

MGM INSTITUTE OF HEALTH SCIENCES

(Deemed University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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Syllabus for MBBS – (First Year)

Approved as per BOM. 04/2007, dated 14.12.2007, item 4 & amended up to BOM.

~~43/2015 dated 14.11.2015~~

Syllabus have been categorized as '**Must know**' (70%), '**Desirable to Know**' (30%) and '**Nice to Know**' (10%) topics.

Inside this booklet, '**Desirable to know**' & '**Nice to Know**' topics are stamped and remaining all unstamped topics belong to '**Must Know**' area.

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INDEX

Sr. No	Item	Page No.
1.	General Considerations and Teaching Approach	1-3
2.	Objective of Medical Graduate Training Programme	4-8
3.	Human Anatomy Syllabus	9-39
4.	Human Physiology Syllabus	40-65
5.	Human Biochemistry Syllabus	66-73
6.	Rules & Regulations of Examination for the Subject of First Year MBBS Course of MGM Institute of Health Sciences, Navi Mumbai	74-80

GENERAL CONSIDERATIONS AND TEACHING APPROACH

- (1) Graduate medical curriculum is oriented towards training students to undertake the responsibilities of a physician of first contact who is capable of looking after the preventive, promotive, curative & rehabilitative aspect of medicine.
- (2) With wide range of career opportunities available today, a graduate has a wide choice of career opportunities. The training, though broad based and flexible should aim to provide an educational experience of the essentials required for health care in our country.

“Training should be able to meet internationally acceptable standards.”

- (3) To undertake the responsibilities of service situations which is a changing condition and of various types, it is essential to provide adequate placement training tailored to the needs of such services as to enable the graduates to become effective instruments of implementation of those requirements. To avail of opportunities and be able to conduct professional requirements, the graduate shall endeavour to have acquired basic training in different aspects of medical care.
- (4) The importance of the community aspects of health care and of rural health care services is to be recognized. This aspect of education & training of graduates should be adequately recognized in the prescribed curriculum. Its importance has been systematically upgraded over the past years and adequate exposure to such experiences should be available throughout all the three phases of education & training. This has to be further emphasized and intensified by providing exposure to field practice areas and training during the internship period. The aim of the period of rural training during internship is to enable the fresh graduates to function efficiently under such settings.
- (5) The educational experience should emphasize health and community orientation instead of only disease and hospital orientation or being concentrated – on - curative - aspects. As such all the basic concepts of modern scientific medical education are to be adequately dealt with.
- (6) There must be enough experiences to be provided for self learning. The methods and techniques that would ensure this must become a part of teaching - learning process.
- (7) The medical graduate of modern scientific medicine shall endeavour to become capable of functioning independently in both urban and rural environment. He/she shall endeavour to give emphasis on fundamental aspects of the subjects taught and on common problems of health and disease avoiding unnecessary details of specialization.
- (8) The importance of social factors in relation to the problem of health and diseases should receive proper emphasis throughout the course and to achieve this purpose, the educational process should also be community based than only hospital based. The

importance of population control and family welfare planning should be emphasized throughout the period of training with the importance of health and development duly emphasized.

- (9) Adequate emphasis is to be placed on cultivating logical and scientific habits of thought, clarity of expression and independence of judgment, ability to collect and analyze information and to correlate them.
- (10) The educational process should be placed in a historic background as an evolving process and not merely as an acquisition of a large number of disjointed facts without a proper perspective. The history of Medicine with reference to the evolution of medical knowledge both in this country and the rest of the world should form a part of this process.
- (11) Lectures alone are generally not adequate as a method of training and are a poor means of transferring/acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstration and on firsthand experience. Students will be encouraged to learn in small groups, through peer interactions so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance and hands on experience for students who assimilate and make this knowledge a part of their own working skills.
- (12) The graduate medical education in clinical subjects should be based primarily on out-patient teaching, emergency departments and within the community including peripheral health care institutions. The out-patient departments should be suitably planned to provide training to graduates in small groups.
- (13) Clinics should be organized in small groups of preferably not more than 10 students so that a teacher can give personal attention to each student with a view to improve his skill and competence in handling of the patients.
- (14) Proper records of the work should be maintained which will form the basis for the students' internal assessment and should be available to the inspectors at the time of inspection of the college by the Medical Council of India.
- (15) Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem. Every attempt be made to de-emphasize compartmentalization of disciplines so as to achieve both horizontal and vertical integration in different phases.

- (16) Every attempt is to be made to encourage students to participate in group discussions and seminars to enable them to develop personality, character, expression and other faculties which are necessary for a medical graduate to function either in solo practice or as a team leader when he begins his independent career. A discussion group should not have more than 20 students.
- (17) Faculty member should avail of modern educational technology while teaching the students and to attain this objective, Medical Education Units/ Departments be established in all medical colleges for faculty development and providing learning resource material to teachers.
- (18) To derive maximum advantage out of this revised curriculum, the vacation period to students in one calendar year should not exceed one month, during the 4 ½ years Bachelor of Medicine and Bachelor of Surgery (MBBS) Course.
- (19) In order to implement the revised curriculum in Toto, State Govts. and Institution Bodies must ensure that adequate financial and technical inputs are provided.
- (20) HISTORY OF MEDICINE –The students will be given an outline on “History of Medicine”. This will be taught in an integrated manner by subject specialists and will be coordinated by the Medical Education Unit of the College.
- (21) All medical institutions should have curriculum committee which would plan curricula and instructional method which will be regularly updated.
- (22) Integration of ICT in learning process will be implemented.

OBJECTIVE OF MEDICAL GRADUATE TRAINING PROGRAMME:

- (1) **NATIONAL GOALS :** At the end of undergraduate program, the medical student should be able to :
 - (a) Recognize 'health for all' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal.
 - (b) Learn every aspect of National policies on health and devote himself / herself to its practical implementation.
 - (c) Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.
 - (d) Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.
 - (e) Become exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

- (2) **INSTITUTIONAL GOALS:** (1) In consonance with the goals each medical institution should evolve institutional goals to define the manpower (or professionals) they intend to produce. The undergraduate students coming out of a medical institute should:
 - (a) Be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.
 - (b) Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.
 - (c) Appreciate rationale for different therapeutic modalities; be familiar with the administration of the "essential drugs" and their common side effects.
 - (d) Be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.
 - (e) Possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.
 - (f) be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:-
 - (i) Family Welfare and Material and Child Health(MCH)
 - (ii) Sanitation and water supply

- (iii) Prevention and control of communicable and non-communicable diseases
 - (iv) Immunization
 - (v) Health Education
 - (vi) IPHS standard of health at various level of service delivery, medical waste disposal.
 - (vii) Organizational institutional arrangements.
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- (g) Acquire basic management skills in the area of human resources, materials and resource management related to health care delivery, General and hospital management, principal inventory skills and counseling
 - (h) Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.
 - (i) Be able to work as a leading partner in health care teams and acquire proficiency in communication skills.
 - (j) Be competent to work in a variety of health care settings.
 - (k) Have personal characteristics and attitudes required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

All efforts must be made to equip the medical graduate to acquire the skills as detailed under :

A comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate:

I. Clinical Evaluation:

- (a) To be able to take a proper and detailed history.
- (b) To perform a complete and thorough physical examination and elicit clinical signs.
- (c) To be able to properly use the stethoscope, Blood Pressure, Apparatus Auroscope, Thermometer, Nasal Speculum, Tongue Depressor, Weighing Scales, Vaginal Speculum etc.:
- (d) To be able to perform internal examination-Per Rectum (PR), Per Vaginum (PV) etc.
- (e) To arrive at a proper provisional clinical diagnosis.

II. Bed side Diagnostic Tests:

- (a) To do and interpret Haemoglobin (HB), Total Count (TC), Erythrocytic Sedimentation Rate (ESR), Blood smear for parasites, Urine examination /albumin /sugar /ketones /microscopic:
- (b) Stool exam for ova and cysts;
- (c) Gram, staining and Siehl-Nielsen staining for AFB;
- (d) To do skin smear for lepra bacilli
- (e) To do and examine a wet film vaginal smear for Trichomonas
- (f) To do a skin scraping and Potassium Hydroxide (KOH) stain for fungus infections;
- (g) To perform and read Montoux Test.

III. Ability to Carry Out Procedures:

- (a) To conduct CPR (Cardiopulmonary resuscitation) and First aid in newborns, children and adults.
- (b) To give Subcutaneous (SC) /Intramuscular (IM) /Intravenous (IV) injections and start Intravenous (IV) infusions.
- (c) To pass a Nasogastric tube and give gastric leavage.
- (d) To administer oxygen-by masic/catheter
- (e) To administer enema
- (f) To pass a ruinary catheter-male and female
- (g) To insert flatus tube
- (h) To do pleural tap, Ascitic tap & lumbar puncture
- (i) Insert intercostal tube to relieve tension pneumothorax
- (j) To control external Haemorrhage.

IV Anaesthetic Procedure

- (a) Administer local anaesthesia and nerve block
- (b) Be able to secure airway potency, administer Oxygen by Ambu bag.

V Surgical Procedures

- (a) To apply splints, bandages and Plaster of Paris (POP) slabs;
- (b) To do incision and drainage of abscesses;
- (c) To perform the management and suturing of superficial wounds;
- (d) To carry on minor surgical procedures, e.g. excision of small cysts and nodules, circumcision, reduction of paraphimosis, debridement of wounds etc
- (e) To perform vasectomy;
- (f) To manage anal fissures and give injection for piles.

VI Mechanical Procedures

- (a) To perform thorough antenatal examination and identify high risk pregnancies.
- (b) To conduct a normal delivery;
- (c) To apply low forceps and perform and suture episiotomies;
- (d) To insert and remove IUD's and to perform tubectomy

VII Paediatrics

- (a) To assess new borns and recognize abnormalities and I.U. retardation
- (b) To perform Immunization;
- (c) To teach infant feeding to mothers;
- (d) To monitor growth by the use of 'road to health chart' and to recognize development retardation;
- (e) To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT)
- (f) To recognize ARI clinically;

VIII ENT Procedures:

- (a) To be able to remove foreign bodies;
- (b) To perform nasal packing for epistaxis;
- (c) To perform trachesotomy

IX Ophthalmic Procedures:

- (a) To invert eye-lids;
- (b) To give Subconjunctival injection;
- (c) To perform appellation of eye-lashes;
- (d) To measure the refractive error and advise correctional glasses;
- (e) To perform nasolacrimal duct syringing for potency

X. Dental Procedures:

To perform dental extraction

XI Community Healthy:

- (a) To be able to supervise and motivate, community and para-professionals for corporate efforts for the health care;
- (b) To be able to carry on managerial responsibilities, e.g. Management of stores, indenting and stock keeping and accounting
- (c) Planning and management of health camps;
- (d) Implementation of national health programmes;
- (e) To effect proper sanitation measures in the community, e.g. disposal of infected garbage, chlorination of drinking water;
- (f) To identify and institute and institute control measures for epidemics including its proper data collecting and reporting.

XII Forensic Medicine Including Toxicology

- (a) To be able to carry on proper medico legal examination and documentation of injury and age reports.
- (b) To be able to conduct examination for sexual offences and intoxication;
- (c) To be able to preserve relevant ancillary material for medico legal examination;
- (d) To be able to identify important post-mortem findings in common un-natural deaths.

XIII Management of Emergency

- (a) To manage acute anaphylactic shock;
- (b) To manage peripheral vascular failure and shock;
- (c) To manage acute pulmonary oedema and LVF;
- (d) Emergency management of drowning, poisoning and seizures
- (e) Emergency management of bronchial asthma and status asthmaticus;
- (f) Emergency management of hyperpyrexia;
- (g) Emergency management of comatose patients regarding airways, positioning prevention of aspiration and injuries
- (h) Assess and administer emergency management of burns

**Syllabus for
HUMAN PHYSIOLOGY**

INDEX

Sr. No	Item	Page No.
1	Broad Curriculum as per MCI Guidelines for Human Physiology	42-43
2	Syllabus of Human Physiology	44-85

BROAD CURRICULUM AS PER MCI GUIDELINES HUMAN PHYSIOLOGY INCLUDING BIO – PHYSICS

(A) PHYSIOLOGY

i) GOAL

The broad goal of the teaching of undergraduate students in Physiology aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and disease.

ii) OBJECTIVES

a) KNOWLEDGE

At the end of the course the student will be able to:

- (1) Explain the normal functioning of all the organ systems and their interactions for well coordinated total body function.
- (2) Assess the relative contribution of each organ system to the maintenance of the milieu interior.
- (3) Elucidate the physiological aspects of normal growth and development.
- (4) Describe the physiological response and adaptations to environmental stresses.

- (5) List the physiological principles underlying pathogenesis and treatment of disease.

b) SKILLS

At the end of the course the student should be able to:

- (1) Conduct experiments designed for study of physiological phenomena.
- (2) Interpret experimental/investigative data.
- (3) Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

c) INTEGRATION

At the end of the integrated teaching the student should acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

(B) BIOPHYSICS

- (a) **GOAL & OBJECTIVES:** The broad goal of teaching Biophysics to undergraduate students is that they should understand basic physical principles involved in the functioning of body organs in normal and diseased conditions.

Total time for teaching Biophysics = 5 hours

Out of which: 1. Didactic lectures = 3 hours
2. Tutorial/group discussion = 1 hour
3. Practical = 1 hour

(b) Topic distribution

(1) Lectures:

- (i) Physical principles of transport across cell membranes and across capillary wall.
- (ii) Biopotentials.
- (iii) Physical principles governing flow of blood in heart and blood vessels.

Also physical principles governing flow of air in air passages.

2. Tutorial/group discussion: On the topic covered in didactic lectures.

3. Practical's:

Demonstration of:

- a) Biopotential on oscilloscope
- b) Electro Encephalogram (EEG)
- c) Electro Myelogram (EMG)
- d) Electro Cardiogram (ECG)

FIRST M.B.B.S. - SYLLABUS

HUMAN PHYSIOLOGY

I) GOAL

The broad goal of the teaching of undergraduate students in physiology aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and diseases.

II) EDUCATIONAL OBJECTIVES:

1) At the end of the course, the student will be able to: describe the normal functions of all the organ systems, their regulatory mechanisms and interactions of the various systems for well-coordinated total body function.

2) Understand the relative contribution of each organ system in the maintenance of the milieu interior (homeostasis).

3) Explain the physiological aspects of normal growth and development.

Analyse the physiological responses and adaptation to environmental stresses.

4) Comprehend the physiological principles underlying pathogenesis and treatment of disease.

5) Correlate knowledge of physiology of human reproductive system in relation to National Family Welfare Program.

III) SKILL :

At the end of the course the student shall be able to :

1) Conduct experiments designed for study of physiological phenomena.

2) Interpret experimental/investigative data.

3) Distinguish between normal & abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

IV) INTEGRATION :

At the end of the integrated teaching the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

V) COURSE CONTENT :

Theory

List of topics.

A) GENERAL PHYSIOLOGY. (5 hours)

Must know.

- Introduction to Physiology
- Branches of Physiology
- Functional organization of human body.
- External and internal environment
- Homeostasis, Biofeedback mechanisms

Cell Physiology:

- Transport across cell membrane.

B) HEMATOLOGY : (15 hours)

Must know

- Composition of blood
- Functions of blood
- Plasma proteins: Types, concentration, functions.
- Erythrocytes: Morphology, functions, normal count physiological variations in normal count & anaemia, polycythemia.
- Haemopoiesis: general concepts
- Erythropoiesis: stages, Sites, regulation, reticulocyte & its clinical significance.
- Haemoglobin: Functions, normal values, physiological variations.
- Fate of erythrocytes: life span, Catabolism of Hb, bilirubin metabolism, jaundice.
- Physiological basis of anaemia, nutritional anaemia.
- Polycythemia: Primary & secondary.

- Leukocytes: differences between R.B.C. & W.B.C., types of W.B.C.s
normal count & differential W.B.C. count, physiological variations,
properties, functions of W.B.C.s,,
Granulopoiesis – stages, regulation,
Lymphopoiesis.
Pathological variations in total & differential W.B.C. count.
- Immunity: definition, concept of antigen & antibody, types of immunity-
Innate & Acquired, & their mechanism, cell mediated & humeral
immunity, B lymphocytes, T lymphocytes & their types.
Primary & secondary response, basis of vaccination.
- Blood groups: Landsteiner's law,
ABO System – type A & B antigen, ABO system & inheritance, relation to
transfusion, cross matching major & minor.
Rh System – inheritance, Rh incompatibility & blood transfusion,
Erythroblastosis foetalis.
- Blood transfusion: indications, storage of blood & changes during storage,
transfusion reactions.
- Monocyte - macrophage system: Classification, functions, functions of
spleen.
- Hemostasis: definition, basic mechanisms of Hemostasis,
- Platelets: structure, normal count & variations, functions, role in platelet
plug formation, Hemostasis & clot retraction.
- Blood coagulation: Coagulation factors in plasma, basic mechanism of
blood clotting, intrinsic & extrinsic pathways & difference between two
pathways, role of calcium in coagulation, role of vitamin K, fate of clot.
Anticoagulants – commonly used & their mechanism of actions,
blood coagulation tests – bleeding time, clotting time.
Haemophilia.
- Body fluid compartments: role of water in body & its distributions,
different body fluid compartments & composition of their fluid.

- Blood volume: normal value, physiological & pathological variations, blood volume regulation in detail (To be taken at end of lectures on C.V.S, kidney and endocrines)

Desirable to know

- Physical properties of blood.
- Plasma proteins: Plasmapheresis, role of liver in plasma protein synthesis, relationship of diet & plasma protein synthesis.
- R.B.C.: advantages of biconcave shape.
- Bone marrow structure and cellular elements.
- Common Haemoglobinopathies (Hbs, Hbc, Thalassaemia)
- Method of determination of life span of R.B.Cs.
- Types of jaundice.
- Polycythemia – effects on haemodynamics,.
- Immunity: Antibody structure & types, antigen – antibody reactions.
- Blood group: M. N. system, other blood groups.
- Thrombocytosis, thrombocytopenia purpura.
- Anticoagulants: used in vitro & in vivo.
- Other blood coagulation tests.
- Classification of haemorrhagic diseases, D.I.C.
- Measurement of: total body water, blood volume, plasma volume, I.C.F. volume.

Nice to know

- Blood component therapy.
- Effects of splenectomy.
- Plasmin system.

