. **Blood brain barrier:** function.	10		
8.	**Hypothalamus:** name of the nucleus, functions **Body Temperature** Normal body temperature, site of measurement, sources of heat gain, channels of heat loss, regulation of body temperature in hot and cold environment.	10		
9.	**Autonomic Nervous system:** physiological anatomy of sympathetic and parasympathetic system, functions. Alarm or stress response	10		
10.	**Vision: p**hysiological anatomy of eye, image formation in the eyes, visual receptors, visual pathway, common refractive errors, accommodation reaction, light reflex, dark and light adaptation. Field of vision, color vision, visual acuity	10		
11.	**Hearing:** auditory apparatus, receptor, Mechanism of hearing, mechanism of sound transmission and auditory pathway.	10		
12.	**Smell:** receptor and pathway**.** **Taste:** receptors, modalities of taste sensation and pathway.	10		

Signature of batch teacher: Signature of head of the department:

Continuous Assessment Card

Department of Physiology---------- **Medical college**
Students name---------- **Roll no.----------**
Session ---------- **Year ----------** Batch
Date of starting ---------- **Date of ending ----------**

Card 8: Physiology Practical

(I hear and I forget, I see and I remember, I do and I understand)

SL NO	**Name of experiment**	**Full Marks**	**Marks obtained**
1	Laboratory equipment. laboratory animals, blood sample, collection (venous & capillary) of blood.	10	
2	Preparation & staining of blood film & differential count of WBC with interpretation and analysis of result	10	
3	Determination of total count of WBC with interpretation and analysis of result	10	
4	Determination of total count of RBC with interpretation and analysis of result	10	
5	Estimation of hemoglobin with interpretation and analysis of result	10	
6	Determination of packed cell volume (PCV), Calculation of MCV, MCH & MCHC with interpretation and analysis of result	10	
7	Estimation of ESR by Westergren method with interpretation and analysis of result	10	
8	Determination of bleeding time, clotting time with interpretation and analysis of result	10	
9	Study of morphology and osmotic behavior of RBC with interpretation and analysis of result	10	
10	Determination of ABO & Rh blood groups with interpretation and analysis of result	10	
11	Auscultation of 1^{st} & 2^{nd} heart sounds	10	
12	Clinical examination of radial pulse.	10	
13	Measurement of normal blood pressure & effects of exercise on blood pressure.	10	
14	Recording & analysis of 12 leads normal ECG	10	
15	Auscultation of breath sounds	10	
16	Spirometric measurement of lung function test. Determination of FVC, FEV_1,FEV_1/FVC %, PEFR, MVV with analysis of result.	10	
17	Study on the tracing of respiratory movements & effects of breath holding, hyperventilation, speech, deglutition (physiological apnoea).	10	
18	Auscultation of intestinal sound.	10	

19	Elicitation of knee jerk, planter response	10	
20	Recording of oral & axillary temperature & effects of exercise on it	10	
21	Mapping of visual field by perimeter	10	
22	Observation of light reflexes and analysis of result	10	
23	Determination of color vision	10	
24	Determination of visual acuity by Snellen's chart.	10	
25	Determination of hearing tests: Rinne and Weber test with interpretation and analysis of result	10	
26.	Determination of specific gravity of urine	10	
27.	Demonstration of uses of computer and other IT materials (One observer station should remain in 1st professional MBBS examination in the physiology discipline)	10	

Signature of batch teacher:

Signature of head of the department:

Syllabus

of

PRANRASAYAN

(Biochemistry)

For
The Course of B.A.M.S Medical Students of Bangladesh

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Departmental Objective

At the end of the course in Biochemistry the students should be able to:

- Demonstrate basic knowledge on major bimolecular, enzymes, hormones and nutrients and of fundamental chemical principles involved in body mechanism upon which life process depends
- Demonstrate skills in performing and interpreting Bio-chemistry laboratory tests and procedure with emphasis on those used in Bangladesh.
- Demonstrate skills in using the modern biochemical appliances
- Equip themselves with requisite knowledge for higher studies and research
- Develop sound attitude towards the need for continuing self education

List of Competencies to acquire:

