

# **Curriculum and Examinations Regulation**

## **1<sup>st</sup> MBBS**

# General Information

**Name of the course: BACHELOR OF MEDICINE AND BACHELOR OF SURGERY**

**Short Title: MBBS Course**

**Duration of Course:**

**Total Duration: 4½ Years + 1 year internship.**

		<b>Subjects</b>	<b>Duration</b>
1	First MBBS	(1) Human Anatomy (2) Human Physiology (3) Biochemistry	1 Year
2	Second MBBS	(1) Pathology (2) Microbiology (3) Pharmacology (4) Forensic Medicine	1½ Years
3	Third MBBS	Part I (1) Ophthalmology (2) Oto-Rhino-Laryngology (ENT) (3) Community Medicine	1 Year
		Part II (1) Medicine (2) General Surgery (3) Obstetrics & Gynecology (4) Paediatrics	1 Year
		Total	4½ Years
4	Internship		1 Year

## **Admission Criteria for MBBS Course:**

The Medical Council of India is the apex body for regulations of MBBS studies in India. The Graduate Medical Act 1997, describes details of eligibility, competitive examination and admission rules. It also publishes Amendments thereof from time to time in the Gazette of India. ([www.mciindia.org](http://www.mciindia.org)) In accordance with the above MCI act the Government of Gujarat has issued notification NO. GP-11-MCG-1008-931-J & NO. GP-16-MCG-2009-810396-J: for the admission in medical courses in the state of Gujarat.

In exercise of the powers conferred by sub-section (1) of section 20 read with section 4 of the Gujarat Professional Medical Educational Colleges or Institutions (Regulation of Admission and Fixation of Fees) Act, 2007 (Guj.3 of 2008) and in super session of all the rules made in this behalf, the Government of Gujarat hereby makes the following rules to regulate admission to the first year of the Professional Medical Educational Courses and payment of fees through

The ADMISSION COMMITTEE FOR PROFESSIONAL MEDICAL EDUCATIONAL COURSES,  
C/o. DEAN, B.J. MEDICAL COLLEGE  
AHMEDABAD – 380 016

**Website : [www.medadmbjmc.in](http://www.medadmbjmc.in)**

## **ADMISSION, SELECTION, MIGRATION & TRAINING:-**

**Admission to the Medical Course - Eligibility Criteria :** No Candidate shall be allowed to be admitted to the Medical Curriculum proper of first Bachelor of Medicine and Bachelor of Surgery (MBBS) Course until:

- (1) He/she shall complete the age of 17 years on or before 31<sup>st</sup> December of the year of admission to the MBBS Course.

(2) He/she has passed qualifying examination as under:

(a) The higher secondary examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years of study comprising of physics, Chemistry, Biology and Mathematics or any other elective subjects with English at a level not less than the core course for English as prescribed by the National Council for Educational Research and Training after the introduction of the 10+2+3 years educational structure as recommended by the National Committee on education.

**Note:-** Where the course content is not as prescribed for 10+2 education structure of the National Committee, the candidates will have to undergo a period of one year pre-professional training before admission to the Medical colleges.

**OR**

(b) The Intermediate examination in science of an Indian University/Board or other recognized examining body with Physics, Chemistry and Biology which shall include a practical test in these subjects and also English as a compulsory subject.

**OR**

(c) The pre-professional/pre-medical examination with Physics, Chemistry and Biology, after passing either the higher secondary school examination, or the pre-university or an equivalent examination. The pre-professional/pre-medical examination shall include a practical test in Physics, Chemistry & Biology and also English as a compulsory subject.

**OR**

(d) The first year of the three years degree course of a recognized university, with Physics, Chemistry and Biology including a practical test in these subjects provided the examination is a "University Examination" and candidate has passed 10+2 with English at a level not less than a core course.

**OR**

(e) B.Sc examination of an Indian University, provided that he/she has passed the B.Sc examination with not less than two of the following subjects Physics, Chemistry, Biology (Botany, Zoology) and further that he/she has passed the earlier qualifying examination with the following subjects - Physics, Chemistry, Biology and English.

**OR**

(f) Any other examination which, in scope and standard is found to be equivalent to the intermediate science examination of an Indian University/Board, taking Physics, Chemistry and Biology including practical test in each of these subjects and English.

**Note:** - The pre-medical course may be conducted either at Medical College or a Science College. Marks obtained in mathematics are not to be considered for admission to MBBS course. After the 10+2 course is introduced, the integrated courses should be abolished.

3. 3% seats of the annual sanctioned intake capacity shall be filled up by candidates with locomotory disability of lower limbs between 50% to 70%.

Provided that in case any seat in this 3% quota remains unfilled on account of unavailability of candidates with locomotory disability of lower limbs between 50% to 70% then any such unfilled seat in this 3% quota shall be filled up by persons with locomotory disability of lower limbs between 40% to 50% - before they are included in the annual sanctioned seats for General Category candidates.

Provided further that this entire exercise shall be completed by each medical college / institution as per the statutory time schedule for admissions and in no case any admission will be made in the MBBS course after 30<sup>th</sup> of September.

**Selection to Students:-** The selection of students to medical college shall be based solely on merit of the candidate and for determination of merit, the following criteria be adopted uniformly throughout the country:

(1) In states, having only one Medical College and one university / board/examining body conducting the qualifying examination, the marks obtained at such qualifying examination may be taken into consideration.

(2) In states, having more than one university/board/examining body conducting the qualifying examination (or where there is more than one medical college under the administrative control of one authority) a

competitive entrance examination should be held so as to achieve a uniform evaluation as there may be variation of standards at qualifying examinations conducted by different agencies.

- (3) Where there are more than one college in a state and only one university/board conducting the qualifying examination, then a joint selection board be constituted for all the colleges.
- (4) A competitive entrance examination is absolutely necessary in the cases of Institutions of All India character.
- (5) Procedure for selection to MBBS course shall be as follows :-
  - (i) In case of admission on the basis of qualifying examination under Clause(1) based on merit, candidate for admission to MBBS course must have passed in the subjects of Physics, Chemistry, Biology & English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry, and Biology at the qualifying examination as mentioned in Clause(2) of regulation 4. In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or Other Backward Classes, the marks obtained in Physics, Chemistry and Biology taken together in qualifying examination be 40% instead of 50% as above.
  - (ii) In case of admission on the basis of competitive entrance examination under Clause (2) to (4) of this regulation, a candidate must have passed in the subjects of Physics, Chemistry, Biology and English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry & Biology at the qualifying examination as mentioned in Clause (2) of Regulation 4 and in addition must have come in the merit list prepared as a result of such competitive entrance examination by securing not less than 50% marks in Physics, Chemistry and Biology taken together in the competitive examination. In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or other Backward Classes the marks obtained in Physics, Chemistry and Biology taken together in qualifying examination and competitive entrance examination be 40% instead of 50% as stated above.

Provided that a candidate who has appeared in the qualifying examination the result of which has not been declared, he may be provisionally permitted to take up the competitive entrance examination and in case of selection for admission to the MBBS course, he shall not be admitted to that course until he fulfils the eligibility criteria under Regulation 4.