C) NERVE (5 hours)

Must know:

- Distinctive histological features relevant to functions of nerve fibers.
- Classification of nerve fibers: based on structure, diameter, functions and only for sensory nerves.
- R.M.P. definition, production & maintenance, method of measurement, significance.
- Action potential: definition,
Phases – depolarization, repolarisation, ionic basis of depolarization & repolarisation.
Production & propagation of A.P.,
Properties of A.P., significance.
- Properties of nerve fibers.
- Strength duration curve: chronaxie and factors affecting it.
- Factors affecting conduction in a nerve.

Desirable to know:

- Experimental techniques to study the mechanism of production of R.M.P. & A.P.: patch clamp, voltage clamp
- Methods of recording of A.P.

D) MUSCLE (7 hours)

Must know.

- Classification of muscles,
- Structure of skeletal muscle:
Electronmicroscopic structure, muscle proteins – contractile, regulatory, structural & enzymatic.
Sarcoplasmic tubular system: concept of sarcoplasmic triads & their functions.
- Neuromuscular transmission: Physiologic anatomy, events, N-M blocking & its clinical significance, applied aspect – myasthenia gravis.

- Excitation – contraction coupling.
 - Molecular basis of skeletal muscle contraction: sliding filament theory, power stroke – cross bridge cycle, role of calcium.
 - Energetics: fuel used by skeletal, muscle at rest & in exercise, metabolic pathways involved to yield A.T.P.,
- Oxygen debt: definition, types (lactic, alactic), incurring of debt, repaying the debt, significance.
- Properties of skeletal muscle: excitability, refractory period (absolute, relative), conductivity, contractility – types (isometric, isotonic), effects of summations (multiple motor unit summation, frequency summation & tetanizibility), all or none law, extensibility & elasticity, fatiguability.
 - Factors affecting development of tension in the muscle:
 - a) number of motor units contracting- type of muscle, number of muscle fibers in each unit activated, supraspinal influences.
 - b) length – tension relationship
 - c) frequency of stimuli, duration of stimulation
 - d) load
 - e) type of contraction
 - f) Chemical composition of muscle fibers and ions.
 - E.M.G. (in brief)
 - Skeletal muscle circulation.
 - Smooth muscle: structure, distribution, types molecular mechanism of contraction, properties, regulation, and disorders.

Desirable to know

- Heat liberated during various phases of contraction, Fenn effect.
- Recording of muscle activity.

Nice to know

- E.M.G. details.

E) RESPIRATORY PHYSIOLOGY (15 hours)

Must know:

- Physiologic anatomy
- Functions of respiratory system, non respiratory functions of lung
- Mechanics of respiration:

Ventilation :

Inspiratory & expiratory muscles, intrapleural pressure, lung & thoracic compliance, factors affecting compliance, work of breathing, surface tension forces & role of surfactant, airway resistance, elastic resistance.

- Lung volumes and capacities. Measurement, physiological & significance (tidal volume, vital capacity, forced vital capacity – details)
- Pulmonary ventilation, alveolar ventilation, alveolar dead space, - applied aspect,

Maximum breathing capacity & breathing reserve.

Diffusion of Gases :

- Exchange of respiratory gases at alveolar – capillary membrane, factors affecting diffusion.

Gas Transport :

- Transport of oxygen, role of Haemoglobin, oxygen dissociation curve & factors affecting it.
- Transport of carbon dioxide

Control of Breathing :

Neural control – higher centers, reflexes.

Chemical control – central & peripheral chemoreceptors role of CO₂, O₂, H⁺

Pulmonary Circulation

- Characteristics
- Ventilation perfusion ratio
- Respiratory adjustment in exercise.
- Hypoxia: types & high altitude hypoxia.

- Artificial respiration:
- Pulmonary function tests - principles

Desirable to know.

- Method of determination of dead space, residual volume, functional residual capacity.
- Oxygen therapy: indications, hazards of hyperbaric oxygen & use.

Nice to know

- Concept of P_{50}
- Positive pressure breathing.

F) CARDIOVASCULAR PHYSIOLOGY (20 hours)

Must know:

- Introduction, functions & importance of the system.
- General organization.
- Structure of heart, pericardium, myocardium, endocardium, nerve supply, Histology, details of cell junctions, syncytium, contractile & conducting fibers.
- Properties of cardiac muscle: excitability, conductivity, contractility, autorhythmicity, all or none law, long refractory period.
- Junctional tissues of heart, pacemaker potential, action potential of cardiac muscle.
- Generation & conduction of cardiac impulse.
- ECG: lead arrangement, normal waves & their significance with reference to lead II
- Cardiac cycle: pressure – volume changes, heart sounds & their clinical significance, correlation of pressure, volume, ECG, heart sounds in cardiac cycle.
- Heart rate & its regulation.
- Haemodynamics - def., blood flow, resistance
- Cardiac output: normal values, physiological variations, factors affecting cardiac output – details, regulation, measurement – principles.

- Blood pressure:
Normal levels, measurement, determinants, short term & long term regulation - details.
- Capillary circulation, tissue fluid formation.
- Lymphatic system: Anatomy & structure, formation of lymph, composition of lymph, functions of lymphatic system, lymphflow & factors affecting it.
- Regional circulation: Physiologic anatomy, factors affecting, special features: coronary, cerebral , skin, portal
- Adaptation of cardiopulmonary system to various grades of exercise.
- Hemorrhagic shock – stages & compensatory mechanisms, effects on body, physiological basis of treatment in brief.

Desirable to know:

- Ion channel & receptors (physiological, pharmacological & clinical significance)
- E.C.G. – electrical axis of heart, heart blocks, arrhythmias, ischaemia, infarctions.
- Heart sounds: murmurs & their clinical significance.

Nice to know

- Experimental methods of studying cardiovascular physiology,
- Patho physiology of oedema

G) RENAL PHYSIOLOGY (10 hours)

Must know:

- General introduction, structure & functions of kidney.
- Renal circulation: special features from functional point of view.
- Concept of clearance: to study renal physiology, for :
 - a) GFR – Inulin, Creatinine, basic principle of radioisotope method.
 - b) Renal blood flow – PAH
 - c) Concentration & dilution of urine – free water.
- Formation of urine:
 - 1) Glomerular stage – GFR (definition, dynamics, factors affecting & measurement))
 - 2) Tubular stage – Reabsorption & secretion.
 - a) Sodium, potassium, glucose : details
 - b) Handling of water – concentration & dilution of urine.
 - c) Secretion of H⁺
 - 3) Role of kidney in acid – base balance.
- Physiology of micturition: basic reflex & control, cystometrogram.
- Artificial kidney: basic principles of dialysis.

Desirable to know:

- Experimental studies for renal functions.

Nice to know

- Disorders of micturition.

H) BODY TEMPERATURE REGULATION: (2 hours)

Must know:

- Homeothermia – Balance between heat gain & heat loss.
- Regulation of body temperature,

Desirable to know:

- Hyperthermia, Hypothermia.

I) ALIMENTARY SYSTEM: (12 hours)

Must know:

- General introduction & organizational plan, innervations and blood supply.

Salivary secretion:

- General principles & basic mechanisms of secretion composition ,and functions of saliva, mechanism & regulation of salivary secretion.

Mastication and deglutition:

- Three phases of deglutition- physiologic anatomy, mechanism & control

Gastric secretion:

- Functional anatomy, histology, functions of stomach, composition of gastric juice, cellular mechanism of gastric secretion of acid, pepsin, intrinsic factor, other enzymes, phases of gastric secretion, regulation of gastric secretion.

- **Gastric Motility:**

Electrical activity of stomach, pylorus, emptying of the stomach-pyloric pump, regulation & factors promoting & inhibiting emptying.

Pancreatic secretion:

- Structure, composition & mechanism of secretion of electrolytes & enzymes, regulation of secretion.

- **Liver & gall bladder:**

Microscopic structure, functions of liver, composition of bile, cellular mechanism of bile formation, enterohepatic circulation of bile salts, control of secretion, concentration & storage of bile in gall bladder. filling & evacuation of gall bladder functions of gall bladder

Intestinal secretion:

- Structure, innervations.
- Composition & mechanism of secretion of small intestinal juice, regulation of secretion.
- Secretion of large intestine: mucous, water, electrolyte.
- Motility of small intestine:
Structure & innervation electrical activity of smooth muscle, resting membrane potential, slow waves, spike potentials, rhythmic segmenting contractions, peristalsis, control – neural & hormonal, functions of ileocecal valve.
- Motility of large intestine:
- Structure & innervation, 'mixing & mass movements, defecation reflex' and its control
- G.I. hormones: in brief.

Digestion & absorption:

- Digestion & absorption of - carbohydrate,
 - Proteins
 - Fats

absorption of water, electrolytes and vitamins.

Desirable to know:

- Gastric mucosal barrier, experiments to study regulation of gastric juice secretion, disorders of secretion, peptic ulcer., inhibitors of gastric secretion
- Effects of vagotomy, abnormal gastric motility vomiting.
- Barium meal studies, endoscopy, biopsy.
- Pathophysiology of small intestinal motility, paralytic ileus, diarrhea, obstruction.
- Pathophysiology of colonic motility, irritable bowel syndrome, drugs, constipation.
- Pancreatic function tests.
- Gall stone, effects of removal of gall bladder

Nice to know

- Disturbances of esophageal motility, spasm, achalasia, hiatus hernia.
- Methods for study of intestinal absorption.
- Effects of hepatectomy.

J) NUTRITION: (2 hours)

Must know:

- concept of balanced diet
- factors affecting caloric requirements
- requirements of various nutrients, sources, daily needs.
- nutrition under special conditions – pregnancy, lactation, growing child.

K) ENDOCRINE SYSTEM (10 hours)

Must know:

- Introduction
- Endocrine functions of Hypothalamus – releasing hormones, Mechanism of hormone action
- Anterior pituitary hormones:
functions, regulation, disorders.
posterior pituitary hormones, ADH, Oxytocin. functions, regulation, disorders.

Thyroid:

hormone: synthesis, fate, functions, regulation, disorders.

- Parathyroid:

hormone: synthesis, functions, regulation, disorders – tetany.

- Adrenal cortex: and medulla.

hormone: secretion, functions, regulation, disorders

- Pancreatic hormones:

secretion, functions, regulation, disorders.

Desirable to know:

- Radioimmuno assays.

Nice to know

- Experimental studies.

L) REPRODUCTIVE PHYSIOLOGY: (8 hours)

Must know:

- Sex chromosomes, sex determination, sex differentiation
- Functional anatomy of reproductive system.
- Puberty: changes in males & females and its control.
- Spermatogenesis: stages & regulation

Semen analysis.

- Testosterone: actions & regulation.
- Male sexual act.
- Menstrual cycle & ovarian cycle:
Phases & hormonal regulation.
- Menopause.
- Ovulation: indicators & importance
- Fertilization, implantation of ovum.
- Functions of placenta
- Physiology of pregnancy;
- Maternal changes during pregnancy
- Parturition: in brief – stages and mechanism.
- Lactation: initiation & maintenance and control.
advantages of breast-feeding.
- Contraception: to be taken as integrated topic.

Desirable to know:

- Sex chromosomes: Barr bodies.
- Development of genitals & gonads

Nice to know

- Precocious & delayed puberty.

M) SPECIAL SENSES (8 hours)

Must know:

- Eye:
Functional anatomy of eye, optics, microscopic structure of retina with retinal circuits, image formation,
Photochemistry of vision (photopic & scotopic vision, dark & light adoption),
Pupillary reflexes, Accommodation reaction, Errors of refraction and their correction, Colour vision – physiological & neural basis, accepted theory

of colour vision, classifications, basis of colour blindness and tests of colour blindness, significance.

Visual pathway – processing of information at different levels in visual pathway, organisation of visual cortex. Effects of lesion at different levels in visual pathway,

Movements of eyeballs: functions & control.

- Ear:

Physics of sound, decibel system,

Functions of external ear,

Functional anatomy of middle ear, functions of middle ear in detail, assessment of functions of middle ear, Functional anatomy of cochlea, functions of inner ear, place principle, theories of hearing.

- Audiometry,

Auditory pathway & important features, auditory cortex (role in hearing & speech development)

- Taste:

Functional anatomy of taste buds, different taste modalities, pathway, factors affecting taste sensation,

- Smell:

Functional anatomy of receptors, primary olfactory sensations, pathway, factors affecting smell sensation,

Desirable to know:

- Resolution of images,

- Electrophysiology of internal ear: cochlear micro phonics.

Nice to know

- Electrophysiology of retina.

- Theories of hearing.

N) CENTRAL NERVOUS SYSTEM: (50 hours)

Must know

- Outline of nervous system.

1) General nervous system:

Synapse: definition, physiological anatomy, sequence of events of synaptic transmission, properties, (state the property & its significance), significance of synaptic transmission, applied aspect.

Neurotransmitters – in brief.

Receptors: definition, classification (basis of each classification with example), properties (state each property with underlying mechanism & significance), significance (homeostasis, conscious awareness of environment, tone posture, protection).

Sensations: different modalities, classification with examples and significance

- sensation of touch, pain proprioception : details of each

Reflexes: definition, classification (basis of classification with example), reflex arc & its components, properties (state each property with basis & importance)

Stretch reflex – definition, muscle spindle (details with innervation, role of gamma motor neurons) role of supra spinal control – in brief, functions of stretch reflex (regulation of muscle tone) inverse stretch reflex.

Polysynaptic reflexes: withdrawal reflex.

2) Tracts:

Ascending & descending tracts: details of each tracts – (situation & extent in spinal cord, origin, course & termination, collaterals, somatotopic arrangement, functions, applied aspect, tests)

Ascending tracts: Basic plan of somato sensory pathway for conscious Sensation, pathway from head, face region.

Descending tracts: pyramidal tracts – details., extra pyramidal tracts, differences between UMN & LMN lesions.

2) Sections at various levels in CNS :

a) Spinal transection – spinal animal.

Complete – 3 stages – spinal shock, stage of recovery, stage of reflex failure – details of each stage.

Incomplete. Transection

Hemisecion

b) Low midbrain section – decerebrate animal : Decerebrate rigidity.

(Classical & ischaemic with mechanisms, characteristics features, physiological significance)

c) High midbrain section – High decerebrate animal.

d) Thalamic or Decorticate animal.

3) Posture - & Equilibrium.

Definition, classification of postural reflexes.

(Details of each reflex and its function.)

regulation of posture (integrating centers at various levels of CNS)

vestibular apparatus : Physiologic anatomy, mode of function of utricle & saccule and semicircular canals, vestibulo ocular & vestibulo spinal reflexes.

4) Thalamus :

Functional classification of Thalamic nuclei, with connections of different nuclear groups, functions of thalamus, thalamic syndrome.

5) Hypothalamus :

Functional classification of different hypothalamic nuclei, connections in brief, functions in details.

6) Limbic system :

Parts of limbic system, connections in brief, functions.

7) Reticular formation :

Introduction, anatomy in brief, functional divisions.

(A) Ascending reticular activating system – details with connections & role in sleep wakeful cycle, applied aspect.

(B) Descending reticular system – role in regulation of muscle tone by pontine & medullary regions.

(C) Visceral centres.

8) E. E. G. :

Definition, different waves, characteristics & functional significance of each wave, physiological variation, clinical application in brief.

9) Sleep & Wakefulness :

Concept of alertness & wakefulness with their physiological basis, Definition of sleep, stages of sleep correlated with EEG, sleep cycle – types of sleep, salient features of NREM & REM sleep, physiological effects of sleep on different systems of the body, Neurophysiological mechanisms of sleep, functions of sleep.

10) Cerebellum :

Introduction, functional classification, intracortical circuit, deep cerebellar nuclei, connections of different lobes, functions of cerebellum, cerebellar function tests, effects of lesion in brief.

11) Basal Ganglia :

Introduction, classification of nuclei, connections, intracortical circuits, functions, lesions - Parkinsonism.

12) Cerebral Cortex :

Gross anatomy & divisions, concept of Brodmann's mapping with diagram, Parietal lobe – anatomical & functional divisions, details of each functional part as regards connections, topographic organisation, functions. Frontal lobe – excitomotor Cortex – anatomical & functional parts, details of each part as regards connections, topographic organisation, functions.

Prefrontal Cortex – different areas, connections in brief, functions, effects of lobectomy.

13) speech –

Afferent and efferent mechanisms and role of cortical centers in speech, concept of cerebral dominance, development of speech, vocalization.

14) Memory :

Definition, stages, types, physiological basis, factors affecting, applied – amnesias in brief.

15) Learning :

Definition, types with examples, stages, factors influencing, role of motivation (positive & negative reinforcement, reward & punishment), physiological basis – role of different parts of CNS, structural, biochemical changes.

16) Conditioned reflexes :

Definition, difference between unconditioned & conditioned reflexes, development of conditioned reflexes, properties, significance.

17) Autonomic nervous system :

Organization and functions of Parasympathetic & Sympathetic and their control.

18) CSF :

Introduction, composition, normal CSF pressure, formation & circulation, functions, applied aspect – brief, blood brain barrier, blood CSF barrier.

19) “ Physiology of Brain Death & changes after that ” (This topic included vide Academic Council Resolution No. 303/2008 dated 29/07/2008)

Introduction of “ Brain Death and Organ Donation” topic in subjects of Physiology ,
Preventive & Social Medicine, Psychiatry, Medicine & Surgery

Desirable to know :

General nervous system :

Neurotransmitters – details, susceptibility of synapse to hypoxia drugs etc.,
Mechanisms of referred pain, differences between superficial & deep pain,
central analgesia system, supraspinal control of stretch reflex – details.

Thalamus - applied aspects – effects of lesions.

Hypothalamus - applied aspects – effects of lesions

Reticular formation – effects of lesion

EEG – Method of recording, abnormal patterns.

Basal Ganglia – lesions, involuntary movements.

Cerebellum – Embryology, evolution, effects of stimulation & ablation.

Cerebral cortex – effects of stimulation & ablation in different regions.

Speech – aphasia.

Nice to know

Experimental studies – effects of stimulation & ablation.

Sleep, wakefulness – effects of sleep deprivation, disorders.

Books recommended:

1) Textbooks of Physiology :

- | | | |
|-----------|---|------------------------------|
| Guyton | - | Textbook of Physiology |
| Ganong | - | Review of Medical Physiology |
| S. Wright | - | Applied Physiology |

2) Reference Books :

- | | | |
|-----------------|---|---|
| Best and Taylor | - | Physiological basis of medical practice |
| Berne & levy. | - | Principles of Physiology |
| Dr. V.G. Ranade | - | Laboratory Manual and Journal of Physiology
Practicals |

(A) Haematology

Hb% R. B. C. W. B. C. Differential, B.T.C.T. Blood group, ABO system Rh typing, Blood Indices

(B) Clinical examination and Human experiments

Stethography, Spirometry, Ergography, Perimetry, Tests for physical fitness, Clinical examination of all systems.