After completing the course of biochemistry in BAMS course the student's will-

1) Apply the impact of biochemistry in medicine.
2) Acquainted the biomolecules forming the structure of the human body, their functions and their role in health and diseases.
3) Explain the role of enzymes in the diagnosis and treatment of diseases.
4) Identify the source of energy in human body and the process by which this energy is derived from food.
5) Explain metabolism of the body in fed and fasting state and consequences of prolonged starvation.
6) Explain the role of liver in metabolism and derangement of metabolism in impaired liver function. Explain dyslipidemia and their clinical consequence
7) Describe the water and electrolyte content of human body and their functions. Know the types, causes and consequences of dehydration and over hydration. Explain the causes the consequences of electrolyte imbalance.
8) Describe the sources of acids and bases in our body and the mechanism of their normal balance. Explain the causes and consequences of acidosis and alkalosis and the parameters to diagnose them.
9) Demonstrate about nutrients, balanced diet. Describe the common nutritional disorders of our country and their causes and consequences.
10) Describe the components of balanced diet and explain the basic principles of making a diet chart. Attain the skill to assess nutritional disorders anthropometrically.
11) Explain the basis of genetics and molecular biology and the common genetic disorders and explain the modern technology in molecular biology in the diagnosis and treatment of diseases.
12) Diagnose diabetes mellitus, impairment of renal, liver and thyroid functions.

Attain the skill to perform and interpret the common biochemical tests in the diagnosis of diseases. Attain the skill to perform common bedside biochemical tests

Distribution of teaching - learning hours

Lecture	Tutorial	Practical	Total teaching hours	Integrated teaching for Phase I	Formative Exam		Summative exam	
					Preparatory leave	Exam time	Preparatory leave	Exam time
120 hours	100 hours	100 hours	320 hrs	30 hrs	35 days	42 days	30 days	30 days

(Time for exam. preparatory leave and formative & summative assessment is common for all subjects of the phase)

Teaching - learning methods, teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture Integrated teaching	Tutorial Practical Demonstration Problem solving	Assignment, self assessment and self study.	OHP Video tapes, Audio player Slide Projector Charts, Flip charts, Models, Specimens White board and marker Chalk board and chalk Computer and multimedia Study guide and manuals	Item Examination (oral & or written) Card final (written) Practical examination (OSPE & traditional practical) Term Examination fina Term l (written, oral+ practical [OSPE & traditional])

Related Equipments: Glass wares, micropipette, distilled water plant, p^H meter.

Laboratory equipments: Photoelectric colorimeter, Centrifuge machine, Incubator, Water bath, Hot air oven, Height and weight measuring instrument.

Marks distribution of Assessment of Biochemistry: Total marks – 400

- Written=200 (Formative- 20+MCQ- 40+SAQ-140) SOE=100
- Practical= 100 (OSPE-50+ Traditional-40 +Note Book-10)

PRANRASAYAN (Biochemistry)

Learning objectives	Contents	Teaching/learning strategy	Teaching aids	Hours/days	Assessment
Student will be able to **Biophysics & Biomolecules** Define biochemistry and explain its importance in medicine. Define solution, standard solution and types of standard solution. Describe colloid and crystalloid with example, define dialysis and mention its biomedical importance. Define p^H, p^K and p^H scale and mention their importance. Define acid, base, strong acid and weak acid. Define buffer. State the body fluid buffers with their basic mechanism of action. State Handerson Hasselbach equation and its importance. Define and classify isotope. State its biomedical importance. Define and classify carbohydrates, Mention the sources and importance of biologically important monosaccharides, disaccharides and polysaccharides. Describe the reducing property of carbohydrate. Define amino acid, peptide, polypeptide and protein. state their sources and functions. Describe the structure of protein and denaturation of	**CORE**: • Introduction to Biochemistry • Concept of solutions • Colloids and crystalloids. • Concept of pH and buffer. • Concept of isotope. • Concept of Biomolecules: Carbohydrates. • Amino acids and proteins. Lipids and fatty acids. • Enzymes	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and others reading • Text book • Poster and diagram.	***Lecture** and Seminar 100 hours * **Practical/** Clinical 30 hours	***Written** (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) ***I. Assignment** * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial Class/ Exam.**