#### **Migration:-**

- (1) Migration of students from one medical college to another medical college may be granted on any genuine ground subject to the availability of vacancy in the college where migration is sought and fulfilling the other requirements laid down in the Regulations. Migration would be restricted to 5% of the sanctioned intake of the college during the year. No migration will be permitted on any ground from one medical college to another located within the same city.
- (2) Migration of students from one College to another is permissible only if both the colleges are recognised by the Central Government under section 11(2) of the Indian Medical Council Act, 1956 and further subject to the condition that it shall not result in increase in the sanctioned intake capacity for the academic year concerned in respect of the receiving medical college.
- (3) The applicant candidate shall be eligible to apply for migration only after qualifying in the first professional MBBS examination. Migration during clinical course of study shall not be allowed on any ground.
- (4) For the purpose of migration an applicant candidate shall first obtain "No Objection Certificate" from the college where he is studying for the present and the university to which that college is affiliated and also from the college to which the migration is sought and the university to which that college is affiliated. He/She shall submit his application for migration within a period of 1 month of passing (Declaration of result of the 1st Professional MBBS examination) along with the above cited four "No Objection Certificates" to: (a) the Director of Medical Education of the State, if migration is sought from one college to another within the same State or (b) the Medical Council of India, if the migration is sought from one college to another located outside the State.

(5) A student who has joined another college on migration shall be eligible to appear in the II<sup>nd</sup> professional MBBS examination only after attaining the minimum attendance in that college in the subjects, lectures, seminars etc. required for appearing in the examination prescribed under Regulation 12(1)

**Note-1:** The State Governments/Universities/Institutions may frame appropriate guidelines for grant of No Objection Certificate or migration, as the case may be, to the students subject to provisions of these regulations.

**Note-2:** Any request for migration not covered under the provisions of these Regulations shall be referred to the Medical Council of India for consideration on individual merits by the Director (Medical Education) of the State or the Head of Central Government Institution concerned. The decision taken by the Council on such requests shall be final.

**Note-3:** The College/Institutions shall send intimation to the Medical Council of India about the number of students admitted by them on migration within one month of their joining. It shall be open to the Council to undertake verification of the compliance of the provisions of the regulations governing migration by the Colleges at any point of time.”

## TRAINING PERIOD AND TIME DISTRIBUTION

(1) Every student shall undergo a period of certified study extending over 4 ½ academic years divided into 9 semesters, (i.e. of 6 months each) from the date of commencement of his study for the subjects comprising the medical curriculum to the date of completion of the examination and followed by one year compulsory rotating internship. Each semester will consist of approximately 120 teaching days of 8 hours each college working time, including one hour of lunch.

(2) The period of 4 ½ years is divided into three phases as follows :-

- (a) **Phase-1** (two semesters) - consisting of Pre-clinical subjects (Human Anatomy, Human Physiology, Bio-chemistry and introduction to Community Medicine including Humanities). Besides 60 hours for introduction to Community Medicine including Humanities, rest of the time shall be somewhat equally divided between Anatomy and Physiology plus Biochemistry combined (Physiology 2/3 & Biochemistry 1/3).
- (b) **Phase-II** (3 semesters) - consisting of para-clinical/ clinical subjects.

During this phase teaching of para-clinical and clinical subjects shall be done concurrently.

The para-clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine including Toxicology and part of Community Medicine.

The clinical subjects shall consist of all those detailed below in Phase III.

Out of the time for Para-clinical teaching approximately equal time be allotted to Pathology, Pharmacology, Microbiology and Forensic Medicine and Community Medicine combined (1/3 Forensic Medicine & 2/3 Community Medicine). See Appendix-C.

- (c) **Phase-III** (Continuation of study of clinical subjects for seven semesters after passing Phase-I)

The clinical subjects to be taught during Phase II & III are Medicine and its allied specialties, Surgery and its allied specialties, Obstetrics and Gynaecology and Community Medicine.

Besides clinical posting as per schedule mentioned herewith, rest of the teaching hours be divided for didactic lectures, demonstrations, seminars, group discussions etc. in various subjects. The time distribution shall be as per Appendix-C.

The Medicine and its allied specialties training will include General Medicine, Paediatrics, Tuberculosis and Chest, Skin and Sexually Transmitted Diseases, Psychiatry, Radio-diagnosis, Infectious diseases etc. The Surgery and its allied specialties training will include General Surgery, Orthopaedic Surgery including Physio-

therapy and Rehabilitation, Ophthalmology, Otorhinolaryngology, Anaesthesia, Dentistry, Radio-therapy etc. The Obstetrics & Gynaecology training will include family medicine, family welfare planning etc.

- (3) The first 2 semester (approximately 240 teaching days) shall be occupied in the Phase I (Pre-clinical) subjects and introduction to a broader understanding of the perspectives of medical education leading to delivery of health care. No student shall be permitted to join the Phase II (Para-clinical/clinical) group of subjects until he has passed in all the Phase I (Pre-clinical subjects).
- (4) After passing pre-clinical subjects, 1 ½ year (3 semesters) shall be devoted to para-clinical subjects. Phase II will be devoted to para-clinical & clinical subjects, along with clinical postings. During clinical phase (Phase III) pre-clinical and para-clinical teaching will be integrated into the teaching of clinical subjects where relevant.
- (5) Didactic lectures should not exceed one third of the time schedule; two third schedule should include practicals, clinicals or/and group discussions. Learning process should include living experiences, problem oriented approach, case studies and community health care activities.
- (6) Universities shall organize admission timings and admission process in such a way that teaching in first semester starts by 1<sup>st</sup> of August each year.
- (7) Supplementary examination may be conducted within 6 months so that the students who pass can join the main batch and the failed students will have to appear in the subsequent year.

#### Phase Distribution and Timing of Examinations:

	Semester (Each of 6 months)			Total Duration (Years)	Comment
Ist MBBS	1 <sup>st</sup>	2 <sup>nd</sup>	-	1	I <sup>st</sup> professional Examination (during second semester)
IInd MBBS	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	1 ½	II <sup>nd</sup> professional examination (during fifth semester)
IIIrd MBBS Part I	6 <sup>th</sup>	7 <sup>th</sup>	-	2	III <sup>rd</sup> professional Part I (during 7 <sup>th</sup> semester)
IIIrd MBBS Part II	8 <sup>th</sup>	9 <sup>th</sup>	-		III <sup>rd</sup> professional Part II (Final professional)
				4 ½	
Internship				1	-

#### Note:-

- (a) Passing in Ist Professional is compulsory before proceeding to Phase II training.
- (b) A student who fails in the II<sup>nd</sup> professional examination, will not be allowed to appear III<sup>rd</sup> Professional Part I examination unless he passes all subjects of IInd Professional examination.
- (c) Passing in IIIrd Professional (Part I) examination is not compulsory before entering for 8th & 9th semester training, however passing of III<sup>rd</sup> Professional (Part I) is compulsory for being eligible for III<sup>rd</sup> Professional (Part II) examination.

# **CURRICULUM (1<sup>st</sup> MBBS SUBJECTS)**

# CURRICULUM (1<sup>st</sup> MBBS SUBJECTS)

## Prescribed Teaching Hours and Suggested Model Time Tables:-

Following minimum teaching hours are prescribed in various disciplines:

### A. **Pre-Clinical Subjects :** (Phase-1-First and Second Semester)

Anatomy	650 Hrs.
Physiology	480 Hrs.
Biochemistry	240 Hrs.
Community Medicine	60 Hrs.

**Pre-clinical subjects - Phase I :** In the teaching of these subjects stress shall be laid on basic principles of the subjects with more emphasis on their applied aspects.

## **Subject: (1) HUMAN ANATOMY**

### **(i) Goal**

The broad goal of the teaching of undergraduate students in Anatomy aims at providing comprehensive knowledge of the gross and microscopic structure and development of human body to provide a basis for understanding the clinical correlation of organs or structures involved and the anatomical basis for the disease presentations.