(C) Demonstrations

Reticulocyte count. Platelet count, P. C. V., E. S. R, fragility, peripheral blood smear, bone marrow slides,

E.M.G. S.D. curve, conduction velocity of nerve (Human), E.C.G., E.E.G., Audiometry, H.R.T. (Human reaction time)

Visit to blood bank, wards to show common disorders or video tapes (list given in appendix I), X-rays (list given in appendix II)

Animal experiments on frogs,

a) Skeletal muscle:

effect of graded stimuli,

simple muscle twitch

genesis of tetanus,

effect of load on skeletal muscle

fatigue.

“Velocity of Nerve Impulse & Effect of Two Successive Stimuli in Skeletal Muscle” (his two expt. Is added in new syllabus vide academic council resolution No. 64/2009 dated 28/04/2009)

<p>Introduction of “ Velocity of Nerve Impulse & Effect of Two Successive Stimuli in Skeletal Muscle Topic in 1st MBBS Practical Syllabus</p>

b) Cardiac muscle.

normal cardiogram, effect of temperature,

properties of cardiac muscle,

effect of vagal stimulation and phenomenon of vagal escape.

effect of drugs (Acetyl choline, Adrenaline, Nicotine) on frog's heart.

perfusion of isolated frogs heart with effects of Na^+ , K^+ and Ca^{++} ,

- and demonstration of Starling's law

Museum to be developed

Historical land marks, Nobel laureates

TOPICS FOR HORIZONTAL INTEGRATION IN I-MBBS

(Anatomy , Physiology , Biochemistry)

Sr. no	Month	Name of the Topic	Anatomy	Physiology	Biochemistry
1	1 st & 2 nd week of August	Cell	Cell membrane organelles (1)	Function of cell membrane , cell organelles & transport across cell membrane (3)	Biochemical function carried out by organelles, fluid mosaic model ,transport (2) across cell membrane
2	3 rd week of August	Nerve Muscle	Structure of muscle & Structure of Nerve(1)	Types of Muscles ,Molecular Structure of muscle,Classification of Nerve fibres (3)	-
3	3 rd week of August	Blood	Overview of circulatory system (1) structure of bone(1)	Blood - composition & functions (1), Hemopoiesis(1)	structure of Hb Physiological functions of Hb Hb derivatives abnormal Hb(3) Plasma proteins(2) Immunochemistry (1)
4	Sept	Respiratory System	Organization of RS. Thoracic cage lungs, Pleura Tracheobronchial tree(2)	Respiratory System Organisation(1) Mech. Respiration(1) Muscle movements (1)	Phospholipids (1)
5	Sept	Cardio vascular system	Mediastinum, pericardium , Heart, Great vessels (2)	Cardio vascular system Organisation(1) Structure & function of Heart & blood vessels (1)	Lipoproteins (1)
6	Nov & Dec	Digestive system	Gross anatomy of GIT with microscopic structure & development -Liver & hepatobiliary apparatus Pancreas(5)	Digestive system(10) Liver & gallbladder bile extrahepatic circulation (2)	General idea of digestion & absorption of carbohydrates , proteins , lipids (1) LFT (1) Hb metabolism (2) Iron Metabolism(1)

7	Jan	Excretory system	Gross anatomy & development, Microanatomy of kidney, ureter bladder, urethra(4)	Excretory system(10)	RFT(1) Protein metabolism(7) water & electrolytes(1) Na+, K+ (1)
8	3 rd week of Jan	Endocrine system	Demonstration of pituitary gland, thyroid, Pancreas & suprarenal (3)	Endocrine system(8)	Mechanism of Hormone action (1) TFT (1), Ca-P metabolism, (1) trace elements (1)
9	Feb	Reproductive system	Mammary gland Reproductive system- male & female with development, structure(9)	Reproductive system(7)	---
10	Feb - March	Special senses	Eye, Ear, Tongue, vestibular apparatus Nose Olfactory system (4)	Special senses(12)	--
11	March-April	Nervous system	Overview -spinal cord, Brain meninges, Autonomic nervous system(10)	Central Nervous system(20)	---

Prof. *[Signature]*
Prof & HOD
Anatomy

[Signature]
Prof & HOD
Physiology

[Signature]
22/3/12
Prof & HOD
Biochemistry

MGM/MC/Biochem/2014/581

Date-10/01/2014

To
The Registrar,
MGMHS, Kamothe,
Navi Mumbai

MGM University of Health Sciences
INWARD NO. 228
DATE: 10-1-14
REF: DIPN

Reference: Acad. 15/2014 dated 01.01.2014 received on 09.01.2014

Subject: Topics for Horizontal and Vertical Integration for 1st MBBS

Dear Sir,

It was decided in the BOS that as of now Vertical Integration is not feasible at the 1st MBBS level, but it can be done at higher level (II & III MBBS) as per current MCI Curriculum. Therefore I am not submitting the topics of Vertical Integrated Teaching.

Following are the topics for Horizontal Integrated Teaching -

Sr. No.	Topics	Anatomy	Physiology	Biochemistry
1.	Diabetes Mellitus	Endocrine part of pancreas	Control of Insulin Secretion & Functions	Lab Diagnosis & GTT
2.	Endemic Goiter	Thyroid Gland	Formation & Regulation of T ₃ , T ₄ & TSH	Iodine Metabolism & Function Tests
3.	Myocardial Infraction	Coronary Arteries	ECG	Cardiac Markers
4.	Fatty Liver	Liver Histology	Functions of liver - Transport of Fat from the liver	Lipotropic Factors
5.	Obstructive Jaundice	Hepato-Biliary Tree	Bile Juices, Entro-hepatic recirculation	Diagnostic Biochemical Markers
6.	Glomerular Filtration..	Nephron	Physiology of Glomerular Filtration	Inulin & creatinine clearance test

Deepak
Dr. A. D. Deepak
Chairperson BOS- Preclinical,
Dept of Biochemistry,
MGM Medical College,
Kamothe, NM

Acad
[Signature]
10/1/14

(Approved in BOM 38/2014, dated 28/11/2014, Resolution No. - 3.1)

MGM MC / PHY / 1310 / 2014

LIST OF PHYSIOLOGY BOOKS FOR I MBBS (UNDERGRADUATE COURSE)

B. Standard text books

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology Volumes I & II	A. K. Jain
2.	Medical Physiology for undergraduates new 2012 / 13	Indu Khurana
3.	Textbook of Medical Physiology South Asian Edition 2013	Guyton & Hall
4.	Fundamentals of Medical Physiology	L. Prakasam Reddy

B. Concise books

S.N.	Name of the book	Name of the Author
1.	Concise physiology for undergraduates	A. K. Jain
2.	Essentials of Medical Physiology 6 th Edition 2012	Sembulingam
3.	Textbook of Physiology	Debasis Pramanik
4.	Physiology - Prep manual for undergraduates 4 th Edition 2009	V. D. Joshi


C. Reference books

S.N.	Name of the book	Name of the Author
1.	Textbook of Medical Physiology 2005	Indu Khurana
2.	Ganong's review of medical physiology	Barrett & Barman
3.	Understanding Medical Physiology: A textbook for medical students	R. L. Bijlani & Manjunatha
4.	Physiological basis of medical practice	Best & Taylor

D. Practical books

S.N.	Name of the book	Name of the Author
1.	Practical Physiology	A. K. Jain
2.	Practical Physiology	G. K. Pal
3.	Textbook of practical Physiology	V. D. Joshi
4.	Textbook of practical Physiology	C. L. Ghal

The above list of books is recommended by Board of studies for MGMIHS University


 Dr. R. S. Inamdar
 Dr. Sangita Phatale
 MGM Medical College,
 Navi Mumbai & Aurangabad

To
 Dr. Deepak A. D.
 Chairman
 Board of Studies
 MGMIHS
 Professor & Head
 Department of Biochemistry;
 M.G.M. Medical College,
 Kamothe, Navi Mumbai.

[Approved in BOM 38 / 2014, dated 28/11/2014, Resolution No. - 3.1]

30M-40/2015

Received from Dean, MGM MC, A'ban

on 15/4/2015
(Ac meeting)

ANNEXURE - 28

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY INTRODUCTION TO ANATOMY	PHYSIOLOGY EXTERNAL ENVIRONMENT LIFE PROCESS	BIOCHEMISTRY BIOCHEMICAL COMPOSITION OF CELL	PHYSIOLOGY HOMEOSTASIS	BIOCHEMISTRY CARBOHYDRATES	ANATOMY CONNECTIVE TISSUE (TISSUES OF BODY)
10 TO 11 A.M.	BIOCHEMISTRY INTRODUCTION TO BIOCHEMISTRY	ANATOMY CELL	PHYSIOLOGY INTERNAL ENVIRONMENT (BODY FLUIDS)	ANATOMY TERMINOLOGY	PHYSIOLOGY CONTROL SYSTEM BIOFEEDBACK	PHYSIOLOGY TRANSPORT ACROSS CELL MEMBRANE I
11 TO 01 P.M.	PHYSIOLOGY INTRODUCTION BIOCHEMISTRY INTRODUCTION	PHYSIOLOGY PHYSICAL EXAM. BIOCHEMISTRY INTRODUCTION TO LAB	PHYSIOLOGY PHYSICAL EXAM. BIOCHEMISTRY PRACTICAL LAB	PHYSIOLOGY MICROSCOPE COLLECTION OF BLOOD BIODATA WRITING	PHYSIOLOGY MICROSCOPE COLLECTION OF BLOOD BIOCHEMISTRY BIODATA WRITING	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD INTRODUCTION TO SUP. EXT. AND PECTORAL REGION DISSECTION GENERAL INTRODUCTION	LECT MAMMARY GLAND DISSECTION GENERAL INTRODUCTION	LCD GLAVICLE DISSECTION PECTORAL REGION I	LCD AXILLA DISSECTION PECTORAL REGION II	LECT AXILLARY ARTERY AND AXILLARY NERVE DISSECTION PECTORAL REGION III	LCD SCAPULA DISSECTION AXILLA I

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY BONES AND CARTILAGE	PHYSIOLOGY COMPOSITION AND FUNCTIONS OF BLOOD	BIOCHEMISTRY PROTEIN I	PHYSIOLOGY PLASMA PROTEINS	HOLIDAY	ANATOMY HISTOLOGY INTRODUCTION
10 TO 11 A.M.	BIOCHEMISTRY CHEMISTRY OF CARBOHYDRATES II	ANATOMY MUSCLE	PHYSIOLOGY TRANSPORT ACROSS CELL MEMBRANE II	ANATOMY GENERAL CNS	HOLIDAY	PHYSIOLOGY ERYTHROCYTES FUNCTIONS
11 TO 01 P.M.	PHYSIOLOGY MICROSCOPE COLLECTION OF BLOOD BIOCHEMISTRY TASTE ON MONOSACCHARIDE I	PHYSIOLOGY MICROSCOPE COLLECTION OF BLOOD BIOCHEMISTRY TASTE ON MONOSACCHARIDE I	PHYSIOLOGY TUTORIAL (GEN. PHYSIOLOGY) BIOCHEMISTRY	PHYSIOLOGY STUDY OF NEUBAUER'S CHAMBER AND PCV BIOCHEMISTRY TASTE ON MONOSACCHARIDE I	HOLIDAY	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD BACK DISSECTION AXILLA II	LECT BRACHIAL PLEXUS DISSECTION BRACHIAL PLEXUS	LCD SCAPULAR REGION DISSECTION BACK AND SUBSCAPULAR REGION I	LCD HUMERUS DISSECTION BACK AND SUBSCAPULAR REGION II	HOLIDAY	LCD FRONT AND BACK OF ARM DISSECTION BACK AND SUBSCAPULAR REGION III

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY OF MUSCLE	PHYSIOLOGY MEMBRANE POTENTIAL RMP	BIOCHEMISTRY CHEMISTRY OF HAEMOGLOBIN I	PHYSIOLOGY ACTION POTENTIAL	BIOCHEMISTRY CHEMISTRY OF HAEMOGLOBIN II	ANATOMY HISTOLOGY OF NERVOUS TISSUE
10 TO 11 A.M.	BIOCHEMISTRY PROTEIN II	ANATOMY JOINT I	PHYSIOLOGY ERYTHROPOIESIS FACTORS EFFECTING	ANATOMY JOINT II	PHYSIOLOGY HB FUNCTIONS ANAEMIA	PHYSIOLOGY NEURON AND CLASSIFICATION OF NERVES
11 TO 01 P.M.	PHYSIOLOGY STUDY OF NEUBAUER'S CHAMBER AND PCV BIOCHEMISTRY TASTE ON MONOSACCHARIDE II	PHYSIOLOGY STUDY OF NEUBAUER'S CHAMBER AND PCV BIOCHEMISTRY TASTE ON TRISACCHARIDE I	PHYSIOLOGY TUTORIAL (GEN. PHYSIOLOGY) BIOCHEMISTRY	PHYSIOLOGY STUDY OF NEUBAUER'S CHAMBER AND PCV BIOCHEMISTRY TASTE ON TRISACCHARIDE I	PHYSIOLOGY R.B.C. COUNT AND ESR BIOCHEMISTRY TASTE ON TRISACCHARIDE II	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD RADIUS DISSECTION HISTO FRONT OF ARM I	LECT DERMATOMES AND VENOUS DRAINAGE DISSECTION HISTO FRONT OF ARM II	LCD FRONT OF FORE ARM (SUPERFICIAL) DISSECTION HISTO BACK OF ARM I	LCD ULNA DISSECTION BACK OF ARM II	LECT CUBITAL FOSSA AND ELBOW JOINT DISSECTION SHOULDER JOINT I	LCD WRIST AND PALM DISSECTION SHOULDER JOINT II

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY GEN. CARDIOVASCULAR SYSTEM	PHYSIOLOGY LEUCOCYTES LEUCOPOIESIS	BIOCHEMISTRY CARBOHYDRATE IV	PHYSIOLOGY FUNCTIONS OF WBC AND MONOCYTE MACROPHAGE	BIOCHEMISTRY PROTEIN III	ANATOMY HISTOLOGY EPITHELIUM
10 TO 11 A.M.	BIOCHEMISTRY CARBOHYDRATE III	ANATOMY GEN. LYMPHATIC SYSTEM	PHYSIOLOGY PROPERTIES OF NERVE	ANATOMY INTEGUMENTARY SYSTEM	PHYSIOLOGY PROPERTIES OF NERVE II	PHYSIOLOGY IMMUNITY
11 TO 01 P.M.	PHYSIOLOGY R.B.C. COUNT AND ESR BIOCHEMISTRY TASTE ON TRISACCHARIDE II	PHYSIOLOGY R.B.C. COUNT AND ESR BIOCHEMISTRY TEST ON POLYSACCHARIDE I	PHYSIOLOGY TUTORIAL/LCD BLOOD AND RBC	PHYSIOLOGY R.B.C. COUNT AND ESR BIOCHEMISTRY TEST ON POLYSACCHARIDE I	PHYSIOLOGY RBC AND HB BIOCHEMISTRY TEST ON POLYSACCHARIDE II	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD WRIST AND PALM II DISSECTION HISTO CUBITAL FOSSA	LECT SHOULDER JOINT DISSECTION HISTO FRONT OF FOREARM I	LCD BONES OF HAND DISSECTION HISTO FRONT OF FOREARM II	LCD BACK OF FOREARM AND HAND DISSECTION PALM I	LECT RADIOULNAR JT. DISSECTION PALM II	LCD ELBOW AND WRIST JT DISSECTION BACK OF FOREARM I

MCM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY GLANDULAR EPITHELIUM	PHYSIOLOGY NUROMUSCULAR JUNCTION	HOLIDAY	PHYSIOLOGY BLOOD GROUPS	BIOCHEMISTRY PROTEIN V	ANATOMY HISTOLOGY OF BONE AND CARTILAGE
10 TO 11 A.M.	BIOCHEMISTRY PROTEIN IV	ANATOMY GENERAL EMBRYOLOGY I	HOLIDAY	ANATOMY GENERAL EMBRYOLOGY II	PHYSIOLOGY MUSCLE CLASS: AND STRUCTURE	PHYSIOLOGY RH INCOMPATIBILITY BLOOD TRANSFUSION
11 TO 01 P.M.	PHYSIOLOGY RBS AND HB BIOCHEMISTRY TEST ON POLYSAECHRIDE II	PHYSIOLOGY RBS AND HB BIOCHEMISTRY TUTORIAL ON CARBOHYDRATE	HOLIDAY	PHYSIOLOGY RBS AND HB BIOCHEMISTRY TUTORIAL ON CARBOHYDRATE	PHYSIOLOGY TLC AND BLOOD GR. BIOCHEMISTRY COLOUR REACTION OF PROTEIN I	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD RADIAL NERVE DISSECTION HISTO BACK OF FOREARM II	LECT MEDIAN AND ULNAR NERVE DISSECTION HISTO DISSECTION OF JTS	HOLIDAY	LCD X-RAYS AND LIVING ANAT.	LECT PALMER SPACES AND 1 ST METACARPAL JT. DISSECTION HISTO SEMINAR	LCD INTRODUCTION OF THORAX DISSECTION INT. TO THORAX

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY OF CONNECTIVE TISSUE	PHYSIOLOGY SARCOTUBULAR SYSTEM & EXCITATION	BIOCHEMISTRY LIPID II	PHYSIOLOGY MOLECULAR BASIS OF MUSCLE CONTRACTION	BIOCHEMISTRY LIPID III	ANATOMY HISTOLOGY OF BONE II
10 TO 11 A.M.	BIOCHEMISTRY LIPID I	ANATOMY GENERAL EMBRYOLOGY III	PHYSIOLOGY COAGULATION OF BLOOD	ANATOMY GENERAL EMBRYOLOGY IV	PHYSIOLOGY ANTICOAGULATION INTRAVASCULAR CLOT FORMATION	PHYSIOLOGY PROPERTIES OF SKELETAL MUSCLE
11 TO 01 P.M.	PHYSIOLOGY TLC AND BLOOD GR. BIOCHEMISTRY COLOUR REACTION OF PROTEIN I	PHYSIOLOGY TLC AND BLOOD GR. BIOCHEMISTRY COLOUR REACTION OF PROTEIN II	PHYSIOLOGY TUTORIAL	PHYSIOLOGY TLC AND BLOOD GR. BIOCHEMISTRY COLOUR REACTION OF PROTEIN II	PHYSIOLOGY DLC & BLOOD INDICES BIOCHEMISTRY PRECIPITATION REACTION OF PROTEIN I	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD INTERCOSTAL SPACE DISSECTION HISTO INTERCOSTAL SPACE I	LECT INTERCOSTAL SPACE DISSECTION HISTO INTERCOSTAL SPACE II	LCD THORACIC VERTEBRAE AND STERNUM DISSECTION HISTO INTERCOSTAL SPACE III	LCD PLEURA DISSECTION PLEURA I	LECT MEDIASTINUM DISSECTION PLEURA II	LCD LUNGS DISSECTION LUNGS I