protein. Define and classify lipids, state their sources, functions and biomedical importance. Define and classify fatty acids, state their sources, function and biomedical importance, mention eicosanoids & their synthesis. State the sources and importance of essential fatty acids, omega-3 fatty acid, and omega-6 fatty acid. Define steroids and sterols. Describe the sources, and biomedical importance of cholesterol. Define and classify enzymes, describe the factors affecting enzyme activity. Define isoenzyme with example and mention their clinical application. State the biomedical importance of enzyme, co-factors and mention their functions.					
Define and explain nutrients, essential nutrients, macro and micro nutrients, food, proximate principles of food, diet, balanced diet. State the full meaning of the abbreviations- MR, BMR, BMI, SDA, DRI, RDA, and also define and explain them. State the basis of calculating the calorie requirement of a person. Describe the sources, requirement and function of carbohydrate as nutrient and describe the importance of fibers in diet. State glycaemic index (GI). Describe sources, requirement and function of protein as nutrients; mention the name and significance	**CORE**: • Basic concepts of food, nutrition and dietary principles • Energy balance and calculation of energy Tutorial: equivalent of food. • Nutritional aspect of carbohydrates, fats and proteins, Fibers. • Vitamins and minerals. • Common Nutritional disorders.				

of essential amino acid; state the biological value of protein. Describe the sources, requirement and function of lipids as nutrients mention the sources and nutritional role of polyunsaturated fatty acids. Define and classify vitamins. Describe the sources, function, RDA, deficiency disorders of water soluble vitamins. Describe the sources, functions, RDA, deficiency disorders and toxicity of fat soluble vitamins. State the role of minerals as nutrients, define trace elements. State the importance of minerals: sodium, potassium, calcium, iron, iodine, fluoride, selenium, manganese, copper, zinc etc. Describe iron metabolism. state and describe the phenomenon of the common nutritional disorders e.g. PEM, night blindness, goiter, obesity					
Digestion, Absorption, Bioenergetics and Metabolism At the end of the course, students will be able to: Define digestion, absorption, metabolism, anabolism, and catabolism. Describe the phases of metabolism, enumerate digestive juices, their composition and functions, enumerate local hormones of GIT, their Source and functions. Describe biological oxidation, respiratory chain and oxidative phosphorylation.	**CORE:** • Introduction to metabolism • Biological oxidation, respiratory chain and oxidative phosphorylation. • High and low energy compounds. ATP • Phases of metabolism (digestion, absorption and intermediary metabolism)				

Enumerate high and low energy compounds, describe ATP.					
Carbohydrate Metabolism: State the names and sources of digestive enzymes, their location and process of digestion and absorption of carbohydrate. Define glycolysis and describe the pathway, state the conversion of pyruvate to lactate, acetyl CoA and oxaloacetate. Calculate the amount of energy liberated in glycolysis and oxidative decarboxylation of pyruvate. Describe citric acid cycle and explain why it is called an amphibolic and final common metabolic pathway. Calculate the amount of energy liberated in TCA cycle and total energy liberated from complete oxidation of a mole of glucose in aerobic and in anaerobic conditions. Define glycogenesis and glycogenolysis and state their role in storage and supply of glucose to meet body's demand. State the importance of HMP pathway. Define gluconeogenesis and describe its process and importance. describe glucose homeostasis and mention its importance, State the glucostatic functions of liver with other biochemical functions.	**CORE:** • Glycolysis • Citric acid cycle • Glycogenesis and glycogenolysis Hexose monophosphate shunt • Gluconeogenesis • Blood glucose homeostasis Cori cycle				

Lipid Metabolism State the name and sources of digestive enzymes, their location and process of digestion and absorption of lipids (triacylglycerol, phospholipids, cholesterol esters) Enumerate the blood lipids with their sources and mention the anabolic and catabolic pathways of lipid metabolism. Describe the process of degradation of triacylglycerol. State the processes of fatty acid oxidation and describe beta-oxidation of even and odd chain fatty acids. State the sources and fate of acetyl-CoA. Name the ketone bodies. Describe ketogenesis and fate of ketone bodies, state the biomedical importance of ketone bodies. Define ketosis and mention the causes of ketosis and describe its pathogenesis. Enumerate the lipoproteins, state its general structure and functions, describe the metabolism of chylomicron, VLDL, LDL and HDL cholesterol, explain the clinical importance of LDL & HDL cholesterol. State the role of HMG-CoA reductase in regulation of blood cholesterol level. Define eicosanoids, mention the basic steps of their synthesis.	**CORE:** • Digestion and absorption of lipid. Blood lipids and pathways of lipid metabolism. • Triglyceride metabolism. • Betaoxidation Ketogenesis and ketosis. • Lipid transport and lipoprotein metabolism. Ecosanoids				