### **(ii) Objectives :**

#### **(A) Knowledge :**

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

- comprehend the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of the various structures in the body.
- identify the microscopic structure and correlate elementary ultra-structure of various organs and tissues and correlate the structure with the functions as a prerequisite for understanding the altered state in various disease processes.
- comprehend the basic structure and connections of the central nervous system to analyse the integrative and regulative functions of the organs and systems. He/She should be able to locate the site of gross lesions according to the deficits encountered.
- demonstrate knowledge of the basic principles and sequential development of the organs and systems, recognise the critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards. He/She should be able to explain the developmental basis of the major variations and abnormalities.

#### **(B) Skills :**

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

- identify and locate all the structures of the body and mark the topography of the living anatomy.
- identify the organs and tissues under the microscope.
- understand the principles of karyotyping and identify the gross congenital anomalies.



- (d) understand principles of newer imaging techniques and interpretation of Computerised Tomography (CT) Scan, Sonogram etc.
- (e) understand clinical basis of some common clinical procedures i.e., intramuscular & intravenous injection, lumbar puncture and kidney biopsy etc.

**(C) Integration**

From the integrated teaching of other basic sciences, student should be able to comprehend the regulation and integration of the functions of the organs and systems in the body and thus interpret the anatomical basis of disease process.

**Teaching Schedule (Anatomy)**

**METHODOLOGY**

(For duration of the entire course)

Total working hrs : 650 hrs.

(Including Lectures, Practical, Tutorials, Demonstrations & Seminars)

	<b><u>Number</u></b>
1) Examination	26
2) Didactic Lectures	180
3) Batch Lectures	08
4) Dissection	230
5) Tutorials	70
6) Demonstration	18
7) Histology practical	50
8) Hospital visit	08
9) Quiz	
10)	02
11) Symposium	05
12) Part Ending Test	29
13) Revision	18
14) Museum round	06

**SYLLABUS (Anatomy)**

**GENERAL ANATOMY:**

Introduction, Definition, Scope of anatomy, Terminology, General Information of tissues of the body i.e. skin, & its appendages, bone, cartilage and joint, muscle fascia bursa, and synovial sheath, blood-vessels, anastomosis collateral circulation, lymph nodes and lymphatics, nerve plexuses and ganglia etc. Medico-legal aspects and anatomy Concepts of Anthropology and racial anatomy.

**GROSS ANATOMY:** The students will dissect entire body region-wise and will attend & participate in lectures, tutorials, group discussions, quiz seminars, symposia etc., During dissection of each region students and teachers will keep following guidelines in mind:

**SKIN:** Land marks, blood supply (major vessels), lymph nodes draining it, dermatomes, cutaneous innervation referred pain, sites of common clinical procedures.

**FASCIA:** Regional characteristics, name, thickening etc. fascial planes and spaces of clinical importance.

**MUSCLES:** Gross main bony attachments, exact nerve supply with root value and exact actions of all muscles of extremities, all diaphragms, muscles of eyeball and muscles of branchial origin of head and neck thoracic, abdominal and vertebral muscles should be taught as a 'group' without details of attachment. 'Relations' of very few main muscles should be expected from students. Contour forming muscles to be noted.

**BONES:** Bones should be taught and asked in skeletal only (regional or entire skeletal). Structures attached and related to bones should be shown entirely. More attachments of a structure should be more emphasised than many structures attached on one part. Land marks, movements on joints, sites of common fractures, biopsies etc. should be given more emphasis. Visceral vascular and nervous relations should be given more emphasis. Vertebral curvatures, intervertebral foramina, anomalies, injuries, movements and relations of vertebral column to be emphasised.

**"TYPICAL" and "ATYPICAL"** characters of ribs and vertebrae should be shown on skeleton grossly. Numbers and side determination will be automatically non-significant. Sagittal section of the skull and interior of the cranium to be shown. Pelvis for sex determination and age determination from radiograph should be shown for concept. Details of ossification centres are not required.

**JOINTS:** name, type and variety and type of the movements of all joints should be known. Movements, groups of muscles acting, innervation with root value and dislocation should be given more importance. All details of only very few main joints should be expected.

**VESSELS:** origin, course, branches, areas supplied by, anastomosis and termination of all main arteries should be known. Detailed relations of very few main arteries to be expected. Pulsations, catheterisation, angiography etc. to be emphasised. In case of veins, commencement, course, tributaries and areas drained by and termination of only main veins must be known. Detailed relations of very few main veins must be known. Portocaval and intercaval anastomosis, vertebral and pelvic venous plexus, i.v. injections, venography, venesections, catheterisation should be given more emphasis.

**NERVES-PLEXUSES -GANGLIA:** Origin, root value, course- branches, structures supplied by, lesions and its effects of all nerves should be known. However, detailed relations of very few main nerves should be known. Formation, draw and label & branches of Brachial and Lumbosacral plexus of nerves should be done. Autonomic peripheral pathways with ganglia and their lesions should be done.

**ORGANS:** Gross anatomy, gross development, common important anomalies, gross structure and major relations of all organs should be known. All details of very few main organs.

**LYMPH NODES:** & lymphatic drainage of entire skin & each organ must be known. Detailed lymphatic drainage of very few main organs/areas to be known.

**SPACES:** areas such as triangles, pyramids, lozenges, fossae boxes etc. should be done in detail. e.g. axilla, femoral triangle etc.

**SEROUS MEMBRANES:** Salient features of development, reflections, recesses, and applied aspects should be done.

**SPECIAL SENSES AND PARANASAL AIR SINUSES:** should be done in detail.

**NEUROANATOMY** Entire external features & blood supply of brain and spinal cord should be done in detail. Transverse sections of following structures should be done with an aim of identification of level and identification of each structure seen in the section.[Spinal cord, Medulla Oblongata, Pons and mid-brain with coronal and horizontal section of brain.] Ventricles, meninges, c.s.f., projection fibres (internal capsule) , main association fibres and main commissures should be known. Connections & location of Red Nucleus, Substantia Nigra, Olivary nucleus, nu. pontis, Ventral nu., Tectum, Subthalamic and Hypothalamic nu. should be

known. Special sensory, General sensory Pyramidal and Visceral pathways should be known. Lesions should be given more emphasis.

### **SURFACE ANATOMY:**

**DEAD:** Students should be able to draw on mummy(or on black board with life size human drawing) main organs, points, nerves vessels and spaces of applied importance.

**LIVING:** 'Scopies', 'stomies', pulsations, contours, actions of main muscles. Dermatome, landmarks, movements.

**RADIOLOGICAL ANATOMY:** Plain films, and special procedures. Of all regions should be shown. Clinical details, Preparation of the patient and type of the dye etc. need not be done Only anatomical aspects of the radiograph should be taught, asked and expected.

**SECTIONAL ANATOMY & IMAGING TECHNIQUE:** Films of the cat- scan and MRI ,ultra sonography of very few main standard levels and similarly few transverse , mid-sagittal and coronal sections of the body should be taught, asked and expected. Identify level and structures in these sections.

**HISTOLOGY:** Quick review of General histology with human orientation followed by systemic histology. General histology should provide structure and location while systemic study should enable the student to appreciate differential diagnosis & structure- function correlation. General plan and systemic characteristics should be given more importance. Knowledge of main few slides covering all systems and main organs should be expected from the student.