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY VASCULAR SYSTEM	PHYSIOLOGY PROPERTIES OF SKELETAL MUSCLE	BIOCHEMISTRY ENZYME I	PHYSIOLOGY INTRODUCTION TO CVS	BIOCHEMISTRY ENZYME II	ANATOMY HISTOLOGY OF RESPIRATORY SYSTEM
10 TO 11 A.M.	BIOCHEMISTRY LIPID IV	ANATOMY GENERAL EMBRYOLOGY V	PHYSIOLOGY SMOOTH MUSCLE	ANATOMY GENERAL EMBRYOLOGY VI	PHYSIOLOGY INTRODUCTION OF RESPIRATORY SYSTEM	PHYSIOLOGY PROPERTIES OF CARDIAC MUSCLE I
11 TO 01 P.M.	PHYSIOLOGY DLC & BLOOD INDICES BIOCHEMISTRY PRECIPITATION REACTION OF PROTEIN I	PHYSIOLOGY DLC & BLOOD INDICES BIOCHEMISTRY COLOUR REACTION OF PROTEIN II	PHYSIOLOGY TUTORIAL	PHYSIOLOGY DLC & BLOOD INDICES BIOCHEMISTRY COLOUR REACTION OF PROTEIN II	PHYSIOLOGY DLC AND BTCT BIOCHEMISTRY LCD PH METER	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD PERICARDIUM & EXT. FEATURE OF HEART DISSECTION HISTO ANT. MEDIASTINUM I	LECT MECH. OF RESPIRATION AND JT. OF THORAX DISSECTION HISTO ANT. MEDIASTINUM II	LCD RIGHT ATRIUM & RIGHT VENTRICLE. PULMONARY TRUNK DISSECTION HISTO MIDDLE MEDIA. I	LCD LF. ATRIUM & VENTRICAL ASC. AORTA DISSECTION MIDDLE MEDIA. II	LECT BRONCHO PULMONARY SEG. DISSECTION HEART I	LCD SUPERIOR VENA CAVA, TRACHEA VAGI DISSECTION HEART II

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY LYMPHOID I	PHYSIOLOGY MECHANICS OF RESPIRATION	BIOCHEMISTRY ENZYME IV	PHYSIOLOGY, ATMOSPHERIC AIR & DEAD SPACE AIR	BIOCHEMISTRY VITAMINS I	ANATOMY HISTOLOGY LYMPHOID II
10 TO 11 A.M.	BIOCHEMISTRY ENZYME III	ANATOMY GENERAL EMBRYOLOGY VII	PHYSIOLOGY PROPERTIES OF CARDIAC MUSCLE	ANATOMY GENERAL EMBRYOLOGY VIII	PHYSIOLOGY JUNCTIONAL TISSUES OF HEART	PHYSIOLOGY LUNG VOLUMES AND CAPACITIES
11 TO 01 P.M.	PHYSIOLOGY DLC AND BTCT BIOCHEMISTRY LCD PH METER	PHYSIOLOGY DLC AND BTCT BIOCHEMISTRY TUTORIAL ON HAEMATATOLOGY	PHYSIOLOGY TUTORIAL	PHYSIOLOGY DLC AND BTCT BIOCHEMISTRY TUTORIAL ON HAEMATATOLOGY	PHYSIOLOGY INTRODUCTION TO EXPT. PHYSIOLOGY BIOCHEMISTRY TEST ON BILE SALT AND PIGMENT	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD ESOPHAGUS/ DES AORTA/ THORACIC DUCT DISSECTION HISTO HEART III	LECT RIGHT ATRIUM DISSECTION HISTO SUPERIOR MEDIA.	LCD AZYGOS SYSTEM DISSECTION HISTO POST. MEDIA.	LCD X-RAYS AND LIVING	LECT. BLOOD SUPPLY OF HEART. DISSECTION/ SEMINAR	LCD INTRODUCTION AND ANTERIOR COMP. OF THIGH DISSECTION INTRODUCTION

MM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY GIT I.	PHYSIOLOGY ORIGIN AND SPREAD OF CARDIAC IMPULSE	BIOCHEMISTRY VITAMIN III	HOLIDAY	BIOCHEMISTRY VITAMIN IV	ANATOMY HISTOLOGY GIT II
10 TO 11 A.M.	BIOCHEMISTRY VITAMIN II	ANATOMY GENERAL EMBRYOLOGY IX	PHYSIOLOGY ALVEOLAR VENTILATION	HOLIDAY	PHYSIOLOGY E.C.G.	PHYSIOLOGY TRANSPORT OF OXYGEN
11 TO 01 P.M.	PHYSIOLOGY INT. TO EXP. PHYSIOLOGY BIOCHEMISTRY TEST ON BILE SALT AND PIG.	PHYSIOLOGY EFFECT OF GRADED STIMULUS AND SMC & NORMAL ECG BIOCHEMISTRY TEST ON BILE	PHYSIOLOGY TUTORIAL	HOLIDAY	PHYSIOLOGY EFFECT OF GRADED STIMULUS AND SMC & NORMAL ECG BIOCHEMISTRY TEST ON BILE	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD HIP BONE DISSECTION HISTO FRONT OF THIGH	LECT FEMORAL TRINGLE DISSECTION HISTO FEMORAL TRINGLE	LCD ADD. COMPARTMENT OF THIGH DISSECTION HISTO FEMORAL	HOLIDAY	LECT ADDUCTOR CANAL DISSECTION MEDIAL SIDE OF THIGH I	LCD FEMUR AND PATELLA DISSECTION MEDIAL SIDE OF THIGH I

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY GIT III	PHYSIOLOGY NERVE SUPPLY OF HEART AND HEART RATE	BIOCHEMISTRY VITAMIN VI	HOLIDAY	BIOCHEMISTRY VITAMIN VII	ANATOMY HISTOLOGY GIT IV
10 TO 11 A.M.	BIOCHEMISTRY VITAMIN V	ANATOMY GENERAL EMBRYOLOGY X	PHYSIOLOGY TRANSPORT OF CARBOHYDRATES	HOLIDAY	PHYSIOLOGY CARDIAC CYCLE I	PHYSIOLOGY CARDIAC CYCLE II
11 TO 01 P.M.	PHYSIOLOGY EFFECT OF GRADED STIMULUS AND SMC & NORMAL ECG BIOCHEMISTRY TUTORIAL ON PROTEIN	PHYSIOLOGY EFFECT OF GRADED STIMULUS AND SMC & NORMAL ECG BIOCHEMISTRY TUTORIAL ON PROTEIN	PHYSIOLOGY TUTORIAL	HOLIDAY	PHYSIOLOGY EFFECT OF LOAD ON SKELETAL MUSCLE & PROPERTIES ON CARDIAC MUSCLE BIOCHEMISTRY LCD CALORIMETRY	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD GLUTEAL REGION I DISSECTION HISTO GLUTEAL REGION I	LECT GLUTEAL REGION DISSECTION HISTO GLUTEAL REGION II	LCD GLUTEAL REGION II DISSECTION HISTO GLUTEAL REGION III	HOLIDAY	LCD TIBIA DISSECTION POPLITEAL FOSSA I	LCD POPLITEAL REGION DISSECTION POPLITEAL FOSSA II

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY GIT V	PHYSIOLOGY NERVOUS REGULATION OF RESPIRATION	BIOCHEMISTRY BIOLOGICAL OXIDATION I	PHYSIOLOGY CARDIAC OUTPUT II	BIOCHEMISTRY BIOLOGICAL OXIDATION II	ANATOMY HISTOLOGY RESPIRATORY SYSTEM
10 TO 11 A.M.	BIOCHEMISTRY VITAMIN VIII	ANATOMY GENERAL EMBRYOLOGY XI	PHYSIOLOGY CARDIAC OUTPUT I	ANATOMY EMBRYOLOGY PHARYNGEAL POUCHES & ARCHES	PHYSIOLOGY CHEMICAL REGULATION OF RESPIRATION	PHYSIOLOGY HAEMADYNAMIC OF CIRCULATION
11 TO 01 P.M.	PHYSIOLOGY EFFECT OF LOAD ON SKELETAL MUSCLE & PROPERTIES ON CARDIAC MUSCLE BIOCHEMISTRY LCD COLORIMETER	PHYSIOLOGY EFFECT OF LOAD ON SKELETAL MUSCLE & PROPERTIES ON CARDIAC MUSCLE BIOCHEMISTRY ESTIMATION OF BLOOD SUGAR	PHYSIOLOGY TUTORIAL	PHYSIOLOGY EFFECT OF LOAD ON SKELETAL MUSCLE & PROPERTIES ON CARDIAC MUSCLE BIOCHEMISTRY ESTIMATION OF BLOOD SUGAR	PHYSIOLOGY GENESIS OF TETANUS AND PROPERTIES OF CARDIAC MUSCLE BIOCHEMISTRY ESTIMATION OF BLOOD SUGAR	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD BACK OF THIGH DISSECTION HISTO BACK OF THIGH I	LECT POPLITAL FOSSA DISSECTION HISTO BACK OF THIGH II	LCD HIP JOINT DISSECTION HISTO HIP JOINT I	LCD TARSALS & METATARSALS DISSECTION HIP JOINT II	LECT HIP JOINT DISSECTION FRONT OF LEG & DORSUM OF FOOT I	LCD FRONT OF LEG & DORSUM OF FOOT DISSECTION FRONT OF LEG & DORSUM OF FOOT II

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY OF URINARY SYSTEM	PHYSIOLOGY HYPOXIA ACCLIMATIZATION AT HIGH ALTITUDE	BIOCHEMISTRY CARBOHYDRATE METABOLISM I	PHYSIOLOGY ARTERIAL BLOOD PRESSURE	BIOCHEMISTRY CARBOHYDRATE METABOLISM II	ANATOMY SOLE OF FOOT
10 TO 11 A.M.	BIOCHEMISTRY BIOLOGICAL OXIDATION III	ANATOMY EMBRYOLOGY RESPIRATORY SYSTEM	PHYSIOLOGY VENOUS CIRCULATION	ANATOMY EMBRYOLOGY GIT I	PHYSIOLOGY ABNORMALITY OF RESPIRATION	PHYSIOLOGY REGULATION OF BLOOD PRESSURE I
11 TO 01 P.M.	PHYSIOLOGY GENESIS OF TETANUS AND PROPERTIES OF CARDIAC MUSCLE II BIOCHEMISTRY ESTIMATION OF BLOOD SUGAR	PHYSIOLOGY GENESIS OF TETANUS AND PROPERTIES OF CARDIAC MUSCLE II BIOCHEMISTRY TUTORIAL ON LIPID CHEMISTRY	PHYSIOLOGY TUTORIAL	PHYSIOLOGY GENESIS OF TETANUS AND PROPERTIES OF CARDIAC MUSCLE II BIOCHEMISTRY TUTORIAL ON LIPID CHEMISTRY	PHYSIOLOGY BIOCHEMISTRY REVISION PRACTICE	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD FIBULA AND LAT. COMP. OF LEG DISSECTION HISTO LAT. SIDE OF LEG I	LECT CUTANEOUS NERVES & VENOUS DRAINAGE & LYMPH DISSECTION HISTO LAT. SIDE OF LEG II	LCD BACK OF LEG DISSECTION HISTO MEDIAL SIDE OF LEG	LCD SOLE I DISSECTION BACK OF LEG I	LECT KNEE JOINT DISSECTION BACK OF LEG II	LCD SOLE II AND JT. OF FOOT DISSECTION SOLE I

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY SKIN, SCALP & NAIL.	PHYSIOLOGY PULMONARY FUNCTION TEST	BIOCHEMISTRY CARBOHYDRATE METABOLISM IV.	PHYSIOLOGY CAPILLARY CIRCULATION	BIOCHEMISTRY CARBOHYDRATE METABOLISM V	ANATOMY INGUANAL CANAL
10 TO 11 A.M.	BIOCHEMISTRY CARBOHYDRATE METABOLISM III	ANATOMY EMBRYOLOGY GIT II	PHYSIOLOGY REGULATION OF BLOOD PRESSURE II	ANATOMY EMBRYOLOGY GIT III	PHYSIOLOGY LYMPH	PHYSIOLOGY EDEMA FORMATION
11 TO 01 P.M.	PHYSIOLOGY REVISION BIOCHEMISTRY REVISION	PHYSIOLOGY FATIGUE, VAGAL ESCAPE BIOCHEMISTRY ESTIMATION OF TOTAL PROTEIN	PHYSIOLOGY TUTORIAL	PHYSIOLOGY FATIGUE, VAGAL ESCAPE BIOCHEMISTRY ESTIMATION OF TOTAL PROTEIN	PHYSIOLOGY FATIGUE, VAGAL ESCAPE BIOCHEMISTRY ESTIMATION OF TOTAL PROTEIN	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD TIBIOFIBULAR & ANKLE JT DISSECTION HISTO SOLE II	LECT ARCHES OF FOOT, MECH OF WALKING DISSECTION HISTO SOLE III	LCD X-RAYS AND LIVING OF INF. EXT.	LCD INTRODUCTION TO ABDOMEN DISSECTION HISTO INTRODUCTION	LCD ANTERIOR ABD. I DISSECTION ANTERIOR ABD. I	LCD ANTERIOR ABD II DISSECTION ANTERIOR ABD. II

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY MALE GENITAL SYS. I	PHYSIOLOGY INTRODUCTION TO EXCRETORY SYSTEM	BIOCHEMISTRY CARBOHYDRATE METABOLISM VII	PHYSIOLOGY RENAL CIRCULATION & AUTOREGULATION OF RENAL BLOOD FLOW	BIOCHEMISTRY CARBOHYDRATE METABOLISM VIII	ANATOMY LECT STOMACH
10 TO 11 A.M.	BIOCHEMISTRY CARBOHYDRATE METABOLISM VI	ANATOMY EMBRYOLOGY GIT IV	PHYSIOLOGY PULMONARY CIRCULATION	ANATOMY EMBRYOLOGY GIT V	PHYSIOLOGY CORONARY CIRCULATION	PHYSIOLOGY GFR
11 TO 01 P.M.	PHYSIOLOGY FATIGUE, VAGAL ESCAPE BIOCHEMISTRY ESTIMATION OF TOTAL PROTEIN	PHYSIOLOGY INTRODUCTION TO CLINICAL EXAM. EFFECTS OF DRUGS ON HEART BIOCHEMISTRY SEMINAR ON VITAMIN	PHYSIOLOGY TUTORIAL	PHYSIOLOGY INTRODUCTION TO CLINICAL EXAM. EFFECTS OF DRUGS ON HEART BIOCHEMISTRY SEMINAR ON VITAMIN	PHYSIOLOGY INTRODUCTION TO CLINICAL EXAM. EFFECTS OF DRUGS ON HEART BIOCHEMISTRY SEMINAR ON VITAMIN	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD MALE EXT. GENITAL ORGAN DISSECTION HISTO MALE GENITAL ORGAN	LECT TESTES DISSECTION HISTO TESTES	LCD PERITONEUM I DISSECTION HISTO PERITONEAL CAVITY I	LCD PERITONEUM II DISSECTION PERITONEAL CAVITY I	LECT PERITONEUM DISSECTION GRATER AND LESSER OMENTUM	LCD STOMACH & COELIAC TRUNK DISSECTION STOMACH & COELIAC TRUNK

MOM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY MALE GENITAL ORGAN II	PHYSIOLOGY CEREBRAL AND HEPATIC CIRCULATION	BIOCHEMISTRY PROTEIN METABOLISM II	PHYSIOLOGY CARDIO RESPIRATORY CHANGES DURING EXERCISE	BIOCHEMISTRY PROTEIN META. III	ANATOMY LECT PANCREAS
10 TO 11 A.M.	BIOCHEMISTRY PROTEIN META. I	ANATOMY EMBRYOLOGY GIT VI	PHYSIOLOGY TUBULAR FUNCTION	ANATOMY EMBRYOLOGY GIT VII	PHYSIOLOGY MECHANISM OF CONCENTRATION OF URINE	PHYSIOLOGY CIRCULATORY SHOCK I
11 TO 01 P.M.	PHYSIOLOGY INTRODUCTION TO CLINICAL EXAM. EFFECTS OF DRUGS ON HEART BIOCHEMISTRY SEMINAR ON VITAMIN	PHYSIOLOGY ARTERIAL PULSE AND EFFECT OF IONS ON HEART BIOCHEMISTRY ESTIMATION OF BLOOD UREA	PHYSIOLOGY TUTORIAL	PHYSIOLOGY ARTERIAL PULSE AND EFFECT OF IONS ON HEART BIOCHEMISTRY ESTIMATION OF BLOOD UREA	PHYSIOLOGY ARTERIAL PULSE AND EFFECT OF IONS ON HEART BIOCHEMISTRY ESTIMATION OF BLOOD UREA	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD DUODENUM DISSECTION HISTO DUODENUM	LECT DUODENUM DISSECTION HISTO MESENTRY.	LCD SMALL INTESTINE & SUP. MESENTRIC ARTERY DISSECTION HISTO SMALL INTESTINE	LCD LARGE INTESTINE AND INF. MESENTRIC ARTERY DISSECTION COECUM & APPENDIX	LECT COECUM & APPENDIX DISSECTION LARGE INTESTINE	LCD PANCREAS DISSECTION PANCREAS