Protein Metabolism State the name and sources of digestive enzymes, their location and process of digestion and absorption of protein. State the concept of protein turnover, amino acid pool Define nitrogen balance, mention its types and state the routes of nitrogen loss. State the pathways of amino acid catabolism. Define and describe transamination and deamination. Describe sources and way of disposal of ammonia, explain ammonia intoxication Describe the urea cycle including sites, reactions and importance of the cycle	**CORE:** Digestion and absorption of protein Protein turnover, common amino acid Pool ,nitrogen balance Pathways of protein metabolism Deamination and transamination. Fate of amino acid in the body Source and disposal of ammonia **ADDITIONAL:** Role of liver in over all metabolisms. **Integrated metabolism** Metabolic adjustment of fed, fasting and starvation state.				
Renal biochemistry, body fluid, electrolytes and acid-base balance Define GFR, plasma load, tubular load, transport maximum, renal threshold, plasma clearance, osmolar clearance and free water clearance, describe mechanism of acidification of urine. State the body fluid compartments and state the composition of ECF and ICF state water turn over, water intake and output, describe volume homeostasis (water balance), enumerate volume disorders with example, define water intoxication. Explain the importance of major electrolytes (Na^+, K^+, Ca^{++}, Mg^{++} and $PO_4^{- -}$) and mechanism	**CORE:** **Renal biochemistry in relation to water, electrolytes and acid base homeostasis** Total body water and body fluid compartments. Composition of body fluids. Regulation of normal water balance. Major electrolytes and their homeostasis. Volume disorders. Acid base homeostasis & disorders				

of their homeostasis. Describe acid base homeostasis & state the simple acid base disorder with causes of acidosis and alkalosis and mechanism of their compensation and correction. State acid base parameters, anion gap and base excess, State the role of kidneys in water, electrolyte and acid-base balance. State abnormal constituents in urine with normal urine volume and obligatory urine volume, explain limiting p^H of urinr. Define and classify diuresis with example.					
Clinical Biochemistry and clinical endocrinology State the basic concepts of clinical biochemistry. mention measurements of unit, SI unit State the laboratory hazards with its types. State the normal level of serum bilirubin and mechanism of causation of jaundice. Describe the common liver function tests with interpretation. explain the basis of application of clinical enzymology in disease. State the lipid profiles of blood & their clinical importance. state the causes and consequence of hyperglycaemia and hypoglycaemia. State the laboratory diagnosis of diabetes mellitus, OGTT and its interpretation, define IFG, IGT and HBA_{1c}.	**CORE:** Introduction to clinical biochemistry. Normal biochemical values in conventional and Sl. Units. Clinical enzymology related to liver and myocardial diseases. Lipid profiles and dyslipoproteinemias. Organ function tests (liver, kidney & thyroid) Diagnosis of diabetes mellitus Bilirubin metabolism and Jaundice. Proteinuria and microalbuminuria				

State renal function tests, define proteinuria and microalbuminuria State thyroid function tests with interpretation.					
Fundamentals of Molecular Biology and genetics Explain chemistry, & functions of nucleic acid, nucleosides, and nucleotides. Describe the structure and functions of DNA. Describe the structure, types and functions of RNA. Describe DNA organization, cell cycle and genetic code. Describe the the central dogma & processes of replication of DNA, define gene, allele, genome, genotype, phenotype, trait, and codon. Describe transcription and post transcriptional modification. Describe translation and post translational modification. Explain the concepts & application of medical Biotechnology Explain the concepts & application of recombinant DNA technology. Explain the concept of DNA cloning, PCR, Polymorphism. Define and classify mutations, mutagens	**CORE:** Basic concepts of molecular biology. Nnucleic acid, nucleosides, and nucleotides. Replication, transcription and translation. Gene, genome, allele, trait, genetic code, mutation, mutagens. PCR, DNA cloning, recombinant DNA technology Biomedical aspects of medical biotechnology: understanding & application				

Biochemistry Practical

Learning Objectives	Contents	Teaching Aids	Teaching Hours
Students will be able to: List the laboratory hazards and the precautions to prevent them. Identify the different laboratory glass wares and equipments. Mention their uses. Prepare different type of standard solution from supplied solute, solvent and standard solution. Identify different parts of photoelectric colorimeter. Demonstrate its technique and the basic principle of calculation. Perform different biochemical tests according to given method and manual. Know the clinical indication of performing biochemical tests. Interpret biochemical values to apply in clinical situations.	**CORE** Identification of laboratory glass wares and equipment. Preparation of solutions. Photometry. Estimation, demonstration of technique, calculation and interpretation of result: -Blood glucose estimation. -Serum cholesterol estimation.- -Serum urea -Serum Creatinine -Serum total protein -Serum bilirubin -Abnormal constituents of urine and their clinical significance	OHP, Video tapes, Audio player. Charts , Flip charts, Models, Specimens White board and marker , Chalk board and chalks , Computer and multimedia Study guide and manuals Glass ware, micropipette, Distil water plant pH meter Laboratory equipments: photoelectric colorimeter Centrifuge machine Incubator Water bath Hot air woven Height and weight measuring instrument	**100 hours**