**EMBRYOLOGY:** Quick review of General embryology sufficient for students to understand systemic embryology. Systemic embryology should cover narration of development of all organs /parts without detailed explanation and should enable the student to understand clinically important congenital anomalies. Perinatal changes in circulation, Foetal circulation, twinning, in vitro fertilisation, teratogens and placentation should be given emphasis

**GENETICS:** Quick review of basic principles of genetics. Principles regarding inheritance and chromosomal aberration and genetic basis of common syndromes, anomalies, incompatibilities etc. Karyotypes, genetic counselling and chorionic villi sampling diagnosis of correctable foetal disorders.

**FAMILY WELFARE:** Topics already covered under different heads such as gross anatomy, general anatomy, histology, embryology, genetics etc.

N.B. Wherever 'very few main' is written against any structure such as arteries, joints etc. it means that faculty of all affiliated medical colleges will prepare notify and follow list of actual structures time to time depending upon significance.

**JOURNALS:** A student is expected to prepare a journal in addition to existing histology journal. This additional 'Journal of Anatomy' should have minimum of 25 figures covering gross anatomy, sectional anatomy, karyotype, genetics, embryology, neuroanatomy etc. & short description.

## Subject (2) HUMAN PHYSIOLOGY

### (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. Practicals:

Demonstration of :

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

## Teaching Schedule (Physiology)

### METHODOLOGY

(For duration of the entire course)

Total Working Hrs : 480 hrs.

(Including Lectures, Practical, Tutorials, Demonstrations & Seminars)

	<u>Number</u>
(1) Didactic Lectures	: 228
(2) Demonstrations	: 36
(3) Tutorials	: 32
(4) Seminars conducted during the year	: 10
(5) Practical	: 174
(6) Any other teaching/training activities	: Group Discussion, Microteaching, Symposium
(7) Is there any integrated teaching?	<b>YES</b>
If yes, With Anatomy & Biochemistry	
(8) Records Methods of Assessment thereof	:
(Time table of lectures, demonstrations, seminars, tutorials, practical and dissection )	

### Syllabus: Lectures and Systems for Physiology

#### Topics No. of lectures

#### General Physiology:-

- Cell physiology	2
-Transport across cell membrane	2
-Homeostasis & stress	2
-Action Potential, Ionic composition	2

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### **BLOOD :-**

- Composition and function of blood	1.
- Plasma proteins	1.
- RBC – Erythropoiesis and function of RBC	2.
- Hb	1.
- Anaemias	1.
- WBC – Development and functions	2.
- Platelets	1.
- Blood coagulation disorders and mechanism of haemostasis.	2.
- Blood Groups / Blood Volume	2.
- Immunity	1.
- R.E. system & Lymphatic system	1.
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### **MUSCLE NERVE :-**

- Structure and function of skeletal muscle & smooth muscle	2.
- Properties of skeletal muscle & generation of potentials	2.
- Transmission along cell membrane	1.
- Mechanism of muscle contraction	2.
- Transmission of impulse along neuromuscular junction	1.
- Myasthenia gravis and neurotransmitters, Neuromuscular blocking agents	2.
- Structure, Function and classification of Neurons	2.
- Origin and transmission of impulse in nerve fiber	1.
- Degeneration & regeneration in nerve, reaction of degeneration.	2.
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### **DIGESTIVE SYSTEM :-**

- Digestive tract and functions of salivary glands	1.
- Composition, function & mechanism of secretion of saliva	1.
- Composition, function & mechanism of secretion of gastric juice	2.
- Hypochlorhydria, hyperchlorhydria, peptic & duodenal ulcer; their correlation with stress	1.
- Composition, functions & mechanism of secretion of pancreatic juices	1.
- Composition, functions & mechanism of secretion of bile	1.
- Composition, function & mechanism of secretion of succus entericus	1.
- Function of large intestine	1.
- Function of liver	3.
- Movements of alimentary canal	2.
- Digestion & absorption of various food stuff	1.
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### **RESPIRATORY SYSTEM :-**

- Respiratory tract & function of respiratory system	2.
- Lung volume & capacities	1.
- Intrapulmonary & intra-pleural pressure & surfactant	1.
- Lung Compliance	1.
- Mechanics of breathing	1.
- O <sub>2</sub> carriage	1.
- Co <sub>2</sub> carriage	1.
- Hypoxia	1.
- Control of respiration	1.

- Physiology of High altitude & acclimatization 1.
- Periodic Breathing, Dysbarism 1.
- Cyanosis and Asphyxia 1.
- Applied Physiology 2.

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**EXCRETION :-**

- Structure, blood supply & functions of kidney 2.
- Mechanism of filtration & GFR 2.
- Tubular function 2.
- Micturition & its control 1.
- Renal function tests & pathogenesis of renal disorders 2.
- Functions of skin & Regulation of body temperature 2.
- Water balance, diuretics, dialysis and applied physiology 3.

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**C.V.S.:-**

- Structure & properties of cardiac muscle 1.
- Generation of action potential & transmission of cardiac impulse in conductive tissues 2.
- ECG 1.
- Cardiac cycle, Volume and pressure changes, correlation with ECG & phonocardiogram. 2.
- Heart sounds and murmurs 1.
- Hemodynamics 1.
- Cardiac output & its control 2.
- Heart rate and its control, various arrhythmias 2.
- Arterial B.P. & its control, Hypertension & Hypotension 2.
- Physiology of coronary circulation 1.
- Other Regional circulation 1.
- Physiological basis of shock 1.

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**17**

**ENDOCRINE :-**

- General considerations of endocrine system 1.
- Names, synthesis, actions, control of secretion, function tests & disorders of hormones of Pituitary gland. 2.
- Thyroid gland 2.
- Parathyroid gland 2.
- Adrenal cortex 2.
- Adrenal medulla 2.
- Pancreas Hormones, Diabetes 3.
- Thymus, pineal and local hormones 1.

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**15**

**REPRODUCTION:-**

- Growth & Development of body, influence of various hormones & Puberty 2.
- Male reproductive system & functions of testes 2.
- Reproductive cycles in female & its disorders 2.
- Physiology of pregnancy 1.
- Parturition & physiology of lactation 2.
- Pathogenesis & treatment of gonad disorders in males & females 2.
- Contraceptives & Infertility 2.
- Physio of Newborn, Respi distress syndrome, Circulatory changes 2.

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**15**



## **ANS & CNS**

- General considerations of CNS & ANS 1.
- Structure & properties of synapse and synaptic transmission 2.
- Receptors, their functions with physiology of pain in particular 3.
- Reflexes, Reflex action and their properties 1.
- Tracts of spinal cord, their functions and effects of hemi section and Transaction of spinal cord 4.
- Autonomic nervous system 2.
- Physiology of sleep and speech with their disorders, E.E.G. 3.
- Functions of C.S.F. and lumbar puncture 1.

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**17**

Normal functioning of the following parts of the brain, their disorders and an outline of treatment

1. Hypothalamus 2.
  2. Thalamus 2.
  3. Reticular formation 2.
  4. Cerebellum 2.
  5. Basal Ganglia 2.
  6. Cerebral cortex 4.
- Tone, Posture & Equilibrium 2.
  - Conditioned Reflex 1.
  - Limbic system 1.

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**18**

## **SPECIAL SENSES**

- Various parts of eyeball and their functions 1.
- Refractive media and optics 1.
- Errors of refraction & Accommodation in eye 2.
- Photochemistry of vision 1.
- Acuity & field of vision with disorders 1.
- Colour vision and colour blindness 1.
- Dark & light adaptation, monocular and binocular vision 1.
- Visual pathway and lesions at different levels 1.
- Functions of external ear, middle ear and cochlea 1.
- Mechanism of hearing and endocochlear potentials 2.
- Physiology of taste 1.
- Physiology of smell 1.