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY FEMALE GENITAL TRACT I	PHYSIOLOGY RENAL HANDLING OF WATER & ELECTROLYTES	BIOCHEMISTRY PROTEIN META. V	PHYSIOLOGY ACIDIFICATION OF URINE	BIOCHEMISTRY PROTEIN META. VI	ANATOMY LECT. KIDNEY
10 TO 11 A.M.	BIOCHEMISTRY PROTEIN META. IV	ANATOMY EMBRYOLOGY URINARY SYST. I	PHYSIOLOGY CIRCULATORY SHOCK II	ANATOMY EMBRYOLOGY URINARY SYST. II	PHYSIOLOGY MITURATION Mituration	PHYSIOLOGY RENAL FUNCTION TESTS.
11 TO 01 P.M.	PHYSIOLOGY ARTERIAL PULSE AND EFFECT OF IONS ON HEART BIOCHEMISTRY ESTIMATION OF BLOOD UREA	PHYSIOLOGY RECORDING OF BLOOD PRESSURE & STETHOGRAPHY BIOCHEMISTRY LCD ON CHROMATOGRAPHY	PHYSIOLOGY TUTORIAL	PHYSIOLOGY RECORDING OF BLOOD PRESSURE & STETHOGRAPHY BIOCHEMISTRY LCD ON CHROMATOGRAPHY	PHYSIOLOGY RECORDING OF BLOOD PRESSURE & STETHOGRAPHY BIOCHEMISTRY ESTIMATION OF SERUM BILIRUBIN	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD. LIVER DISSECTION HISTO LIVER	LECT EXTRA HEPATIC BILIARY APP. DISSECTION HISTO GALL BLADDER	LCD SPLEEN DISSECTION HISTO SPLEEN	LCD KIDNEY DISSECTION KIDNEY, URETER, SUPRARENAL	LECT AUTONOMIC NERVOUS SYSTEM DISSECTION KIDNEY, URETER, SUPRARENAL	LCD SUPRARENAL AND URETERS DISSECTION POST. WALL

MOM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY FEMALE REPRODUCTIVE SYSTEM II	PHYSIOLOGY BODY TEMP. REGULATION I	BIOCHEMISTRY PROTEIN META VIII	PHYSIOLOGY BODY TEMP. REGULATION III	BIOCHEMISTRY ACID BASE BALANCE I	ANATOMY LECT URINARY BLADDER
10 TO 11 A.M.	BIOCHEMISTRY PROTEIN META VII	ANATOMY EMBRYOLOGY URINARY SYSTEM III	PHYSIOLOGY BODY TEMP. REGULATION II	ANATOMY EMBRYOLOGY URINARY SYSTEM IV	PHYSIOLOGY INTRODUCTION TO ENDOCRINOLOGY	PHYSIOLOGY INTRODUCTION TO GIT
11 TO 01 P.M.	PHYSIOLOGY RECORDING OF BLOOD PRESSURE & STETHOGRAPHY BIOCHEMISTRY ESTIMATION OF SERUM BILIRUBIN	PHYSIOLOGY BLOOD PRESSURE II & CLINICAL EXAMINATION OF CVS BIOCHEMISTRY ESTIMATION OF SERUM BILIRUBIN	PHYSIOLOGY TUTORIAL	PHYSIOLOGY BLOOD PRESSURE II & CLINICAL EXAMINATION OF CVS BIOCHEMISTRY ESTIMATION OF SERUM BILIRUBIN	PHYSIOLOGY BLOOD PRESSURE II & CLINICAL EXAMINATION OF CVS BIOCHEMISTRY TUTORIAL ON ENZYMES	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD PERINEUM & ANAL TRINGLE DISSECTION HISTO PERINEUM & ANAL TRINGLE	LECT ISCHIORECTAL FOSSA DISSECTION HISTO ISCHIORECTAL FOSSA I	LCD BONY PELVIS DISSECTION HISTO ISCHIORECTAL FOSSA II	LCD UROGENITAL TRINGLE DISSECTION UROGENITAL TRINGLE I	LECT PERINEAL POUCHES DISSECTION UROGENITAL TRINGLE II	LCD URINARY BLADDER DISSECTION URINARY BLADDER

**MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING**

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY OF ENDOCRINES I	PHYSIOLOGY ANTERIOR PITUTARY	BIOCHEMISTRY LIPID META I	PHYSIOLOGY PITUTARY II	BIOCHEMISTRY LIPID META II	ANATOMY LECT PROSTATE & PELVIC DIA.
10 TO 11 A.M.	BIOCHEMISTRY ACID BASE BALANCE II	ANATOMY EMBRYOLOGY MALE GENITAL I	PHYSIOLOGY SALIVARY SECRETION	ANATOMY EMBRYOLOGY MALE GENITAL II	PHYSIOLOGY DEGLUTATION	PHYSIOLOGY THYROID I
11 TO 01 P.M.	PHYSIOLOGY BLOOD PRESSURE II & CLINICAL EXAMINATION OF CVS BIOCHEMISTRY TUTORIAL ON ENZYMES	PHYSIOLOGY ECG & CLINICAL EXAMINATION OF RS BIOCHEMISTRY ESTIMATION OF ALK. PHOSPHATASE	PHYSIOLOGY TUTORIAL	PHYSIOLOGY ECG & CLINICAL EXAMINATION OF RS BIOCHEMISTRY ESTIMATION OF ALK. PHOSPHATASE	PHYSIOLOGY ECG & CLINICAL EXAMINATION OF RS BIOCHEMISTRY ESTIMATION OF ALK. PHOSPHATASE	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD UTERUS DISSECTION HISTO UTERUS	LECT UTERUS DISSECTION HISTO OVARY AND F. TUBE	LCD OVARY AND F. TUBE DISSECTION HISTO OVARY AND F. TUBE	LCD RECTUM & ANAL CANAL DISSECTION RECTUM & ANAL CANAL I	LECT RECTUM & ANAL CANAL DISSECTION RECTUM & ANAL CANAL II	LCD PROSTATE DISSECTION PROSTATE

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION IST M.B.B.S. TEACHING

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	ANATOMY HISTOLOGY OF ENDOCRINES II	PHYSIOLOGY GASTRIC SECRETIONS I	BIOCHEMISTRY LIPID META IV	HOLIDAY	BIOCHEMISTRY LIPID META V	ANATOMY LECT (INTEGRATED) CORSS SECTIONAL ANAT.
10 TO 11 A.M.	BIOCHEMISTRY LIPID MKTA III	ANATOMY EMBRYOLOGY FEMALE REPRODUCTIVE I	PHYSIOLOGY THYROID II	HOLIDAY	PHYSIOLOGY GASTRIC SECRETIONS II	PHYSIOLOGY PANCREATIC SECRETION
11 TO 01P.M.	PHYSIOLOGY ECG & CLINICAL EXAMINATION OF RS BIOCHEMISTRY ESTIMATION OF ALK. PHOSPHATASE	PHYSIOLOGY ARTIFICIAL RESPIRATION & SPIROMETRY BIOCHEMISTRY TEST ON CARBOHYDRATE METABOLITES	PHYSIOLOGY TUTORIAL	HOLIDAY	PHYSIOLOGY ARTIFICIAL RESPIRATION & SPIROMETRY BIOCHEMISTRY TEST ON CARBOHYDRATE METABOLITES	P.S.M.
01 TO 02 P.M.	LUNCH					
02 TO 05 P.M.	LCD DIA. AND MUSCLES OF POST. ABD. WALL DISSECTION HISTO DIAPHRAGM	LECT NERVES, VESSELS & LYMPH OF POST ABD. WALL DISSECTION HISTO POST. ABD WALL & PELVIS	LCD X-RAYS & LIVING HISTOLOGY PRACT.	HOLIDAY	REVISION	REVISION

MGM MEDICAL COLLEGE, AURANGABAD
HORIZONTAL INTEGRATION 1ST M.B.B.S. TEACHING

FIRST TERM EXAMINATION

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9 TO 10 A.M.	THEORY ANATOMY	THEORY PHYSIOLOGY	THEORY BIOCHEMISTRY	TERMINAL PRACTICE	TERMINAL PRACTICE	TERMINAL PRACTICE
10 TO 11 A.M.						
11 TO 01 P.M.						
01 TO 02 P.M.						
02 TO 05 P.M.						

Department of Health Sciences
MGM Medical College
Kamothe, Navi Mumbai
Date: 01.12.2014

DEPARTMENT OF PHYSIOLOGY
M. G. M. MEDICAL COLLEGE, KAMOTHE, NAVI MUMBAI

MGMMC/PHY/1413/2014

Date: 01.12.2014

To,
The Registrar,
MGMIHS,
Kamothe, Navi Mumbai

(Through Chairman BOS – Pre clinical)

Subject: First MBBS Physiology Model Question Paper – Paper I & II (Section B & Section C)


Sir,


With reference to discussion during video conferencing on the date 24.11.2014, please find herewith model question papers for First MBBS Physiology Paper I & II (Section B & Section C).

This is for your kind information and necessary action.

Thanking you,

Yours faithfully,


02-12-14.
Dr. P. J. Shinde
Professor & Head
Department of Physiology
MGM Medical College,
Aurangabad


Dr. R. S. Inamdar
Professor & Head
Department of Physiology
MGM Medical College,
Kamothe, Navi Mumbai

Dr. (Signature)



MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

I-MBBS - MODEL QUESTION PAPER

Subject - PHYSIOLOGY PAPER-I

Maximum Marks: 50

Duration – 2 ½ Hours (Section A = 30 Minutes. Section B & C = 2 Hours)

SECTION – B

Write briefly on ANY FOUR

(5 marks X 4 = 20 marks)

- a. Primary active transport
- b. Erythroblastosis foetalis
- c. Baroreceptors
- d. Ovulation
- e. Hypoxic Hypoxia

SECTION – C

Answer in detail (ANY TWO OUT OF THREE)

(10 marks X 2 = 20 marks)

- a. Enumerate hormones secreted by anterior pituitary. Describe actions of growth hormone.
Add a note on disorders due to hyper secretion of growth hormone. (2+5+3)
- b. What are the functions of platelets? Describe intrinsic pathway. Add a note on haemophilia (4+4+2)
- c. Describe the transport of oxygen in the body. Draw and label Oxy-haemoglobin dissociation curve. What are the factors affecting Oxy-haemoglobin dissociation curve. (4+3+3)

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

I-MBBS - MODEL QUESTION PAPER

Subject - PHYSIOLOGY PAPER-II

Maximum Marks: 50

Duration – 2 ½ Hours (Section A = 30 Minutes, Section B & C = 2 Hours)

SECTION – B

Write briefly on ANY FOUR

(5 marks X 4 = 20 marks)

- a. Peristalsis
- b. Organ of Corti
- c. Juxtaglomerular apparatus
- d. Classification of receptors
- e. Myasthenia gravis

SECTION – C

Answer in detail (ANY TWO OUT OF THREE)

(10 marks X 2 = 20 marks)

- a. Describe the composition, functions and regulation of secretion of gastric juice. Add a note on peptic ulcer. (2+2+3+3)
- b. Describe connections and functions of basal ganglia. Add a note on Parkinsonism. (4+4+2)
- c. Describe visual pathway with the help of a neat, labeled diagram. What are the effects of lesions at various levels of the visual pathway? (4+3+3)

Approved in BOM 43/2015, Dated 06/11/2015
Resolution No. - 3.1

Resolution No. 3.1(a): Resolved to incorporate the videos of animal experiments in First MBBS Physiology Practical/Demonstrations of Experimental Physiology (Annexure-I) for the batch of Students to be admitted in 1st MBBS from the academic year 2016-17 onwards.

Annexure - I

List of animated videos for Experimental (Amphibian) Physiology practicals:

- Instruments of experimental physiology
- Dissection to obtain Nerve muscle preparation
- Reactivity of Tissues + Simple Muscle Twitch + Effect of temperature on muscle contraction
- Effect of increasing strength of stimulus + Effect of two successive stimuli on muscle twitch
- Genesis of Tetanus + Genesis of Fatigue
- Effect of Load on Muscle Contraction + Isometric Contraction
- Conduction Velocity of Nerves
- Normal Cardiogram of Frog + Effect of Temperature on Frog's heart
- Effects of Stannius Ligatures on Frog's Heart
- Properties of the heart muscle
- Effect of Vagosympathetic Stimulation on Frog's heart
- Effect of Nicotine and atropine on Frog's heart
- Effect of Ion's on Perfused Frog's heart

Annexure - II

Horizontal Integration: Is done in collaboration with physiology and biochemistry departments on clinically relevant topics during the course.

- Lung (bronchopulmonary segments)
- Heart (Conducting system)
- Liver (cirrhosis) and hepatic acini
- Peptic ulcer
- Coronary heart disease
- Parkinsonism
- Portal hypertension
- Diabetes mellitus
- Jaundice (hepatitis)
- Cerebral stroke
- Spinal cord
- Cerebellum
- Cerebrum
- CSF

1. Introduction of early clinical exposure

- For example -
 - Introduction to imaging techniques and correlation with anatomical structure in normal person.
 - Upper limb - Erb's palsy, Klumke's paralysis, claw hand, wrist drop,
 - Lower limb - varicose veins, Trendelenburg's test for gluteus medius, Knee arthroscopy and replacement, foot drop
 - Thorax - pleural effusion, procedure of pleural or pericardial tap, diaphragmatic hernia, X-ray chest with introduction of terms such as CT scan, HRCT, Bronchoscopy. Introduction of echocardiography and valvular movements, Angiography.
 - Abdomen - renal calculi, Meckel's diverticulum, cholecystitis, Introduction to endoscopy of stomach and large intestine and duodenum, Peancreatic and gallstone removal with endoscopy.
 - Pelvis - interior of bladder by cystoscopy, ectopic pregnancy, haemorrhoids, Introduction of pelvic laparoscopy.
 - Head, face, neck - facial palsy, parotitis, black eye in scalp injury
 - Neuro-anatomy - Huntington's chorea, hydrocephaly, procedure of lumbar puncture, Introduction of MRI and MRI angiography and tensor imaging.

Embryology animations:

Various anomalies as per organ development.

Fertilization.

Implantation.

Folding of embryo.

Rotation of Gut.

Pharyngeal apparatus.

Face.

Developing heart.

ANNEXURE - II

Item No. 3: To consider and take appropriate resolutions on the recommendations and decisions taken by the Academic Council (AC-22/2015) in its meeting held on Saturday, 17th October, 2015.

Resolution No. 3: Following Resolutions were passed by the Board of Management on the recommendations of the meeting of Academic Council AC-22/2015 dated 17/10/2015 :

3.1 Preclinical :

✓ **Resolution No. 3.1(a):** Resolved to incorporate the videos of animal experiments in First MBBS Physiology Practical/Demonstrations of Experimental Physiology (Annexure-I) for the batch of Students to be admitted in 1st MBBS from the academic year 2016-17 onwards.

✓ **Resolution No. 3.1(b):** Resolved to include Early Clinical Exposure in the curriculum of First MBBS by way of video clipping, animations, visit to Wards wherever necessary (Annexure-II) for the batch of Students to be admitted in 1st MBBS from the academic year 2016-17 onwards.

Resolution No. 3.1(c): Resolved to shift 'Thorax' portion from Anatomy (1st MBBS) Paper II to Paper I to have proper distribution in two papers for the batch of Students to be admitted in 1st MBBS from the academic year 2016-17 onwards.

✓ **Resolution No. 3.1(d):** Resolved to accept the proposed pattern of redistribution of the marks in First MBBS – University Biochemistry Practical Examination (Annexure-III) for the batch of Students to be admitted in 1st MBBS from the academic year 2016-17 onwards.

Resolution No. 3.1(e): Resolved to conduct a workshop on competency based education in both the Campuses at Navi Mumbai & Aurangabad for all courses under MGM Institute.

3.2 Paraclinical :

✓ **Resolution No. 3.2(a):** Resolved to approve the change in existing journal of 2nd MBBS Microbiology (Annexure-IV) & log book of MD Microbiology (Annexure-V) for the batch of Students entering into 2nd MBBS from the academic year 2016-17 onwards.

✓ **Resolution No. 3.2(b):** Resolved to approve the change in syllabus of Microbiology MBBS (Annexure-VI) for the batch of Students entering into 2nd MBBS from the academic year 2016-17 onwards.

✓ **Resolution No. 3.2(c):** Resolved to approve the change in syllabus of Pathology MBBS (Annexure-VII) and Pathology PG Logbook (Annexure-VIII) for the batch of Students entering into 2nd MBBS from the academic year 2016-17 onwards.

Approved As per Bom 45/2016, Dated 28/04/2016
Resolution No. - 3.1 (b)

Resolution No. 3.1(b): Resolved to accept revised method to calculate internal assessment marks for 1st MBBS as given below from the academic year 2016 -17 onwards:

For Theory:

	Anatomy	Physiology	Biochemistry
1 st Sem. & Prelim Exam.	15	15	15
Day to day assessment as per MCI norms	05	05	05
Total marks	20	20	20

For Practical:

	Anatomy	Physiology	Biochemistry
1 st Sem. & Prelim Exam.	15	15	15
Day to day assessment as per MCI norms	05	05	05
Total marks	20	20	20

**DEPARTMENT OF PHYSIOLOGY
MGM MEDICAL COLLEGE, KAMOTHE, NAVI MUMBAI**

MGM/MED-C/PHY/2016/626

Date: 28.12.2016

To
The Registrar
MGM IHS,
Navi Mumbai

Subject: First MBBS Syllabus for Human Physiology, Human Anatomy & Human Biochemistry subjects.

Sir,

Please find herewith the First MBBS Syllabus for Human Physiology, Human Anatomy & Human Biochemistry syllabus, as submitted by HODs after due discussion sent by email registrar@mgmuhs.com & dyr@mgmuhs.com.

This is for your kind information and necessary action.

Thanking you,

Academic Connect

HL
28.12.16

Yours sincerely,



Dr. R. S. Inamdar
Chairman
Pre Clinical BOS
Professor & Head
Department of Physiology
MGM Medical College,
Kamothe, Navi Mumbai

MGM Institute Of Health Sciences

WARD NO. 10099

DATE: 28/12/16

REF: 2

MGMIHS

**SYLLABUS
FOR
FIRST MBBS - HUMAN PHYSIOLOGY**

MGM INSTITUTE OF HEALTH SCIENCES
BROAD CURRICULUM AS PER MCI GUIDELINES
MBBS – PHASE I-SUBJECT – HUMAN PHYSIOLOGY

(A) PHYSIOLOGY

i) GOAL

The broad goal of the teaching Physiology to undergraduate students of First MBBS, aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and disease.

ii) OBJECTIVES

a) KNOWLEDGE

At the end of the course the student will be able to:

- (1) Explain the normal functioning of all the organ systems and their interactions for well coordinated total body function.
- (2) Assess the relative contribution of each organ system to the maintenance of the milieu interior.
- (3) Elucidate the physiological aspects of normal growth and development.
- (4) Describe the physiological response and adaptations to environmental stresses.
- (5) List the physiological principles underlying pathogenesis and treatment of disease.

b) SKILLS

At the end of the course the student should be able to:

- (1) Conduct experiments designed for study of physiological phenomena.
- (2) Interpret experimental/investigative data.
- (3) Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

c) INTEGRATION

At the end of the integrated teaching the student should acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

(B) BIOPHYSICS

(a) GOAL & OBJECTIVES: The broad goal of teaching Biophysics to undergraduate students is that they should understand basic physical principles involved in the functioning of body organs in normal and diseased conditions.