Card No- 1. Biophysics and Biomolecules

No.	Items	Marks(10 in each item)	Initials and date
1.	Introduction of biochemistry, acid, base, p^H, p^K, buffer, Henderson-Hasselbalch equation.		
2.	Solutions, crystalloid, colloid, dialysis and isotopes.		
4.	Carbohydrates.		
5.	Lipids		
6.	Amino Acids and Protein.		
7.	Enzymes, coenzymes, cofactors, isoenzsymes		

Card No- 2. Food, nutrition and vitamins

No	Items	Marks(10 in each item)	Initial and date
1.	Basic concepts of Nutrient,food, diet, balanced diet, essential dietary		
	components, , total calorie calculation,DRI, RDA, MR, BMR, BMI, SDA.		
	glycaemic index (GI) of food.		
3.	Minerals- (macro & micro), trace elements, common nutritional disorders,		
	PEM, BMI. obesity, iron metabolism and its deficiency, iodine deficiency		
4.	Water soluble vitamins		
5.	Fat soluble vitamins		

Card No- 3. Digestion, absorption, bioenergetics and metabolism

No	Items	Marks(10 in each item)	Initial and date
1.	**Digestive juices**, local hormone of GIT, digestion & absorption of		
	carbohydrate, lipid, protein.		
2.	**Bioenergetics-** biological oxidation, high energy phosphates, oxidative		
	phosphorylation, respiratory chain. metabolism-definition, phases; anabolism,		
	catabolism		
3.	**Carbohydrate metabolism**- glycolysis, fate of pyruvate, TCA cycle, HMP		
	pathway, gluconeogenesis, glycogenesis, glycogenolysis, blood glucose		
	regulation.		
4.	**Lipid metabolism:** lipolysis, Beta-oxidation of fatty acid, fate of Actyl-CoA,		

	ketone bodies, ketosis & its pathoghenesis. Lipoproteins & their metabolism,		
	Cholesterol metabolism.		
5.	**Protein metabolism:** Amino acid pool, Transamination, Deamination.		
	Source & fate of ammonia, ammonia intoxication, Urea cycle.		

Card No- 4. Renal biochemistry, body fluid, electrolytes and acid base balance

No	Items	Marks(10 in each item)	Initial and date
1.	**Renal biochemistry-** GFR, tubular load, TM, renal threshold, plasma		
	Clearance, osmolar clearance, free water clearance, acidification of urine.		
2.	**Body fluid-** Body fluid compartments, daily water intake & output, water		
	Turnover, body fluid volume regulation, volume disorders and diuresis.		
3.	**Acid-Base Balance-** origin of acids & bases, maintenance of static blood p^H.		
	Acid base disorders, their compensation & coprrection, anion gap and base		
4.	**Serum Electrolytes-** Serum electrolytes & their reference ranges. Functions,		
	regulations, hypo & hyper states **o**f serum $[Na^+]$, $[K^+]$ $[Ca^{++}]$ & $[PO_4^{-}]$		

Card No- 5. Clinical biochemistry and clinical endocrinology

No	Items	Marks(10 in each item)	Initial and date
1.	Clinical biochemistry- S I unit, Laboratory hazards, Sample collection,		
	Photometry. Clinical enzymology, lipid profiles of blood.		
2.	Clinical enzymology and lipid profiles of blood.		
3.	Diagnosis of diabetes mellitus.OGTT, IGT, IFG and $HbA_{1C.}$		
4.	Thyroid function tests and interpretation.		
5.	Commonly done LFT. Jaundice.		
6.	Renal function tests and interpretation.		

Card No- 6. Fundamental of molecular biology and genetics

No	Items	Marks(10 in each item)	Initial and date
1.	Nucleic acids, nucleotides, DNA, RNA, DNA organization, Cell cycle.		
2.	The central dogma, Genome, Gene, Genetic code, Codon, Mutation, mutagens, Genotype, Phenotype, trait, allele.		
3.	Replication, Transcription and post transcriptional modification,		
4.	Translation and post translational modification.		
5.	Recombinent DNA technology, PCR, Cloning.		