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**14**

## **BIOPHYSICS :-**

- Principles of biophysics and its applied aspects 1.
- Biopotentials and its applied aspects 1.
- Transport across cell membrane 1.

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**3**

## **ENVIRONMENTAL, REGULATORY & EXERCISE PHYSIOLOGY:-**

- Physiology of high altitude, acclimatization & effect of high atmospheric pressure 2.
- Aviation & space physiology 1.
- Body temperature regulation, Hypo & Hyperthermia 2.
- Physiology of exercise & yoga 2.

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**7**

## **TUTORIALS**

1. Haemoglobin	1
2. Blood groups	2
3. Neurons and Neuroglia	1
4. Rigor mortis & Myasthenia gravis	1
5. Lymph & R.E. System	1
6. Radial pulse Tracing	1
7. Bleeding Disorders	1
8. Isotonic & Isometric contraction	1
9. Hypoxia, O <sub>2</sub> therapy & cyanosis	2
10. Deglutition and vomiting	1
11. Emptying of stomach & peristalsis	1
12. Movements of small & large intestine, Defecation	1
13. Skin – structure & function	1
14. Asphyxia, Hypercapnia	1
15. O <sub>2</sub> & CO <sub>2</sub> dissociation curve periodic breathing	1
16. Acidification of urine, role of kidney in Ph regulation	1
17. Adrenal Medulla	1
18. Cutaneous Circulation	1
19. E.E.G.	1
20. Speech and Aphasia	1

## **Subject (3) BIOCHEMISTRY**

Biochemistry including medical physics and Molecular Biology.

### **(i) GOAL**

The broad goal of the teaching of undergraduate students in biochemistry is to make them understand the scientific basis of the life processes at the molecular level and to orient them towards the application of the knowledge acquired in solving clinical problems.

### **(ii) OBJECTIVES**

#### **(a) KNOWLEDGE**

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

- (1) describe the molecular and functional organization of a cell and list its subcellular components;
- (2) delineate structure, function and inter-relationships of biomolecules and consequences of deviation from normal;
- (3) summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered;
- (4) describe digestion and assimilation of nutrients and consequences of malnutrition;
- (5) integrate the various aspects of metabolism and their regulatory pathways;
- (6) explain the biochemical basis of inherited disorders with their associated sequelae;
- (7) describe mechanisms involved in maintenance of body fluid and pH homeostasis;
- (8) outline the molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine;
- (9) summarize the molecular concepts of body defence and their application in medicine;
- (10) outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
- (11) familiarize with the principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data;
- (12) the ability to suggest experiments to support theoretical concepts and clinical diagnosis.

#### **b. SKILLS:**

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

- (1) make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
- (2) analyze and interpret investigative data;
- (3) demonstrate the skills of solving scientific and clinical problems and decision making;

#### **c. INTEGRATION**

The knowledge acquired in biochemistry should help the students to integrate molecular events with structure and function of the human body in health and disease.

## Syllabus (Biochemistry)

1. Cell membrane,
2. Chemistry and metabolism of Fat and Carbohydrates and proteins,
3. Enzymes Body Fluids.
4. pH buffers. Acid base balance and regulation,
5. Biological oxidation,
6. Body defense mechanism And its application in medicine.
7. Environmental Biochemistry and Cancer Biochemistry,
8. Organ Function Tests, Newer Techniques.
9. Protein chemistry and Metabolism,
10. Nucleic and Transcription,
11. Replication,
12. Molecular Biology, Genetic Engineering Bio-Technology,
13. Integration of Metabolism,
14. Purine, Pyrimidine Chemistry, And Metabolism,
15. Vitamins, Minerals and Nutrition.

# Subject (4) INTRODUCTION TO HUMANITIES & COMMUNITY MEDICINE

Including Introduction to the subjects of Demography, Health Economics, Medical Sociology, Hospital Management, Behavioral Sciences inclusive of Psychology.

**Note: Though Teaching Starts in 1<sup>st</sup> year , the examination for this subject will be conducted at the end of III MBBS part-1.**

## **OBJECTIVES**

### **(a) KNOWLEDGE**

The student shall be able to :

1. explain the principles of sociology including demographic population dynamics;
2. identify social factors related to health, disease and disability in the context of urban and rural societies;
3. appreciate the impact of urbanization on health and disease;
4. observe and interpret the dynamics of community behavior;
5. describe the elements of normal psychology and social psychology;
6. observe the principles of practice of medicine in hospital and community setting;

### **(b). SKILLS**

At the end of the course, the student should be able to make use of:

- (1) Principles of practice of medicine in hospital and community settings and familiarization with elementary nursing practices.
- (2) Art of communication with patients including history taking and medico-social work. Teaching of community medicine, should be both theoretical as well as practical. The practical aspects of the training programme should include visits to the health establishments and to the community where health intervention programmes are in operation.

In order to inculcate in the minds of the students the basic concepts of community medicine to be introduced in this phase of training, it is suggested that the detailed curriculum drawn should include at least 30 hours of lectures, demonstrations, seminars etc. together with atleast 15 visits of two hours each.

## **SYLLABUS**

The entire curriculum of community medicine has been split to be taught into broad groups. First group of curriculum will be covered during phase I (First and second semesters) while second group of curriculum will be covered during phase II & III (Third semester through Seventh Semester).

Accordingly breakup of curriculum is shown as under:

First Group of Curriculum to be Covered during phase I (First and Second semester)

### **A. Class-room Teaching**

1. Introduction to Humanities and Community Medicine

History of Medicine, Definition of Health, Concept of Health, Spectrum of Health Determinants of Health, Indicators of Health

2. Demography & Population Dynamics:  
Definition, Collection of Demographic Data, Population census, records of vital Statistics, Demographic cycle, Demographic Trends in India, Definitions of Vital Events, Collection of Vital Statistical Data, Compilation, Tabulation & Presentation.
3. Health Economics  
Introduction, Natural Economical resources of the Country, Economic Levels, Health Planning & Budgeting.

#### 4. Social Science & health

##### (a) Medical Sociology

Concepts and principles of sociology, Social Sciences, Social Classification, Social Factors related to health and diseases, Social organizations, Urban and rural society, Family type, function and role of family in health and disease, Society in concern, its functions, role of cultural health and disease, hospital sociology

##### (b) Behavioral Sciences

Community behaviour and ecology, interaction of human being to human environment, social psychology, and impact of psychology on health effect of urbanization on health and diseases, medico-social problems

#### 5. Hospital Management

The principle of practice of medicine including the visit to the hospital full familiarization with elementary nursing practices, practices of sterilizations injection and dressing practices, necessity for record keeping, art of communication with patients including history taking, Medico-social work and immunization against the disease and health check up.

#### 6. Health Care delivery system

Health care delivery system at center, state, District and Local levels. Rural Health services, health care of community, Primary health care, Comprehensive health care, Basic health care, Health care delivery, health status and health problem of India and Gujarat.

#### **(B) Field visits to health establishments:**

Following health establishments have been considered for field visits. In these establishments health intervention programmes are operative. Total 15 visits will be planned. Each visit will cover two hours of demonstration and participation etc.

1. Urban Health Center
2. Family visit in community
3. Anganwadi Center
4. Immunization Clinic
5. Malaria clinic( NMEP)
6. Curative and preventive General Practice Clinic
7. Family Welfare Planning and training Centre
8. Post Partum Unit
9. District TB Clinic
10. S.T.D. clinic
11. Medical Record Section of hospital
12. Hospital set up- visit to learn autoclaving, Sterilization, Incineration, Organization etc.