Total time for teaching Biophysics = 5 hours

Out of which: 1. Didactic lectures = 3 hours

2. Tutorial/group discussion = 1 hour

3. Practical = 1 hour

(b) Topic distribution

(1) Lectures:

- (i) Physical principles of transport across cell membranes and across capillary wall.
- (ii) Biopotentials.
- (iii) Physical principles governing flow of blood in heart and blood vessels.
- (iv) Physical principles governing flow of air in air passages.

2. Tutorial/group discussion: On the topic covered in didactic lectures.

3. Practicals:

Demonstration of:

- a) Biopotential on oscilloscope
- b) Electro Encephalogram (EEG)
- c) Electromyogram (EMG)
- d) Electrocardiogram (ECG)

HUMAN PHYSIOLOGY

I) GOAL

- a. The broad goal of the teaching Physiology to MBBS - undergraduate students aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and disease

II) EDUCATIONAL OBJECTIVES

- 1) At the end of the course, the students will be able to: describe the normal functions of all the organs systems, their regulatory mechanisms and interactions of the various systems for well-coordinated total body functions.
- 2) Understand the relative contribution of each organ system in the maintenance of the milieu interior (homeostasis).
- 3) Explain the physiological aspects of normal growth and development. Analyse the physiological responses and adaptation to environmental stresses.
- 4) Comprehend the physiological principals underlying pathogenesis and treatment of disease.
- 5) Correlate knowledge of physiology of human reproductive system in relation to National Family Welfare Program.

III) SKILL

At the end of the course the students shall be able to:

- 1) Conduct experiments designed for study of physiological phenomena.
- 2) Interpret experimental/investigative data.
- 3) Distinguish between normal & abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

IV) INTERGRATION

- a. At the end of the integrated teaching the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

V) COURSE CONTENT: -

Total number of hours – 480 hours

A) GENERAL PHYSIOLOGY (5 Hours)

Must know -

- Introduction to physiology
- branches of physiology
- Functional organization of human body
- External and internal environment
- Homeostasis, Biofeedback mechanisms

B) HAEMATOLOGY (15 Hours)

Must know

- Composition of blood
- Functions of blood
- Plasma proteins: Types, concentrations, functions.
- Erythrocytes: Morphology, functions, normal count physiological variations in normal count and anemia, polycythemia.
- Haemopoiesis: general concepts.
- Erythropoiesis: stages, sites, regulation, reticulocyte & its clinical significance.
- Haemoglobin: Functions, normal values, physiological variations.
- Fate of erythrocytes, life span.
- Catabolism of Hb, bilirubin metabolism, jaundice.
- Physiological basis of anaemia, nutritional anaemia.
- Polycythemia: Primary & secondary.
- Leukocytes: differences between R.B.C. & W.B.C, types of W.B.C.s normal count & differential W.B.C. count, physiological variations, properties, functions
- Granulopoiesis- stages, regulation
- Lymphopoiesis
- Pathological variations in total & differential W.B.C count.
- Immunity: definition, concept of antigen & antibody, types of immunity-Innate & acquired and their mechanism, cell mediated & humeral immunity, B lymphocytes, T lymphocytes & their types.
- Primary and Secondary response, basis of vaccination.
- Blood groups: Landsteiner's law
- ABO System- type A and B antigen, ABO system & inheritance, relation to transfusion, cross matching major & minor.

- Rh System - inheritance, Rh incompatibility & blood transfusion, Erythroblastosis foetalis.
- Blood transfusion: indications, storage of blood & changes during storage, transfusion reactions.
- Monocytes - macrophage system: Classification, functions of spleen.
- Hemostasis: definition, basic mechanisms of Hemostasis,
- Platelets: structure, normal count & variations, functions, role in platelet plug formation, Hemostasis & clot retraction.
- Blood coagulation factors in plasma, basic mechanism of blood clotting, intrinsic & extrinsic pathway & difference between two pathways, role of calcium in coagulation, role of vitamin K, fate of clot.
- Anticoagulants - commonly used & their mechanism of actions, blood coagulation tests – bleeding time, clotting time.
- Haemophilia.
- Body fluid compartments: role of water in body & its distributions, different body fluid compartments & composition of their fluid.
- Blood volume: normal value, physiological & pathological variations, blood volume regulation in detail (To be taken at end of lectures on C.V.S, kidney and endocrines)

Desirable to know

- Physical properties of blood.
- Plasma proteins: Plasmapheresis, role of liver in plasma protein synthesis, relationship of diet & plasma protein synthesis.
- R.B.C.: Advantages of biconcave shape.
- Bone marrow structure and cellular elements.
- Common Haemoglobinopathies (Hbs, Hbc, thalassemia)
- Method of determination of life span of R.B.Cs.
- Types of jaundice.
- Polycythemia- effects on haemodynamics,
- Immunity: Antibody structure & types, antigen- antibody reactions.
- Blood group: M.N. system, other blood groups.
- Thrombocytosis, thrombocytopenic purpura.
- Anticoagulants: used in vitro & in vivo.
- Other blood coagulation tests.

- Classification of hemorrhagic diseases, D.I.C.
- Measurement: total body water, blood volume, plasma volume, I.C.F. volume.

Nice to know

- Blood component therapy.
- Effects of splenectomy.
- Plasmin system.

B) NERVE (5 Hours)

Must know:

- Distinctive histological features relevant to functions of nerve fibers.
- Classification of nerve fibers: based on structure, functions and only for sensory nerves.
- R.M.P. definition, production & maintenance, method of measurement, significance.
- Action potential: definition,
- Phases- depolarization, repolarization & ionic basis of depolarization & repolarization.
- Production & propagation of A.P.
- Properties of A.P. significance
- Properties of nerve fibers.
- Strength duration curve: Chronaxie and factors affecting it.
- Factors affecting conduction in a nerve.

Desirable to know:

- Experimental techniques to study the mechanisms of production of R.M.P. & A.P.: patch clamp, voltage clamp
- Methods of recording of A.P.

D) MUSCLES (7 Hours)

Must know

Classifications of muscles

Structure of skeletal muscle:

Electron microscopic structure, muscle proteins- contractile, regulatory, structural & enzymatic

Sarcoplasmic tubular system: concept of sarcoplasmic triads & their functions.

Neuromuscular transmission: physiological anatomy, events, N-M blocking & clinical significance, applied aspect-myasthenia gravis.

Excitation- contraction coupling

- Molecular basis of skeletal muscle contraction: sliding filament theory, power stroke-cross bridge cycle and role of calcium.
Energetics: fuel used by skeletal muscle at rest & in exercise, metabolic pathways involved to yield A.T.P.
Oxygen debt: definition, types (lactic, alactic), incurring of debt, repaying the debt, significance.
- Properties of skeletal muscle: excitability, refractory period (absolute, relative), conductivity contractility-types (isometric, isotonic), effects of summations (multiple motor unit summation, frequency summation & tetanizability), all or none law, extensibility & elasticity, fatigability.
- Factors affecting development of tension in the muscle.
 - a. Number of motor units contracting- type of muscle, number of muscle fibers in each unit activated, supraspinal influences.
 - b. Length –tension relationship
 - c. Frequency of stimuli, duration of stimulation
 - d. Load
 - e. Type of contraction
 - f. Chemical composition of muscle fibers and ions.
 - g. E.M.G.(in brief)
 - h. Skeletal muscle circulation.
 - i. Smooth muscle: structure, distribution, types, molecular mechanism of contraction, properties, regulation, and disorders.

Desirable to know

- Heat liberated during various phases of contraction, fenn effect.
- Recording of muscle activity.

Nice to know

- E.M.G. details.

E) RESPIRATORY PHYSIOLOGY (15 Hours)

Must know

- Physiological anatomy
- Functions of respiratory system, non respiratory functions of lung
- Mechanics of respiration:

Ventilation:

Inspiratory & expiratory muscles, intrapleural pressure, lung & thoracic compliance, factors affecting compliance, work of breathing, surface tension forces & role of surfactant, airway resistance and elastic resistance.

- Lung volumes and capacities. Measurement, physiological & significance (tidal volume, Inspiratory reserve volume, expiratory volume, vital capacity, forced vital capacity- details)
- Pulmonary ventilation, alveolar dead space, -applied aspect.
- Maximum breathing capacity & breathing reserve.
- Diffusion of Gases:
- Exchange of respiratory gases at alveolar- capillary membrane, factors affecting diffusion.
- Gas Transport:
- Transport of oxygen, role of Hemoglobin, oxygen dissociation curve & factors affecting it.
- Transport of carbon dioxide.
- Control of Breathing:
- Neural control – central & peripheral chemoreceptors, role of CO_2 , O_2 , H^+
- Pulmonary circulation
- Characteristics
- Ventilation perfusion ratio
- Respiratory adjustment in exercise
- Hypoxia: types & high altitude hypoxia
- Artificial respiration
- Pulmonary function tests
- Desirable to know
- Method of determination of dead space, residual volume, functional residual capacity.
- Oxygen therapy: indications, hazards of hyperbaric oxygen & use.
- Nice to know**
- Concept of P_{50}
- Positive pressure breathing.

- **F) CARDIOVASCULAR PHYSIOLOGY (20 hours)**
- **Must know**
- Introduction, functions & importance of the system.
- General organization.
- Structure of heart, pericardium, myocardium, endocardium, nerve supply.
- Histology, details of cell junctions, syncytium, contractile & conducting fibers.
- Properties of cardiac muscle: excitability, conductivity, contractility, autorhythmicity, all or none law, long refractory period.
- Junctional tissues of heart, pacemaker potential, action potential of cardiac muscle.
- Generation & conduction of cardiac impulse.
- Cardiac cycle: pressure - volume changes, heart sounds & their clinical significance, correlation of pressure, volume, ECG, heart sounds in cardiac cycle.
- Heart rate & its regulation.
- Haemodynamics – definition, blood flow, resistance
- Cardiac output: normal values, physiological variations, factors affecting cardiac output- details, regulation, measurement- principles.
- Blood pressure:
- Normal levels, measurement, determinants, short term & long term regulation- details.
- Capillary circulation, tissue fluid formation.
- Lymphatic system: Anatomy & structure formation of lymph, functions of lymphatic system, lymph flow & factors affecting it.
- Regional circulation: Physiologic anatomy, factors affecting, special features: coronary, cerebral, skin portal.
- Adaptation of cardiopulmonary system to various grades of exercise.
- Hemorrhagic shock- stages & compensatory mechanisms, effects on body, physiological basis of treatment in brief.
- **Desirable to know:**
- Ion channel & receptors (physiological, pharmacological & clinical significance)
- E.C.G. – electrical axis of heart, blocks, arrhythmias, ischaemia, infarctions.
- Heart sounds: murmurs & their clinical significance.
- **Nice to know**
- Experimental methods of studying cardiovascular physiology,
Pathophysiology of oedema

G) RENAL PHYSIOLOGY (10 Hours)

Must know

- General introduction, structure & functions of kidney.
- Renal circulation: special features from functional point of view.
- Concept of clearance: to study renal physiology, for:
 - a) GFR- Inulin, creatinine, basic principle of radioisotope method.
 - b) Renal blood flow- PAH clearance.
 - c) Concentration & dilution of urine- free water.
- Formation of urine:
 - 1) Glomerular stage- GFR (definition, dynamics, factors affecting & measurement)
 - 2) Tubular stage- GFR reabsorption & secretion.
 - a) Sodium, potassium, glucose: details.
 - b) Handling of water- concentration & dilution of urine.
 - c) Secretion of H⁺
 - 3) Role of kidney in acid-base balance.
- Physiology of micturition: Basic reflex & control, cystometrogram
- Artificial kidney: basic principles of dialysis.

Desirable to know:

- Experimental studies for renal functions.

Nice to know

Disorders of micturition

H) BODY TEMPERATURE REGULATION: (2 hours)

Must know:

- Homoeothermic - balance between heat gain & heat loss.
- Regulation of body temperature,
- Desirable to know:
- Hyperthermia, Hypothermia.

I) ALIMENTARY SYSTEM (12 hour)

Must know:

- General introduction & organizational plan, innervations and blood supply.
- Salivary secretion:

General principles & basic mechanisms of secretion composition, and functions of saliva, mechanisms & regulation of salivary secretion

Mastication and deglutition:

- Three phases of deglutition.
- Physiologic anatomy, mechanism & control, Gastric secretion:
- Gastric Motility:
- Structure, composition & mechanism of electrolytes & enzymes, regulation of secretion.
- Microscopic structure, functions of liver, composition of bile, cellular mechanism of bile formation, enterohepatic circulation of bile salts, control of secretion, concentration & storage of bile in gall bladder. Filling & evacuation of gall bladder, functions of gall bladder.

Intestinal secretion

- Structure, innervations.
- Composition & mechanism of secretion of small intestinal juice, regulation of secretion.
- Secretion of large intestine: mucous, water, electrolytes.
- Motility of small intestine:

Structure & innervation electrical activity of smooth muscle, resting membrane potential, slow waves, spike potentials, rhythmic segmentation contractions, peristalsis, control- neural & hormonal, functions of ileocecal valve.

Structure & innervation, mixing & mass movements, defecation reflex and its control

- G.I. hormones: in brief.

Digestion & absorption:

Digestion & absorption of

- carbohydrate,
- Proteins
- Fats

Absorption of water, electrolytes and vitamins

Desirable to know:

- Gastric mucosal barrier, experiment to study regulation of gastric juice secretion, disorders of secretion, peptic ulcer, inhibitors of gastric secretion.
- Effects of vagotomy, abnormal gastric motility, vomiting.
- Barium meal studies, endoscopy, biopsy.

- Pathophysiology of small intestinal motility, paralytic ileus, diarrhea, obstruction.
- Pathophysiology of colonic motility, irritable bowel syndrome, drugs, constipation.
- Pancreatic function tests.
- Gall stone, effects of removal of gall bladder.

Nice to know

- Disturbances of esophageal motility, spasm, achalasia, hiatus hernia.
- Methods for study of intestinal absorption.
- Effects of hepatectomy.

J) NUTRITION: (2 Hour)

Must know

- Concept of balanced diet
- Factors affecting caloric requirements.
- Requirements of various nutrients, sources, daily needs.
- Nutrition under special conditions- pregnancy, lactation, growing child.

K) ENDOCRINE SYSTEM (10 Hours)

Must know

- Introduction
- Endocrine functions of Hypothalamus- releasing hormones, Mechanism of hormone action.
- Anterior pituitary hormones;
Functions, regulation disorders
Thyroid: Hormone: synthesis, fate, functions, regulation parathormone secretion, functions and tetany.
Adrenal cortex: and medulla.
Hormone: secretion, functions, regulation, disorders.
- Pancreatic hormones.
Secretion, functions, regulation, disorders.

Desirable to know:

Radioimmuno assays.

Nice to know

- Experimental studies.

L) REPRODUCTIVE PHYSIOLOGY: (8 hours)

Must know

- Sex chromosomes , sex determination, sex differentiation
- Functional of anatomy of reproductive system.
- Puberty: changes in male & females and its control.
- Spermatogenesis: stages & regulation.
- Semen analysis.
- Testosterone: actions & regulation
- Male sexual act.
- Menstrual cycle & ovarian cycle:
Phases & hormonal regulation
- Menopause.
- Ovulation: indicators & importance.
- Fertilization, implantation of ovum.
- Functions of placenta.
- Physiology of pregnancy.
- Maternal changes during pregnancy.
- Parturition: in brief – stages and mechanism.
- Lactation: initiation & maintenance and control.
Advantage of breast -feeding.
- Contraception: to be taken as integrated topic.

Desirable to know:

- Sex chromosomes: Barr bodies.
- Development of genitals & gonads.

Nice to know:

- Precious & delayed puberty.

M) SPECIAL SENSES (8 Hours)

Must know:

- Eye:
Functions anatomy of eye, optics, microscopic structure of retina with retinal circuits,
image formation.
Photochemistry of vision, photopic & scotopic vision, dark & light adaptation

Pupillary reflexes, Accommodation reflex Errors of refraction and their correction, colour vision – physiological & neural basis, accepted theory of colour vision, classifications, basis of colour blindness and tests of colour blindness, significance. Visual pathway- processing of information at different levels in visual pathway, organization of visual cortex. Effects of lesion at different levels in visual pathway Movement of eyeballs: functions & control.

- Ear
- Physics of sound, decibel system,
- Functions of external ear,
- Functional anatomy of middle ear, functions of middle ear in detail, assessment of functions of middle ear, Functional anatomy of cochlea, functions of inner ear, place principle, theories of hearing.
- Audiometry,
- Auditory pathway & important features, auditory cortex (role in hearing speech development)
- Taste
- Functional anatomy of taste receptors, primary taste sensations, pathway, factors affecting taste sensation.
- Smell:
- Functional anatomy of olfactory receptors, primary olfactory sensations pathway, factors affecting smell sensation.
- **Desirable to know:**
- Resolution of images.
- Electrophysiology of internal ear: cochlear micro phonics.
- **Nice to know**
- Electrophysiology of retina.
- Theories of hearing.

N) CENTRAL NERVOUS SYSTEM: (50 hours)

Must know

- Outline of nervous system.
- 6) General nervous system:
 - Synapse: definition, physiological anatomy, sequence of synaptic transmission, applied aspect.
 - Neurotransmitters-in brief
 - Receptors: definition, classification (basis of each classification with example), properties (state each property with underlying mechanism and significance), significance (homeostasis, conscious awareness of environment, tone posture, protection).
 - Sensations: different modalities, classification with examples and significance
 - Sensation of touch, pain proprioception: details of each
 - Reflexes: definition, classification (basis of classification with example), reflex arc and its components, properties (state each property with basis and importance)
 - Stretch reflex – definition, muscle spindle, details with innervations, role of gamma motor neurons) role of supra spinal control – in brief, functions of stretch reflex (regulation of muscle tone) inverse stretch reflex.
 - Polysynaptic reflexes: withdrawal reflex.
- 2) Tracts:
 - Ascending and descending tracts: details of each tracts – (situation & extent in spinal cord, origin, course and termination, collaterals, somatotopic arrangement, functions, applied aspect, tests)
 - Ascending tracts: Basic plan of somatosensory pathway for conscious sensation, pathway from head, face region.
 - Descending tracts: pyramidal tracts-details. Extra pyramidal tracts, differences between UMN and LMN lesions.
- 2) Sections at various levels in CNS:
 - a) Spinal transection – spinal animal.
 - Complete – 3 stages – spinal shock, stage of recovery, stage of reflex failure – details of each stage.
 - Incomplete transection
 - Hemisecion

b) Low midbrain section – decerebrate animal: Decerebrate rigidity. (Classical and ischaemic with mechanisms, characteristics features, physiological significance)

c) High midbrain section – High decerebrate animal.

d) Thalamic or Decorticate animal.