Total Teaching Hours for Biochemistry

System	Lecture	Tutorial	Practical	
1. Biophysics and Biomolecules	18	16	15	00
2. Digestion Absorption, Bioenergetics and Metabolism	28	25	10	02
3. Body Fluids, Electrolytes and Acid Base Balance	14	15	10	02
4. Clinical Endocrinology	10	14	00	02
5. Food, Nutrition & vitamins	10	10	00	02
6. Molecular Biology and genetics (Fundamentals)	10	10	00	00
7. Clinical Biochemistry	10	10	25	02
Total Teaching Hours: (270)	100	100	60	10

Syllabus

of

DRAVYAGUNA

(Pharmacology & Pharmacognosy)

For
The Course of B.A.M.S Medical Students of Bangladesh

Published by
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Dravyaguna (Pharmacology & Pharmacognosy)

Objectives: At the end of the course in Dravyaguna (Pharmacology & Pharmacognosy) the Students should be able to:

- Equip them with adequate knowledge of Dravyaguna (Pharmacology & Pharmacognosy) both in basic, general & clinical aspect.
- Describe the basic physicochemical properties, mechanism actions, pharmacokinetic principles and adverse reactions of drugs as well as mechanism and drug action of different system of medicine.
- Describe the basic principles and concepts considered essential rational, effective, safe and economic use of drugs in clinical practice.
- State the principles underlined the concepts of essential drugs and apply them in community oriented healthcare services.
- Recognized and manage the drug reactions, interactions and problems due to misuse and abuse of drug.
- Understand details knowledge of medicinal plants with their therapeutically uses including phytochemistry and pharmacology.
- Know synonym, morphology, cultivation, collection, preparation, preservation, dosage, conservation, impurities, purification, identification, effects, and side effects of Dravya.
- Perform and interpret modern pharmacology, WHO essential drug list, neutraceuticals and herbal medicine, biotechnology etc.
- Demonstrate knowledge and skill to precede higher studies and research in Dravyaguna in relation to needs and disease profile of the country.
- Demonstrate knowledge of pharmacological activities and drug administration of Ayurvedic drugs (both single and compound).
- Develop sound attitude towards the need for continuous self education.
- Evaluate the ethical and legal issues involved in drug prescribing, development, manufacture and marketing.

Dravyaguna (Pharmacology & Pharmacognosy)

Theory

Paper-I: Basic Pharmacology & Pharmacognosy **Marks – 100**

Learning objectives	Contents	Teaching/ learning strategy	Teaching aids	Hours/ days	Assessment
• Details knowledge of Basic Pharmacology & Pharmacognosy. • Details knowledge of Sapta padartha (Dravya, Rasa, Guna, Virya, Vipaka,- Prabhava and Karma.) and pancha prodatha (Rasa, Guna, Virya, Vipaka,- Prabhava) • Details knowledge of Karma. • Details knowledge of different Gana. • Details knowledge of Bheashaja Pariksha vidhi. • Details knowledge of Nighantu Vigyan. • Details knowledge of Photochemistry and with importance. • Details knowledge of pharmacology of the following groups like	**CORE:** **Introduction of Dravyaguna (Pharmacology & Pharmacognosy):** • **General Pharmacology**: Introducing Pharmacology, Drug Administration, Drug Absorption, Bio-availability, Drug Distribution, Drug Metabolism. Drug Elimination, Clinical Pharmacokinetics, Dynamics: How do drugs act? Quantitative aspects of drug action, Individual variations in drug responses & Drug safety and vigilance. • **Pharmacognosy**-Definition and scope of Pharmacognosy, origin and historical development of Pharmacognosy, subject matters of Pharmacognosy and importance it in pharmacy, crude drugs, medicinal plant analysis, vegetable drugs, biological and geological sources of drugs, natural substances, active constituents, Materia Medica, pharmacopoeia, formulary, monograph, official drug, unofficial drug, pharmacological action of plant drugs. • **Dravyaguna Shastra Paribhasa**-Lakshana of Sapta Padartha of Dravyaguna Vijnana viz Dravya- Rasa-Guna- Virya- Vipaka- Prabhava and Karma. ○ **Dravya:** Etymological derivation, definition, panchbhoutikatwa. Classification of Dravya according to Samhitas and Nighantus Taxonomical classification.	* Lecture * Case presentation * Self study/learning * Short presentation with video * Brain storming and group discussion	• Multimedia projector • OHP • Video Film or tape, TV, VCR • Audio player • Colored Charts, Flip charts, • Models, Specimens • White board and marker • Study guide and manuals Seminar • Handout and	***Lecture** and Seminar 100 hours * **Practical/** Clinical 30 hours	***Written** (Formative, SEQ/ SAQ, MCQ) * **Oral** (Structured) * **Practical** (OSPE, Spotting, Preparing Chart) ***I. Assignment** * **Item examination & card completion** (Oral & practical) * **OPD/IPD clinical case presentation**. * **Tutorial**