Second group of curriculum to be covered during phase II & III  
(THIRD TO SEVENTH SEMESTERES)

A. Class room Teaching (Theory)

Following subjects will be covered through class room teaching which will involve lectures, seminars, symposiums etc

1. Environment Health

a. Air and Ventilation

Atmospheric air - its composition, effect of vitiated air, overcrowding. Indices of thermal comfort, Natural and artificial ventilation. Air pollution, Air borne diseases, disinfection of air, air conditioning measurements of air temperature, humidity & velocity. Indices of heat stress, effect of heat on health.

b. lighting:

Requirements, Sources, Measurements, Normal standards, Health effect of poor lighting.

c. Noise:

Sources, Properties, Measurements, Effect on human health, Noise control.

d. Radiation :

Sources: type of radiations, measurements, Effect on health, Radiation protection and control.

e. Housing in Relation to health:

Criteria for healthful housing, House standards, overcrowding, Housing and Health.

f. Disposal of Wastes:

Collection, Removal, disposal of refuse, night soil and sewage sanitary barrier, fecal borne diseases, Various methods of disposal of dead.

g. Village Sanitation:

Housing, Provision of safe water supply, sanitary disposal of refuse and excreta, village latrines, Manure pit.

h. Sanitation of Camp & Fair:

Site, water supply, control of food establishments, Disposal of refuse and excreta, Control of communicable diseases.

**2. Nutrition & Health**

Importance of safe milk and other food stuffs, Adulteration, Preservation, food poisoning, food and milk borne diseases, Role of nutrition in various diseases, Dietetics- nutritional surveys, National Nutritional programme.

**3. Genetics and Health**

Principles, Heredity, Chromosomal disorders and abnormalities, Population genetics, General Epidemiology and Control of genetic disorders, Genetic counseling

**4. General Epidemiology:**

Definition, Epidemiology methods, uses of epidemiology, screening of disease, Epidemic investigation, Infectious disease Epidemiology, Disease transmission, Nature of reservoir of infection, Immunity, Immunoprophylaxis, National Immunization Programmes, Non-communicable diseases epidemiology, Disease control and prevention, Health advice to

travelers, Hospital acquired infection, Notification, Isolation, Quarantine, Surveillance, Disinfection & Sterilization.

**5. Systemic Epidemiology:**

**a. Communicable Disease**

Problem, Epidemiology, prevention, control and national control and eradication program of common communicable disease such as small pox, chickenpox, measles, Rubella, Mumps, Influenza, Diphtheria, Whooping cough, Meningococcal meningitis, Viral hepatitis, Cholera, Enteric Fever, Tuberculosis, Acute Respiratory Infections, Poliomyelitis, Food poisoning, Amoebiasis, Bacillary dysentery, Diarrheal Diseases, Helminthes infestations, Guinea worm, Yellow fever, Dengue fever, KFD, Japanese encephalitis, Rickettsial diseases, Plague, Malaria, Filarial, Leishmaniasis, Rabies, Trachoma, Tetanus, Leprosy, STD, AIDS, Yaws etc.

**b. Non-communicable Disease:**

Problem, Epidemiology, Prevention, Control and national control programmes for common non-communicable diseases such as Cancer, Cardio-Vascular disease, Rheumatic fever and heart disease, Hypertension, Diabetes, Obesity, Blindness, Accidents etc.

**6. Occupational Health**

Occupational environment, Interaction of Physical, Chemical, Biological, Mechanical and Social agents with man, Occupational hazards and disease of importance and their prevention and control such as Pneumoconiosis, Lead poisoning, Occupational Cancers, Occupational dermatitis, Radiation hazards, Hazards of Agricultural workers, Accidents in Industry, Industrial Toxicology, Sickness Absenteeism, Health Problems and General measures of prevention and control of industrial problems, prevention and control of occupational diseases, Indian Factory Act and ESIS Act, Industrial Social Security.

**7. Maternal and child Health & Family Planning**

Maternal & Infant mortality and morbidity in the country, Causes and schemes for its prevention, Measures for promotion of maternal and child welfare prevention of prenatal, neonatal and infants deaths, care of the pre school child, Various national, state and voluntary agencies for child and maternal protection, Socioeconomic and educational aspects of the problem.

**8. School Health**

School premises and environmental sanitation, periodic medical inspection. Early detection of ailments, Defects and their treatment, Correction of deformities, mid day meal program, care of backward child, health education.

**9. Family planning**

Medico-social and health aspects of family planning, Contraceptive, national family welfare program, post partum program, medical termination of pregnancy act.

**10. Geriatrics and Health**

Problems of ageing, health status of aged person, measures to solve the problems of aged persons.

**11. Mental health**

Mental deficiency, Care and control of mental health, child guidance clinic, drug dependence and its control

**12. Health education**



Principles of health education, health and personal habits, various methods for the dissemination of knowledge

**13. Public health administration**

Health planning, health management, Health planning in India, Bhore Committee, Mudaliar Committee, Other health committee reports for health planning in India. Five year health plans, Health for all by 2000A.D. health status and health man power, Money Materials, etc. to improve health status of people, hospitals, health insurance, government and non governmental health agencies.

National Health Program of India, ROME, ICDS etc. international health organizations like, WHO, UNICEF, FAO, ILO, CARE and others.

**B. Field visit/ Practical/ Clinics/ Tutorials/ Demonstration/Community posting/ etc.**

Following subjects will be covered through teaching methods using field visits, Practical, Clinics, Demonstration, Community posting, work shops, etc. students will be posted for 4 weeks each during third, Fourth and sixth semesters(Total Semester period will be 12 weeks). If required additional period of 2 hour each will be arranged depending upon subject and the suitable community hour exposure.

1. Training in Hospitals;

Hospital visit will be arranged to demonstrate the following.

- a. Nursing including the bed making
- b. Techniques of disinfection and dressing
- c. Management of hospital including clean linen
- d. Bed side manners and medical ethics
- e. The art of communication, history taking, winning the confidence of the patients.
- f. Keeping completeness and reliability.
- g. patient psychology – understanding patients' perception, his perception
- h. medico – social work
- i. principles of health education – doctor's role

2. Field visits:

Field visits will be arranged to demonstrate following:

- a. Factors determining health and disease including environmental influences
- b. Applied sociology – importance of community participation
- c. Limited resources – necessity of maximization of utilization
- d. Importance of nutrition on health & disease
- e. Acute infectious disease and other local endemic disease .e.g., trachoma, goiter, filariasis etc.
- f. Tuberculosis
- g. Preventive aspects of psychological medicine and psychiatry
- h. Preventive aspect of leprosy
- i. V.D. control
- j. Preventive aspect of dietetics and nutrition, information on all National health programme and role of International health organization.
- k. Family welfare planning and community medicine
  1. The need for family planning
  2. Organization or family planning services
  3. Health education in relation to family planning
  4. Nutrition
  5. Psychological needs of the mother, the child and the family
  6. Demography and vital statistics

3. health information and basic medical statistics

Sources and presentation of data, sampling, measures of central tendency, variability, normal distribution and normal curve, sampling variability and significance, demography and vital statistics, life table etc.