3) Posture - & Equilibrium.

Definition, classification of postural reflexes

(Details of each reflex and its function)

Regulation of posture (integrating centers at various levels of CNS)

Vestibular apparatus: Physiologic anatomy, mode of function of utricle and saccule and semicircular canals, vestibule ocular and vestibule spinal reflexes.

4) Thalamus:

Functional classification of Thalamic nuclei, with connections of different nuclear groups, functions

6) Limbic system:

Parts of limbic system, connections in brief, functions.

7) Reticular formation:

Introduction, anatomy in brief, functional divisions

(A) Ascending reticular activating system – details with connections and role in sleep wakeful cycle, applied aspect.

(B) Descending reticular system – role in regulation of muscle tone by pontine and medullary regions.

(C) Visceral centres.

8) E. E. G.:

Definition, different waves, characteristics and functional significance of each wave, physiological variation, clinical application in brief.

9) Sleep and Wakefulness:

Concept of alertness and wakefulness with their physiological basis. Definition of sleep, stages of sleep correlated with EEG, sleep cycle – types of sleep, salient features of NREM & REM sleep, physiological effects of sleep on different systems of the body, Neurophysiological mechanisms of sleep, functions of sleep.

10) Cerebellum:

Introduction, functional classification, intracortical circuit, deep cerebellar nuclei, connections of different lobes, functions of cerebellum, cerebellar function tests, effects of lesion in brief.

11) Basal Ganglia:

Introduction, classification of nuclei, connections, intracortical circuits, functions, lesions – Parkinsonism

12) Cerebral Cortex:

Gross anatomy and divisions, concept of Brodman's mapping with diagram, Parietal lobe – anatomical & functional divisions, details of each functional part as regards connections, topographic organisation, functions. Frontal lobe – excitomotor cortex - anatomical & functional parts, details of each part as regards connections, topographic organisation, functions.

Prefrontal Cortex – different areas, connections in brief, functions, effects of lobectomy.

13) Speech –

Afferent and efferent mechanisms and role of cortical centers in speech, concept of cerebral dominance, development of speech, vocalization.

14) Memory:

Definition, stages, types, physiological basis, factors affecting, applied – amnesias in brief.

15) Learning:

Definition, types with examples, stages, factors influencing, role of motivation (positive and negative reinforcement, reward and punishment), physiological basis – role of different parts of CNS, structural, biochemical changes.

16) Conditioned reflexes:

Definition, difference between unconditioned and conditioned reflexes, development of conditioned reflexes, properties, significance

17) Autonomic nervous system:

Organization and functions of Parasympathetic and Sympathetic nervous system and their control

18) CSF:

Introduction, composition, normal CSF pressure, formation and circulation, functions, applied aspect – brief, blood brain barrier, blood CSF barrier.

19) i. Physiology of Brain Death and changes after that

ii. Brain death and organ donation

Desirable to know:

General nervous system:

Neurotransmitters – details, susceptibility of synapse to hypoxia drugs etc.,

Mechanisms of referred pain, differences between superficial and deep pain, central analgesia system, supraspinal control of stretch reflex – details.

Thalamus – applied aspects – effects of lesions.

Hypothalamus – applied aspects – effects of lesions

Reticular formation – effects of lesion

EEG – Method of recording, abnormal patterns.

Basal Ganglia – lesions, involuntary movements

Cerebellum – Embryology, evolution, effects of stimulation and ablation.

Cerebral cortex- effects of stimulation and ablation in different regions.

Speech – aphasias.

Nice to Know

Experimental studies – effects of stimulation and ablation.

Sleep, wakefulness – effects of sleep deprivation, disorders.

PHYSIOLOGY PRACTICALS

NO.	TITLE OF PRACTICAL
PART – I : HAEMOTOLOGY (PRACTICALS)	
1.	The Microscope and Collection of Blood
2.	Estimation of Haemoglobin content of Blood
3.	W.B.C. Count
4.	R.B.C. Count
5.	Determination of Blood Groups
6.	Differential W.B.C. Count
7.	Determination of Bleeding Time & Coagulation Time
PART – II : HAEMOTOLOGY (DEMONSTRATIONS)	
1.	Platelets / Thrombocytes
2.	Reticulocyte Count
3.	Determination of Erythrocyte Sedimentation Rate & Estimation of Packed Cell Volume
4.	Anemia & Blood Indices
5.	Osmotic fragility of red blood cells
6.	Blood Transfusion – Visit to Blood Bank
PART – III : CLINICAL PHYSIOLOGY	
1	Introduction to Clinical Examination
2	Clinical Examination of Arterial Pulse and Estimation of Venous Pressure
3	Determination of Arterial Blood Pressure
4	Clinical Examination of Cardiovascular system
5	Clinical Examination of Respiratory system
6	Artificial Respiration in Man
7	Clinical Examination of the Alimentary system and the abdomen
8	Clinical Examination of Higher Functions
9	Clinical Examination of III, IV, VI Cranial Nerves
10	Clinical Examination of Other Cranial Nerves-I, V, VII, IX, X, XI, XII
11	Clinical Examination of Sensory System
12	Clinical Examination of Motor System-I
13	Clinical Examination of Motor System-II
14	Tests for Hearing & Deafness
15	Clinical Examination of Eyes
16	Visual Reflexes
17	Acuity of Vision
PART – IV : HUMAN PHYSIOLOGY (LECTURE-CUM-DEMONSTRATION)	
1	Cardiopulmonary Efficiency Tests
2	Electrocardiography (E.C.G.)
3	Spirometry
4	Stethography
5	Ergography
6	Perimetry
7	Colour Vision
8	Pregnancy Test
9	Body Temperature in Man

PART - V : EXPERIMENTAL PHYSIOLOGY (LECTURE-CUM-DEMONSTRATION)	
1	Study of instruments and Normal Cardiogram
2	Effect of Temperature on Frog's Heart
3	Properties of Cardiac Muscle-I
4	Properties of Cardiac Muscle-II
5	Properties of Cardiac Muscle-III
6	Beneficial Effect
7	Nervous Regulation of Heart
8	Vagal Escape
9	Effect of Acetylcholine of Frog's Heart
10	Effect of Adrenaline on Frog's Heart
11	Effect of Nicotine on Frog's Heart
12	Effect of various ions on isolated Frog's Heart
13	Simple Muscle Curve
14	Effect of Various Strengths of Stimuli
15	Effect of two success stimuli in skeletal muscle
16	Velocity of nerve impulse effect
17	Effect of Load
18	Genesis of Tetanus
19	Phenomenon of Fatigue
PART – VI : PHOTOGRAPHS, GRAPHS & CHARTS	
1.	Calculations - Blood
	- CVS
	- RS
	- Renal
2.	Graphs & Charts - Cystometrogram
	- Volume - Pressure Curve in different chambers of the Heart -
	- Strength Duration Curve
	- Action Potential in Nerve Fiber
	- Action Potential in Purkinje fiber of Heart
	- Compound Action Potential
	- Typical Photographs of endocrine disorders Gigantism
	- Dwarfism
	- Acrompgaly
	- Grave's Disease
	- Cretinism
	- Myxoedema
	- Cushing's Syndrome
	- Carpopedal Spasm

List of animated videos for Experimental (Amphibian) Physiology practicals:

- Instruments of experimental physiology
- Dissection to obtain Nerve muscle preparation
- Reactivity of Tissues + Simple Twitch + Effect of two successive stimuli on muscle twitch
- Genesis of Tetanus + Genesis of Fatigue
- Effect of Load on Muscle Contraction + Isometric Contraction
- Conduction Velocity of Nerves
- Normal Cardiogram of Frog + Effect of Temperature on Frog's heart
- Effects of Stannius ligatures on Frog's Heart
- Properties of Vagosympathetic Stimulation on Frog's heart
- Effect of Nicotine and atropine of Frog's heart
- Effect of Ion's on Perfused Frog's heart

Introduction of early clinical exposure

- 1) Visit to – Hospital, OPD, Blood Bank, Central Clinical Laboratory, Pulmonary function test Laboratory, Cardiology (Stress Test, Echo-cardiography), Neurology (EEG, EMG), Audiometry, Ophthalmology.
- 2) Inclusion of videos, X-rays, ECGs, Lab. Reports, case profile, patients.

**LIST OF PHYSIOLOGY BOOKS FOR FIRST MBBS
(UNDERGRADUATE COURSE)**

A. Text books

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology Volumes I & II	A. K. Jain
2.	Medical Physiology for undergraduates	Indu Khurana
3.	Textbook of Medical Physiology	Guyton & Hall
4.	Comprehensive Textbook of Medical Physiology Vol I & Vol II	G. K. Pal
5.	Fundamentals of Medical Physiology	L Prakasham Reddy

B. Concise books

S.N.	Name of the book	Name of the Author
1.	Concise physiology for undergraduates	A. K. Jain
2.	Essentials of Medical Physiology	Sembulingam
3.	Textbook of Physiology	Debasis Pramanik
4.	Physiology – Prep manual for undergraduates	V. D. Joshi

C. Reference books

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology	Indu Khurana
2.	Ganong's review of medical physiology	Barrett & Barman
3.	Understanding Medical Physiology: A textbook for medical students	R. L. Bijlani & Manjunatha
4.	Physiology basis of medical practice	Best & Taylor

D. Practical books

S.N.	Name of the book	Name of the Author
1.	Practical Physiology	A. K. Jain
2.	Practical Physiology	G. K. Pal
3.	Textbook of practical Physiology	V. D. Joshi
4.	Textbook of Practical Physiology	C. L. Ghai

RULES AND REGULATIONS OF EXAMINATION

4. THEORY EXAMINATION IN PHYSIOLOGY

4.1. There shall be two papers in preliminary / university examination in the physiology.

The course content shall be distributed as per given below:

4.2. **Physiology Paper-I:** Cell membrane and transport systems across the cell membrane, Homeostasis, Cardiovascular, Blood, Respiratory, Endocrines, Reproduction, Acclimatization to hypoxia, Exercise physiology.

4.3. **Physiology Paper II:** Nerve and Muscle Physiology, Gastrointestinal, Excretory and Temperature regulation, C.N.S. and special senses.

• PATTERN OF VIVA VOCE AND PRACTICAL EXAMINATION:

There shall be separate batches of students for viva and Practicals.

• Viva examination (orals) Total marks 20

• Practical examination Total marks 40

3 Exercises

• Clinical examination Total marks 20

Four sub questions each of 5 marks

• C.V.S. Total marks 5

• R.S. Total marks 5

• C.N.S. Total marks 5

• Abdomen & Special senses Total marks 5

• Haematology Total marks 10

• Short exercises Total marks 10

Sub questions having 2 marks each

• Calculations

• Interpretation of graphs

• Charts

• Data analysis and interpretation

• Photographs on-endocrine disorders

• Neurological disorder

• **TOPICS TO BE ASKED AS APPLIED QUESTIONS IN THEORY:**

- Erythroblastosis foetalis
- Haemophilia, purpura
- Myasthenia gravis
- Peptic ulcer
- Oedema
- Jaundice and anaemia – due to mismatched transfusion
- Myxoedema
- Cretinism
- Hyperthyroidism
- Tetany
- Acromegaly, Gigantism
- Respiratory distress syndrome
- Parkinsonism
- Asthma

- 7.1. Internal assessment shall be based on the overall performance of the students during examinations during the course of the study in First MBBS
- 7.2. Weightage for the internal assessment shall be 20% of the total marks in each subject
- 7.3. The students must secure a minimum of 35% of the total marks assigned for internal assessment in the subject in order to be eligible to appear in final university examination in that subject
- 7.4. There shall be one terminal examination on conclusion of First semester and one preliminary examination 6 weeks prior to commencement of university examination
- 7.5. The First terminal examination will include one theory paper of 60 marks and practical of 40 marks and viva 20 marks. Preliminary examination shall have Theory 100 marks (2 papers of 50 marks each), viva 20 marks and practicals of 40 marks
- 7.6. Computation of Internal Assessment – Internal assessment shall be computed out of 40 marks (20marks in theory and 20 marks in practical) on overall performance in class test / internal examination conducted by the department, seminars, presentation, project work, field work, laboratory journal and attendance etc.

Internal Assessment of Physiology

INTERNAL ASSESSMENT:

	Theory	Practical
Terminal & Prelim exams	15	15
Day to day assessment	05	05
Total	20	20

EXAMINATION PATTERN

Terminal, Preliminary, University Examination

THEORY

	Terminal	Preliminary		University	
Total Marks	60	50	50	50	50
Durations	2.30 hrs.	2.30 hrs.	2.30 hrs.	2.30 hrs.	2.30 hrs.
Paper	Only one paper	Paper I	Paper II	Paper I	Paper II
Section A	MCQ – Sec-A 20 X 0.5 = 10 Marks	MCQ - Sec-A 20 X 0.5 = 10 Marks	MCQ - Sec-A 20 X 0.5 = 10 Marks	MCQ - Sec-A 20 X 0.5 = 10 Marks	MCQ - Sec-A 20 X 0.5 = 10 Marks
Section B	SAQ - Sec-B 6 out of 7 6 X 5 = 30 Marks	SAQ - Sec-B 4 out of 5 4 X 5 = 20 Marks	SAQ - Sec-B 4 out of 5 4 X 5 = 20 Marks	SAQ - Sec-B 4 out of 5 4 X 5 = 20 Marks	SAQ - Sec-B 4 out of 5 4 X 5 = 20 Marks
Section C	LAQ – Sec-C 2 out of 3 10 X 2 = 20 Marks	LAQ – Sec-C 2 out of 3 10 X 2 = 20 Marks	LAQ – Sec-C 2 out of 3 10 X 2 = 20 Marks	LAQ – Sec-C 2 out of 3 10 X 2 = 20 Marks	LAQ – Sec-C 2 out of 3 10 X 2 = 20 Marks

Practical Examination - Total Marks=40 Marks

Haematology - 10 Marks

Clinical - 20 Marks

Graphs, charts, endocrine photographs, calculations = 10 Marks

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

I-MBBS – MODEL QUESTION PAPER

Subject – **PHYSIOLOGY PAPER-I**

Maximum Marks: 50

Duration – 2½ Hours (Section A=30 Minutes, Section B & C=2 Hours)

SECTION A

Multiple Choice Questions (MCQs)

(0.5X20=10marks)

1. Which among the following is an example of a positive feedback mechanism? a. Clotting b. Regulation of blood glucose concentration c. Regulation of Blood pressure d. Thermoregulation	2. Transport of Glucose & sodium is an example of a. Antiport b. Symport c. Diffusion d. Osmosis
3. The second messenger system are the following EXCEPT a. cAMP b. cGMP c. Calmodulin d. GABA	4. Parasitic infestations produce increase in a. Neutrophils b. Eosinophils c. Lymphocytes d. Basophils
5. Immunoglobulin secreted in saliva, tears and milk is a. IgG b. IgA c. IgM d. IgE	6. Increase in RBC count is called a. Amemia b. Leukocytosis c. Polycythemia d. Leukemia
7. Plasma proteins exerts a colloidal osmotic pressure of 25-30mmHg which mainly due to a. Albumin b. Fibrinogen c. Prothrombin d. Globulin	8. Ramp signal for inspiration is produced in the a. Ventral respiratory group of neurons (VRG) b. Dorsal respiratory group of neurons (DRG) c. Apneustic center d. Pneumotaxic center
9. Normal value of anatomical dead space is a. 50ml b. 100ml c. 150ml d. 200ml	10. Bluish discoloration of skin and mucus membrane is termed a. Cyanosis b. Anemia c. Asphyxia d. Dyspnoea
11. T wave of ECG indicates a. Atrial depolarization b. Atrial repolarization c. Ventricular depolarization d. Ventricular repolarization	12. The energy of muscle contraction is derived from the following except: a. ATP b. Muscle glycogen c. Lactic acid d. Creatine phosphate
13. _____ are called exchange vessels a. Arteriole b. Veins c. Capillaries d. Arteries	14. Which of the following factor causes bradycardia? a. Exercise b. Excitement c. Fever d. Hypothermia
15. Second heart sound is produced due to closure of a. Semilunar valves b. Mitral valves c. Tricuspid valve d. Atrioventricular valves	16. The condition of circulatory failure is termed a. Shock b. Bradycardia c. Tachycardia d. Coma
17. Cushing syndrome is due to an increase in a. Glucocorticoids b. Mineralocorticoids c. Sex steroids d. Thyroxine	18. Diabetes insipidus occurs due to the deficiency of a. Growth hormone b. Insulin c. ADH d. Thyroxine
19. Normal serum calcium levels is -- mg/dl a. 5-6 b. 9-11 c. 12-16 d. 16-20	20. Fertilization occurs in the a. Fallopian tube b. Uterine cavity c. Cervix d. Vagina

SECTION – B

Write briefly on ANY FOUR

(5 marks X 4 = 20 marks)

- a. Primary active transport
- b. Erythroblastosis fetalis
- c. Baroreceptors
- d. Ovulation
- e. Hypoxic Hypoxia

SECTION – C

Answer in detail (ANY TWO OUT OF THREE) (10 marks X 2 = 20 marks)

1. Enumerate hormones secreted by anterior pituitary. Describe actions of growth hormone.
Add a note on disorders due to hyper secretion of growth hormone. (2+5+3)
2. What are the functions of platelets? Describe intrinsic pathway. Add a note on haemophilia (4+4+2)
3. Describe the transport of oxygen in the body. Draw and label Oxy-haemoglobin dissociation curve. What are the factors affecting Oxy-haemoglobin dissociation curve. (4+3+3)

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

I-MBBS – MODEL QUESTION PAPER

Subject – **PHYSIOLOGY PAPER-II**

Maximum Marks: 50

Duration – 2½ Hours (Section A=30 Minutes, Section B & C = 2 Hours)