Anaesthetics, CNS depressants etc.	○ **Guna:** Etymological derivation, definition and Classification of Guna. Detailed knowledge of Gurvadi Guna & Paradi gunas. ○ **Rasa:** Etymological derivation, definition, Meaning of "Rasa" in various contexts. Shad Rasas (Madhura, Amla, Lavana, Katu, Tikta, and Kashaya), Panchabhautik constitution of Rasas, Nirvrittiviseshakrama (manifestation in general and particular), Ritu and shad rasa Rasanurasayoh bheda (Difference between rasa and anurasa), Lakshana (characteristics),Guna and Karma of shad Rasas, Kopana and Shamana of Dosha and dushya by Shad rasas. Effects of excess usage of Rasa. Rasopalabdhi, Rasaskandha. ○ **Vipaka:** Etymological derivation and definition, difference between Avasthapaka and Vipaka, Types of Vipaka, (Dvividha-Trividha,Panchavidha) Guna and karma of Vipaka. Grades of Vipaka (taratamya), Vipakopalabdhi hetu (Factors to determine Vipaka). ○ **Veerya:** Etymological derivation, definition and Swarupa of Virya, Number of Virya. (Dwividha & Ashtavidha), Panchabhauthikatva Virya karmani (Effects of Virya), General principles in determination of virya along with exceptions. ○ **Prabhava:** Definition, Effects of Prabhava. ○ Interrelation of Rasa-Guna-Virya-Vipaka-Prabhava with respect to their strength (balabal nirupana). Samanapratyayarabdha and Vichitrapratyayarabdha dravyas. ○ **Karma:** Lakshana, swaroopa and bheda of karma (Definition, nature and types of action). Explanation of the following Karmas with examples: 1. Deepana 2. Pachana 3.		others reading • Text book • Poster and diagram.		**Class/ Exam.**

	Samshodhana 4. Samshamana 5. Anulomana 6. Sransana 7. Bhedana 8. Rechana 9. Chhedana 10. Lekhana 11. Grahi 12. Sthambhana 13. Madakari 14. Pramathi 15. Abhishyandi 16. Vyavayi 17. Vikashi 18. Rasayana 19. Vajeekarana 20. Jeevaneeya 21. Balya 22. Brimhana 23. Langhana 24. Medhya • **Brief information on Karmas of dashemani gana of Charak Samhita**. • **Mishraka Gana**: o Audbhida Gana (Vegetable origin) Brihatpanchamoola, Laghupanchamoola, Vallipanchamoola, Kantakapanchamoola, Trinapanchamoola,Madhyamapanchamoola, Jeevaneeya panchamoola, Panchapallava, Panchavalakala, Triphala, Trikatu,Trimada, Chaturusana, Panchakola, Shadusana, Chaturbeeja, Jeevaniya gana, Ashtavarga, Trijataka, Chaturajataka, Katuchaturjataka Panchatikta, Amlapanchaka, Chaturbhadra,Trikarshika, Swalpatriphala, Madhuratriphala, Mahavisha, Upavisha, Agrya aushadh varga- Knowledge of Agrayaaushadha Varga with example. o Jangama Gana (Animal origin)-Ksheerashtaka, Mutrashtaka, Pitta panchaka. o Parthiva Gana (Mineral origin)-Lavana Panchaka, Kshara dvaya, Kshara Ashtaka. • **Basis of nomenclature**: Basis of nomenclature of dravya, Basis and Derivation of synonyms. • **Bheashaja Pariksha vidhi** (as described in Charaka samhita vimana sthana 8) o Dravya Sangrahana (collection of dravya) o Ecology-Classification of desha (geographical area) and bhumi (soil), swarupa of sangrahaniya dravya of (Nature and				