4. Environmental health
  - a. role of environment in health and disease components of environmental health and their impact on health and disease.
  - b. Water  
sources, collection, storage and distribution of water, impurities and their relation to health, purification, importance of safe water supply. Collection and forwarding of sample of water, analysis of water, standards of purity, public swimming bath sanitation. National water and sanitation programme, Water borne diseases
  - c. Medical entomology  
Life history, role in disease transmission and control of common vectors of medical importance such as mosquitoes, house fly, tsetse fly, louse, rat flea, bedbugs, ticks, mites, Cyclops etc.
  - d. Rodents  
Role in disease transmission, habitates and control of common rodents of medical importance
  - e. Insecticides  
Classification, resistance and toxicity
  - f. Demonstration on insects, micro-organism, parasites, insecticide, rodenticides, instruments, food stuff, immunological substances etc.
5. Epidemiological exercise and statistical exercise  
Students will be trained for epidemiological and statistical exercise through classroom exercises, field visit demonstration etc.
6. Family health and clinic-social case study
7. National health programmes and Epidemic situations
8. Visit to an industry and class room demonstration on occupational health relevant to state
9. Project work

# **EXAMINATIONS REGULATIONS**

# EXAMINATIONS REGULATIONS

## ESSENTIALITIES FOR QUALIFYING TO APPEAR IN PROFESSIONAL EXAMINATIONS

The performance in essential components of training are to be assessed, based on:

- (1) Attendance 75% of attendance in a subject for appearing in the examination is compulsory inclusive of attendance in non lecture teaching. i.e. seminars, group discussions, tutorials, demonstrations, practicals, Hospital (Tertiary, Secondary, Primary) postings and bed side clinics, etc.
- (2) Internal Assessment :
  - (i) It shall be based on day to day assessment ( see note), evaluation of student assignment, preparation for seminar, clinical case presentation etc.:
  - (ii) Regular periodical examinations shall be conducted throughout the course. The questions of number of examinations is left to the institution:
  - (iii) Day to day records should be given importance during internal assessment :
  - (iv) Weightage for the internal assessment shall be 20% of the total marks in each subject :
  - (v) Student must secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination of that subject.

### Note:-

Internal assessment shall relate to different ways in which students participation in learning participation in learning process during semesters in evaluated.

Some examples are as follows:

- (i) Preparation of subject for students seminar.
- (ii) Preparation of a clinical case for discussion.
- (iii) Clinical case study/problem solving exercise.
- (iv) Participation in Project for health care in the community ( planning stage to evaluation).
- (v) Proficiency in carrying out a practical or a skill in small research project.
- (vi) Multiple choice questions (MCQ) test after completion of a system/teaching.

Each item tested shall be objectively assessed and recorded. Some of the items can be assigned as Home work/Vacation work.

### UNIVERSITY EXAMINATIONS :

Theory papers will be prepared by the examiners as prescribed. Nature of questions will be short answer type/objective type and marks for each part indicated separately.

Practicals/clinicals will be conducted in the laboratories or hospital wards. Objective will be assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation.

Viva/oral includes evaluation of management approach and handling of emergencies. Candidate's skill in interpretation of common investigative data, x-rays, identification of specimens, ECG,etc. also is to be evaluated.

The examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary for knowledge, minimum skills alongwith clear concepts of the fundamentals which are necessary for him to carry out his professional day to day work competently. Evaluation will be carried out on an objective basis.

Question papers should preferably be of short structure/objective type.

Clinical cases/practicals shall take into account common diseases which the student is likely to come in contact in practice. Rare cases/obscure syndromes, long cases of neurology shall not be put for final examination.

During evaluation (both Internal and External) it shall be ascertained if the candidate has acquired the skills as detailed in Appendix-B.

There shall be one main examination in a year and a supplementary to be held not later than 6 months after the publication of its results. Universities Examinations shall beheld as under:-

First Professional:-

In the second Semester of Phase 1 training, in the subjects of Anatomy, Physiology and Bio-Chemistry.

Second Professional:-

In the Fifth Semester of Phase II training, in the subjects of Pathology, Microbiology, Pharmacy and Forensic Medicine.

**Third Professional :-**

Part 1- in the Seventh Semester of Phase III, in the subjects of Ophthamology, Oto-rhynolaryngology and Community Medicine.

**Third Professional :-**

Part II-(Final Professional) – At the end of Phase III training in the subjects of Medicine, Surgery, Obstetrics & Gynecology and Pediatrics.

**Note :-**

Results of all university examinations shall be declared before the start of teaching for next semester.

#### **DISTRIBUTION OF MARKS TO VARIOUS DISCIPLINES :**

(A) FIRST PROFESSIONAL EXAMINATION:(Pre-clinical Subjects):-

(a) Anatomy:

Theory-Two papers of 50 marks each

(One applied question of 10 marks in each paper)

100 marks.

Oral (Viva)

20 marks

Practical

40 marks

Internal Assessment

(Theory-20; Practical-20)

40 marks

Total

200 marks

**(b) Physiology**

Theory-Two papers of 50 marks each ( One applied question of 10 marks in each paper)	100 marks
Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

**(c) Biochemistry :**

Theory-Two papers of 50 marks each ( One applied question of 10 marks in each paper)	100 marks
Oral (Viva)	20 marks
Practical	40 marks
Internal Assessment (Theory-20; Practical-20)	40 marks
Total	200 marks

Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in Practicals.

**APPOINTMENT OF EXAMINERS:**

- (1) No person shall be appointed as an examiner in any of the subjects of the Professional examination leading to and including the final Professional examinations for the award of the MBBS degree unless he has taken at least five years previously, a doctorate degree of a recognized university or an equivalent qualification in the particular subject as per recommendation of the Council on teachers' eligibility qualifications and has had at least five years of total teaching experience in the subject concerned in a college affiliated to a recognized university at a faculty position.
- (2) There shall be at least four examiners for 100 students, out of whom not less than 50% must be external examiners. Of the four examiners, the senior most internal examiner will act as the Chairman and co-ordinator of the whole examination programme so that uniformity in the matter of assessment of candidates is maintained. Where candidates appearing are more than 100, one additional examiner, for every additional 50 or part thereof candidates appearing, be appointed.
- (3) Non medical scientists engaged in the teaching of medical students as whole time teachers, may be appointed examiners in their concerned subjects provided they possess requisite doctorate qualifications and five year teaching experience of medical students after obtaining their postgraduate qualifications. Provided further that the 50% of the examiners (Internal & External) are from the medical qualification stream
- (4) External examiners shall not be from the same university and preferably be from outside the state.
- (5) The internal examiner in a subject shall not accept external examinership for a college from which external examiner is appointed in his subject.
- (6) A university having more than one college shall have separate sets of examiners for each college, with internal examiners from the concerned college.

- (7) External examiners shall rotate at an interval of 2 years.
- (8) There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions.
- (9) Except Head of the department of subject concerned in a college/institution, all other with the rank of reader or equivalent and above with requisite qualifications and experience shall be appointed internal examiners by rotation in their subjects; provided that where there are no posts of readers, then an Assistant Professor of 5 years standing as Assistant Professor may be considered for appointment as examiner.
- (10) The grace marks up to a maximum of five marks may be awarded at the discretion of the University to a student who has failed only in one subject but has passed in all other subjects.

### **Guidelines for Paper setter**

1. There will be 2 papers. Paper I & paper II each contains – section I & section II.
2. Time is 3 hours
3. Paper setter should strict to course content & avoid duplication in different –paper & sections.
4. The question should be set in such a way that in should be completed within time.
5. As far as possible paper setter should write questions legibly in his own handwriting & avoid overwriting.
6. The blue print of curriculum & section wise break of mark allotted is appended.