SECTION A

Multiple Choice Questions (MCQs)

(0.5X20=10 Marks)

1. The nerve fiber with maximum diameter is Group _____ fiber a. A α b. A β c. B d. C	2. Troponin sub unit with affinity for calcium is a. T b. I c. C d. All of the above
3. Skeletal muscle contraction is excited when the intracellular concentration of _____ ion rises a. Na ⁺ b. K ⁺ c. Mg ²⁺ d. Ca ²⁺	4. Which salivary component minimizes risk of buccal infection and dental caries a. Lysozymes b. IgA c. Lactoferrin d. All of the above
5. Hydrochloric acid in the stomach is the secreted by the a. Chief cells b. Parietal cells c. Mucous cells d. G cells	6. The following stimulates gastric juice secretion a. Gastrin b. Gastric distension c. Vagus nerve d. All of the above
7. The hormone causing gallbladder emptying is a. Gastrin b. Glucagon c. Colecystokinin d. Secretin	8. The usual stimulus of peristalsis is a. Distension b. Sympathetic stimulation c. Acid chyme d. Alkaline chyme
9. Deglutition or Swallowing center is situated in a. Midbrain b. Pons c. Medulla d. Cerebellum	10. The percentage of glomerular filtrate normally reabsorbed is a. 1% b. 10% c. 15% d. 99%
11. Net filtration pressure in the kidney is ----mm Hg a. 5 b. 10 c. 15 d. 20	12. Glucose and-----are 100% reabsorbed by proximal convoluted tubule a. Na ⁺ b. water c. Cl ⁻ d. Amino acids
13. Major portion (more than 70%) of glomerular filtrate is reabsorbed in a. Loop of Henle b. Proximal convoluted tubule c. Distal convoluted tubule d. Collecting tubules	14. Amount of urine left in the urinary bladder at the end of micturition is-----ml. a. 50 b. 100 c. 150 d. Zero
15. Most synapses in the nervous system are a. Chemical b) Electrical c. Mechanical d) Conjoint	16. Head ganglion of autonomic nervous system is a. Thalamus b. Hypothalamus c. Super cervical thalamus ganglion d. Stellate ganglion
17. The first relay station of pain is a. Spinal cord b Medulla c. Pons c. Thalamus	18. Most common site of lesion in the pyramidal tract is a. Internal capsule b. Midbrain c. Pons d. Medulla
19. Receptors for vision are a) Telreceptors b) Exteroreceptor c) Interoreceptor d) Chemoreceptor	20. Which of the following essential for normal motor activity a) Motor cortex b) Cerebellum c) Basal ganglia d) All of the above

SECTION – B

Write briefly on ANY FOUR

(5 marks X 4 = 20 marks)

- a. Peristalsis
- b. Organ of Corti
- c. Juxtaglomerular apparatus
- d. Classification of receptors
- e. Myasthenia gravis

SECTION – C

Answer in detail (ANY TWO OUT OF THREE) (10 marks X 2 = 20 marks)

1. Describe the composition, functions and regulation of secretion of gastric juice. Add a note on peptic ulcer (2+2+3+3)
2. Describe connections and functions of basal ganglia. Add a note on Parkinsonism. (4+4+2)
3. Describe visual pathway with the help of a neat, labeled diagram. What are the effects of lesions at various levels of the visual pathway? (4+3+3)

Resolution passed in BOM – 48/2017, dated 24/01/2017

Item No. 5.6: BOS (Preclinical) dated 20.09.2016

- a) About **Internal assessment examination pattern Anatomy, Physiology and Biochemistry.**

Resolution No. 5.6(a): It was resolved to abide by the existing **Internal assessment examination pattern of Anatomy, Physiology and Biochemistry in 1st MBBS** with regards to distribution of marks and pattern in concurrence with rules of MCI & MGMIHS.

- b) **Internal Assessment pattern – First MBBS**

Resolution No. 5.6(b): It was resolved that the actual modality to calculate day to day assessment component of internal assessment in MBBS subjects is to be decided by the respective department heads with keeping all the records for verification in future.

- c) About inclusion of Bioethics in MBBS (UG) curriculum.

- d) About inclusion of Bioethics in PG curriculum and research.

For both above items' following resolution was adopted:

Resolution No. 5.6(c): It was resolved to send the material received by University from UNESCO chair, Bioethics to Dean Faculty (Aurangabad and Navi Mumbai) and Chairpersons of BOS for their perusal and appropriate inputs to be put forth in next BOS meeting for discussion. [Annexure-II & III of BOM-48/2017]

Resolution No. 1.3.7.1 of BOM-51/2017: Resolved to continue the current Internal Assessment pattern for MBBS (i.e. 5 marks for Day-to-day assessment) for Pre and Para Clinical subjects (Anatomy, Physiology, Biochemistry, Microbiology, Pharmacology, Pathology and FMT). For rest of the subjects, Internal Assessment is to be calculated from terminal/Post end exam marks and Prelims examination, with immediate effect.

Resolution No. 1.3.7.3 of BOM-51/2017: Approved to include Bioethics in First MBBS curriculum with three Lectures (1 hr each) per subject of Anatomy, Physiology and Biochemistry with topics: (with effective from Academic year 2017-18)

2) Physiology –

- 1) Animal Ethics
- 2) Research Ethics
- 3) Patient's privacy & confidentiality

1st year MBBS
physiology

Resolution No. 1.3.7.2 of BOM-51/2017: Resolved to shift topic 'General Physiology' from Paper-I to Paper-II in the First MBBS-University examination from Academic year 2017-18.

Resolution No. 3.5.2 of BOM-52/2018: It was resolved to conduct Bioethics as lecture schedule in MBBS in Anatomy, Physiology, Biochemistry with topics & time table as mentioned below, with effect from batch admitted in 2017-18 onwards-

- 2) Physiology –
- 1) Animal Ethics (December)
 - 2) Research Ethics (January)
 - 3) Patient's privacy & confidentiality (February)

Resolution No. 3.5.9 of BOM-52/2018:

- a) BOM reiterated the earlier BOM resolution as mentioned below:

Resolution No. 1.3.7.5 of BOM-51/2017: It was resolved that

- i) In all the subjects of all courses, MCQ weightage (Section A) shall be a maximum of 20% of the total marks in each paper.
 - ii) BOS will have to accordingly workout the changes in Section B & C weightage and put up in forthcoming BOS meeting.
 - iii) Further University Examination section must validate the MCQ Question Bank by Faculties before giving it to question paper-setter.
- b) To be effective from:
- (i) Ist MBBS - Batch appearing in University August/September 2018 examination onwards.
 - (ii) IInd MBBS - Batch appearing in University January 2019 examination onwards.
 - (iii) IIIrd MBBS (Part I) and IIIrd MBBS (Part II) - Batch appearing in University January 2019 examination onwards.

Resolution No. 3.5.11 of BOM-52/2018: Resolved to have Exam Schedule of Ist MBBS which is as follows :

1. Terminals 1st week of February 2018
2. Prelims – 1st week of July 2018
3. University Exam
 - a) Theory – August 1st week 2018
 - b) Practical – 3rd week of August 2018

Resolution No. 3.5.1 of BOM-52/2018: Resolved to have Internal Assessment for each subject in 1st (MBBS) as mentioned below, with effect from batch admitted in 2017-18 onwards:

Theory – 20 marks

1. 15 marks (Terminal & Prelim exam theory marks)
2. 5 marks (Departmental assessment)
 - a. 3 marks (4 Periodical Theory tests)
 - b. 2 marks (Seminars)

Practical – 20 marks

1. 15 marks (Terminal + Prelim Practical marks)
2. 5 marks (continuous departmental assessment)
 - a. 3 marks (4 Periodical practical tests)
 - b. 2 marks Journals

Note – There will be 4 periodical tests in each subject (Two per term) in theory & practicals of 30 marks each.

Resolution No. 3.5.8 of BOM-52/2018: It was resolved that 2 horizontal & 1 Vertical integration will be taken per term in 1st MBBS, with effect from batch admitted in 2017-18 onwards. [Annexure-II A, II B, II C & II D]

Annexure VII A**I MBBS -Horizontal Integration Topics of Anatomy ,Physiology and Biochemistry.**

Sr. No.	Topics	Anatomy	Physiology	Biochemistry
1.	Diabetes Mellitus	Endocrine Part Of Pancreas	Control of Insulin Secretion & Functions	lab Diagnosis & GIT
2.	Endemic Goiter	Thyroid Gland	Formation & Regulation of T ₃ , T ₄ & TSH	Iodine Metabolism & Function Tests
3.	Myocardial Infarction	Coronary Arteries	ECG	Cardiac Markers
4.	Jaundice	Hepato Biliary Tree	Fate of Haemoglobin Bile Enterohepatic circulation	Diagnostic tests for Jaundice.
5.	Glomerular Filtration	Nephron	Physiology of Glomerular Filtration	Inulin & Creatinine Clearance Test

*Note :

1. Two sessions of Horizontal integration will be conducted per term for 1st MBBS students.
2. This can be subject to change as per requirement and rotation in subsequent years.

Annexure VII B

Vertical Integration Topics of Anatomy

1. Breast cancer

- Anatomy – Mammary Gland
- Radiology – Mammography
- Surgery – Diagnosis and treatment in reference to Anatomy

2. Thyroid – Goitre

- Anatomy – Thyroid Gland
- Medicine – Diagnosis with reference to Anatomy and Physiology
- Surgery – Diagnosis and treatment in reference to Anatomy
- Community Medicine – Epidemiology

3. Tonsillitis

- Anatomy – Palatine Tonsil
- ENT – Diagnosis and treatment in reference to Anatomy

4. Fallopian tube – Ectopic Pregnancy

- Anatomy – Fallopian tube
- OBGY – Diagnosis and treatment in reference to Anatomy
- Community Medicine – Tubal ligation as method of contraception

5. Tuberculosis

- Anatomy – Lungs
- Pathology – Changes in lungs with reference to normal histology
- Radiology – Findings in chest radiographs
- Respiratory Medicine – Diagnosis and treatment in reference to Anatomy
- Community Medicine – Epidemiology

***Note :** As per the discussion in the meeting BOS Preclinical – 27/11/2017, we are submitting sample topics for vertical integration. This can be subject to change as per requirement and rotation in subsequent years

One session of vertical integration will be conducted per term for 1st MBBS students

Annexure for item no 8 in BOS Preclinical – 27/11/2017

PG Allied Posting

As per the discussion in the meeting BOS Preclinical – 27/11/2017, we are submitting final schedule of allied posting in MD Anatomy.

- a. Pathology – 2 weeks
- b. FMT – 2 weeks
- c. Radiology – 4 weeks
- d. Genetics – 2 weeks

NOTE : MD Student from Aurangabad campus can be deputed for genetics posting in Navi Mumbai campus.

Resolution No. 4.3.5 of BOM-53/2018: Resolved to add reference book entitled “ESSENTIAL IN RESPIRATORY MEDICINE” by Dr. S.H. Talib in the UG/PG curriculum in medicine and allied subjects

Resolution No. 4.5.1.2 of BOM-55/2018: Resolved that the internal assessment for 1st M.B.B.S. will be calculated as per the table below from 2018-19 onwards. Further Departments should maintain record of Internal Assessment:

Theory: (20 Marks)

	I Terminal & Prelim	4 Periodicals	PBL	Seminar
Existing	15	3		2
Revised	10	5	5 PBL/Seminar/case studies/any other as per dept.	

Practical: 20 marks

	I Terminal & Prelim	4 Periodicals	OSPE	Journal
Existing	15	3		2
Revised	10	5	5 Journal/OSPE/any other method as per dept.	

Resolution No. 4.5.1.3 of BOM-55/2018: Resolved to accept specific mark distribution in MCQ (Section A) in 1st MBBS – Anatomy, Physiology & Biochemistry. To be implemented from 2018-19 onwards. [Annexure-30-A,B,C]

Annexure C - 2**SPECIFIC MARK DISTRIBUTION IN MCQ PAPER IN I MBBS PHYSIOLOGY****Paper I**

Sr. No.	Topic	No. of Questions
7.	General physiology	2
8.	Cardiovascular System	4
9.	Respiratory System	4
10.	Blood	4
11.	Endocrine	4
12.	Reproduction	2
Total		20

Paper II

Sr. No.	Topic	No. of Questions
10.	Nerve-Muscle Physiology	3
11.	Digestive System	4
12.	Renal System	4
13.	CNS	6
14.	Special Sense	3
Total		20

10 % of MCQ marks should be from clinically based questions

Resolution No. 4.5.1.5 of BOM-55/2018: Resolved that : [Annexure-32]

- (i) It was resolved that haematology Practical evaluation in Physiology (Ist MBBS) should have a case – based question. (To be started from 2018-19 batch onwards.)

Existing	Revised
Hematology practical / 10 Marks	Hematology Practical along with case based question / 10 Marks

- (ii) It was resolved that experimental Practical evaluation in Physiology (Ist MBBS) should be in the form of spots so that all the students will be assessed for the same question. (To be started from 2018-19 batch onwards.)

Existing	Revised
Experimental – Skeletal Muscle, Cardiac Muscle, Graph, Charts, Endocrine Photographs, Calculation – asked as 5 items X 2 Marks = 10 Marks to be written & Viva taken by Examiner	Experimental – Skeletal Muscle, Cardiac Muscle, Graph, Charts, Endocrine Photographs, Calculation – To be Evaluated as Spots: 5 Spots X 2 Marks = 10Marks, each spot having 4 sub questions – a,b,c,d of 0.5 Marks each, given 5minutes each for objectivity & uniformity.

PHYSIOLOGY PRACTICAL EVALUATION SYSTEM

Haematology Practicals (Marks 10)

Sr. No.	Haematology Practical	Case Based Questions (e.g.)
1	Determination of Haemoglobin	Anaemia
2	Total WBC Count	Infection, Leukaemia
3	Total RBC Count	Polycythaemia, Aplastic anaemia
4	Differential WBC Count	Eosinophilia, Acute bacterial infection
5	Blood groups	Mismatched blood transfusion, Haemophilia
6	Bleeding time and Clotting time	Purpura, Haemophilia

(Each practical will be accompanied by one relevant case based question)

Spots (Graphs / Charts / Calculations)**Marks = 10**

Sr. No.	Item	No.	Marks
1.	Skeletal Muscle Graphs	1	2
2.	Cardiac Muscle Graphs	1	2
3.	Endocrine Photographs	1	2
4.	Charts	1	2
5.	Calculations	1	2

(Spots – 5 minutes for each spot. Total 5 spots X 2 Marks = 10 Marks)

Resolution No. 4.13 of BOM-55/2018: Resolved as follows:-

- (i) Slow learners must be re-designated as potential learners.
- (ii) Students scoring less than 35% marks in a particular subjects/course in the 1st formative exam are to be listed as potential learners. These learners must be constantly encouraged to perform better with the help of various remedial measures.
- (iii) Students scoring more than 75% marks in a particular subjects/course in the 1st formative exam are to be listed as advanced learners. These learners must be constantly encouraged to participate in various scholarly activities.

Resolution No. 3.1.4.2 of BOM-57/2019:

- i.** Resolved to include “Gender Sensitization” into UG (from new batch 2019-2020) and PG (from existing batches) curricula. [**Annexure-21**]
- ii.** Resolved to align the module of “Gender Sensitization” with MCI CBME pattern for MBBS students.
- iii.** Resolved that Dr. Swati Shiradkar, Prof., Dept. of OBGY., MGM Medical College, Aurangabad will coordinate this activity at both campuses.

Annexure - 21

Gender sensitization for UG (2nd , 3rd , 8th semesters) and PG (3 hours)

INCLUSION OF “ GENDER SENSATIZATION” IN CURRICULUM

Introduction :

The health care provider should have a healthy gender attitude, so that discrimination, stigmatization, bias while providing health care will be avoided. The health care provider should also be aware of certain medico legal issues related with sex & gender.

Society particularly youth & adolescents need medically accurate, culturally & agewise appropriate knowledge about sex, gender & sexuality. So we can train the trainers for the same. It is need of the hour to prevent sexual harassment & abuse .

To fulfill these objectives, some suggestions are there for approval of BOS.

Outline

- 1)For undergraduates :- Three sessions of two hours each, one in 2nd term, one in 3rd term & one in 8th term.
- 2)For Faculties and postgraduates :- One session of two hrs .
- 3)For those want to be trainers or interested for their ownself, value added course, which is optional about sex, gender, sexuality & related issues.

Responsibility

ICC of MGM, MCHA , with necessary support from IQAC & respective departments.

Details of undergraduate sessions

1)First session in 2nd term

Aim – To make Students aware about the concept of sexuality & gender.

To check accuracy of knowledge they have,

To make them comfortable with their own gender identify & related issues.

To make them aware about ICC & it is functioning.

Mode – Brain storming , Interactive power point presentation experience sharing.

Duration – Around two hours

Evaluation – Feedback from participants.

2)Second session in 3rd / 4th term

Aim – To ensure healthy gender attitude in these students as now they start interacting with patients.

To ensure that the maintain dignity privacy while interacting with patients and relatives, particularly gender related.

To make them aware about importance of confidentiality related with gender issues.

To encourage them to note gender related issues affecting health care & seek solutions.

Mode – focused group discussions on case studies, Role plays & discussion.

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Duration – Around two hours.

Evaluation – Feedback from participants.

Third session in 8th term.

Aim – To understand effect of gender attitudes on health care in various subjects.

To develop healthy gender attitude while dealing with these issues.

Mode – Suggested PBL by departments individually. (In collaboration with ICC till faculty sensitization is complete)

Evaluation – Feedback

FOR POSTGRADUATES

Session of 2-3 hrs preferably in induction program.

Aim – To introduce medically accurate concept of gender, sex, gender role & sex role.

To ensure healthy gender attitude at workplace.

To understand gender associated concepts on health related issues & avoid such bias while providing health care.

To make them aware about ICC & its functioning.

Mode – Interactive PPT

Role plays & discussion

Duration – 2 to 3 hrs

Evaluation – Feedback.

FOR FACULTIES

Session of 2 hours may be during combined activities.

Aim – To ensure clarity of concept about gender & sex.

To discuss effect of these concepts on health-related issues.

To identify such gender & sex-related issues in individual subject specialties.

To discuss methodology like PBL for undergraduate students when they are in 7th-8th semester.

Mode – Role play

 Focused group discussion

 Case studies

Evaluation – Feedback.

Sdp-Pimple/joshi-obgy