	quality of drug to be collected). o Sangrahana vidhi (Method of collection) -Vegetable and Animal origin drugs according to part used. o Period of collection according to virya. o Samrakshana vidhi (preservation of collected dravyas), o Beshajagara (Storehouse) o Study on different prayojyanga (useful plant parts). o Concept of dravya shodhan (purification of dravya). o Brief knowledge of Apamishran (drug adulterants). o Prashasta bheshaja (ideal drug), plant extracts. o Concept of viruddha Dravya (incompatibility of the dravya). o Impurities of dravya, purification, o Artificial/synthetic drugs. • **Knowledge of plant extracts, additives, excipients, preservative, food colors**. • **Introduction to Nighantu Vigyan**-Dhanwantari Nighantu, Bhavaprakashanighantu, Rajanighantu. • Brief knowledge of cultivation, conservation of medicinal plants and information about endangered species. • **Knowledge of Photochemistry and with importance**: Photochemistry and pharmaceutical uses of lipids, carbohydrate with related compounds, proteins, alkaloids, acids, esters, phenols and phenolic glycosides, volatile oils, resins, saponin, tanin, mucilage, fixed oils, glycosides, vitamins and hormones, hallucinogenic, allergenic and other toxic plants, pesticides of natural origin and antibiotics. • **Brief Knowledge about pharmacology of the following** - Anesthetics, CNS depressants, Sedatives, Hypnotics, Tranquilizers, Antipyretics, Analgesics, Antiepileptic, Antihypertensive, Antianginal, Antiplatelet, Hypolipidaemic,				

	Haemopoetic, Coagulants, Bronchodilators, Aerosols/ Inhalants, Expectorants, Digestants, Carminatives, Antacids, Antiulcer, Laxatives, Antidiarrhoeals, Antiemetic, Hepatoprotective, Diuretic, Antidiuretic, Lithotriptic, Anti-inflammatory, Hormonal therapy, Antiobesity, Antidiabetic, Antithyroid, Oxytocic. Galactagogues, Contraceptives, Styptics, Antihistamines, Antimicrobial, Antibiotics, Antimalarial, Amoebicidal, Antifilarial, Anthelmentic, Antifungal, Vitamins, Minerals, Water imbalance and IV fluids, Vaccines, Antivenom, Antirabbies serum, Local antiseptics, drugs in ophthalmic practice, Anti cancer drugs and immunomodulators. • **Additional:** o Mechanism and drug action of Different system of medicine: Vitamins and vitamins containing few selected animal drugs, surgical dressings, sutures and fibers, contribution of traditional drugs to modern medicine. o Contribution of traditional medicine to modern medicine.				

Practical and Oral Examination

Paper-I: General Pharmacology & Pharmacognosy

Marks- 100: Practical 50 (OSPE-20 +Traditional -20+ Practical Note Book-10), Oral 50 (Structured)

Practical:

1. Detailed knowledge of identification of following drugs: -
    - Kanda (stem) – Gulancha, harjora
    - Patra (leaves) – Swarnapatri/sonapata, Vasa ,Kumari neem
    - Pushpa (flower and Parts of flower)- Lavanga, Nagapuspa,Jaba
    - Phala (fruit) - Pippali, Madanaphala,Vidanga
    - Beeja (seeds) – Eranda,Kapikacchu, Vidanga
    - Twaka (bark) –Kutaja, Arjuna,
    - Moola(Root)- Punarnava, Aswagandha
    - Niryasa (exudate) - Hingu, Guggulu,Mocharasa
    - Jangama dravya (animal origin) - Madhu.Ghrita
2. Collection of minimum 25 herbarium specimen from field visit.
3. Compilation of a drug not less than 20 pages
4. Concept based clinical study on single drugs (Minimum 5 from detailed and non-detailed list of drugs) in patients.
5. Prescription writing, Drug Dosage Formulations.

Oral: Oral Examination should be structured within the syllabus of Dravyaguna I (Pharmacology & Pharmacognosy) Paper-I

Reference Books:

1. Dravyaguna Kosha-Acharya Priyavrata Sharma
2. Dravyaguna Sutram-Acharya Priyavrata Sharma
3. Dravyaguna Vigyana-Dr. Gyanendra Pandey
4. Dravyaguna Vigyana(Vol. 1-2)-Acharya Yadavji Tikram Ji
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