# Subject (1) Anatomy

## Examination Schedule

No.	Type	Marks	Month
1	General anatomy Part ending(Theory)	50	August-2012
2	Upper Limb Part ending	100(50+50)	September-2012
3	Lower Limb Part ending	100(50+50)	November-2012
4	Abdomen Part ending	100(50+50)	February-2013
5	Head Neck & Brain Part ending	100(50+50)	April-2013
6	1 <sup>st</sup> Internal Exam Theory & Practical	100(50+50)	January-2013
7	Preliminary Exam	175(100+75)	May-2013
8	Final University Theory Examination-Two papers each of 50 marks	100(50+50)	June-2013
9	Final University Practical examination	60	July-2013
* exam held as per final university exam pattern			

## Internal Assessment Marks Calculation (Anatomy)

Total Internal Assessment Marks		
1	Theory	20 marks
2	Practical	20 marks
Internal Assessment Marks Calculation		
1. Theory		
	Lectures attendance & day to day evaluation*	2.5 marks
	Internal assessment -one	5 marks
	Preliminary assessment -one	7.5 mark
	Part Ending assessment	5 marks
	<b>Total</b>	<b>20 marks</b>
2. Practical		
	Practical attendance & day to day evaluation**	2.5 marks
	Internal practical assessment	5 marks



	Preliminary exam assessment	7.5 marks
	Journal evaluation	5 marks
	<b>Total</b>	<b>20 marks</b>

\* Day to day evaluation for theory includes MCQs , Short Notes and objective questions

\*\* Day to day evaluation for practical includes individual performance in practical class and journal completion

## Final University Anatomy Examination

### MARKS SCHEME FOR FINAL UNIVERSITY EXAM 2012-2013

<b>Theory</b>		
	<b>Marks</b>	
Paper-I	50	3 hrs
Paper-II	50	3 hrs
Oral Viva(Soft part)	20	
Internal Assessment	20	
<b>Total</b>	<b>140</b>	
<b>Practical</b>		
	<b>Marks</b>	
Hard parts & embryology models	10	
Surface anatomy (living & dead)	10	
Histology	10	
Radiology (plain & special procedure)	10	
Internal Assessment	20	
<b>Total</b>	<b>60</b>	
<b>Division of marks in pairs of the practical examiners</b>		
Pair-I Soft parts	20 marks	All candidates
Pair-II Hard parts, embryology models & surface anatomy	20 marks	All candidates
Pair-III Histology & Radiology	20 marks	All candidates

**ANATOMY**  
**UNIVERSITY EXAMINATION**  
**THEORY ( Paper Scheme )**

**PAPER--I**

**Time:- 3 hrs**

**Total 50 marks**

<b>Section—I</b>		<b>25</b>
Q-1. Short Notes on Applied Anatomy of :		
Head & Neck , Upper Limb & Neuro Anatomy	2 out of 3	2 X 5 =10
Q-2. Short Notes :		
(a) Neuro Anatomy	2 out of 3	2 X 3 = 6
(b) Systemic Histology of : Head & Neck & Neuro Anatomy	1 out of 2	1 X 3 = 3
Q-3. Short Notes		
(a) General Anatomy	1 out of 2	1 X 3 = 3
(b) General Embryology	1 out of 2	1 X 3 = 3
<b>Section—II</b>		<b>25</b>
Q-4. Short Notes : Head & Neck	2 out of 3	2 X 5 =10
Q-5. Short Notes :		
(a) Upper limb	2 out of 3	2 X 3 = 6
(b) Systemic Embryology of : Head & Neck, Neuro Anatomy	1 out of 2	1 X 3 = 3
Q-6. Objective questions :		
Head & Neck, Upper Limb & Neuro Anatomy	6 out of 8	6 X 1 = 6

# ANATOMY

**PAPER--II**

**Time:- 3 hrs**

**Total 50 marks**

<b>Section-I</b>		<b>25</b>
Q-1. Short Notes on Applied Anatomy of :		
Abdomen, Lower Limb & Thorax	2 out of 3	2 X 5 =10
Q-2. Short Notes :		
(a) Thorax	2 out of 3	2 X 3 = 6
(b) Systemic Histology of : Abdomen & Thorax	1 out of 2	1 X 3 = 3
Q-3. Short Notes :		
(a) Genetics	1 out of 2	1 X 3 = 3
(b) Family Welfare	1 out of 2	1 X 3 = 3
<b>Section – II</b>		<b>25</b>
Q-4. Short Notes : Abdomen	2 out of 3	2 X 5 =10
Q-5. Short Notes :		
(a) Lower Limb	2 out of 3	2 X 3 = 6
(b) Systemic Embryology of : Abdomen & Thorax	1 out of 2	1 X 3 = 3
Q-6. Objective questions :		
Abdomen, Lower Limb & Thorax	6 out of 8	6 X 1 = 6

## **Subject 2. Human Physiology**

### **Examinations Schedule**

<b>No.</b>	<b>Type</b>	<b>Marks</b>	<b>Month</b>
1.	1 <sup>st</sup> Periodic Assessment	50	October/November
2.	2 <sup>nd</sup> Periodic Assessment	50	March
3.	Internal Assessment Theory & Practical	100 (70+30)	Dec /January
4.	Preliminary Assessment*	160 (120+40)	May
5	Final University Theory Examination-two Papers each of 50 Marks	100 (50+50)	JUNE
6	Final University Practical examinations and Viva voce	40 + 20	July
*examination held as per final university examination pattern			

## Internal Assessment Marks Calculation (Physiology)

<b>Total Internal Assessment Marks</b>		
1	Theory	20 marks
2	Practical	20 marks
<b>Internal assessment marks Calculation</b>		
<b>1 Theory</b>		
	Lectures Attendance and day to day evaluation*	2.5 marks
	Internal assessment - One	5 marks
	Preliminary assessment	7.5 marks
	Periodic assessment -Two	5 marks
	<b>Total</b>	<b>20 marks</b>
<b>2 Practical</b>		
	Practical Attendance and day to day evaluation**	2.5 marks
	Internal Practical Assessment	5 marks
	Preliminary Assessment	7.5 marks
	Journal evaluation	5 marks
	<b>Total</b>	<b>20 marks</b>

\*Day to day evaluation for theory includes MCQs, Short Notes and objective questions

\*\*Day to day evaluation for Practical includes individual performance in Practical class and Journal Completion

# Final University Physiology Examination

## MARKS SCHEME FOR FINAL UNIVERSITY EXAM 2012-13

<b>Theory</b>			
		Marks	
Paper-I	50	3hrs	
Paper-II	20	3 hrs	
Oral Viva	20		
Internal Assessment	20		
<b>Total</b>	<b>140</b>		
<b>Practical</b>			
		Marks	
Haematology	15 Marks		
Clinical Physiology	10 Marks		
Calculation, graph, Chart, Photograph etc	10 Marks		
Instruments	05 Marks		
Internal Assessment	20 Marks		
<b>Total</b>	<b>60 Marks</b>		
<b>Division of Marks in Pairs of the practical examiners.</b>			
Pair-I	Oral Viva	20 Marks	All candidates
Pair-II	Haematology	15 Marks	All candidates
	Instruments	05 Marks	All candidates
Pair-III	Clinical Physiology	10 Marks	All candidates
	Calculation, graph Chart, Photograph etc	10 Marks	All candidates

## PAPER WISE DISTRIBUTION OF TOPICS IN HUMAN PHYSIOLOGY

PAPER-I	<ul style="list-style-type: none"><li>• Cell &amp; general physiology</li><li>• Hematology</li><li>• Nerve-Muscle physiology</li><li>• Digestive system</li><li>• Respiratory system</li><li>• Cardiovascular physiology</li><li>• ANS</li><li>• Body temperature &amp; BMR</li></ul>
PAPER – II	<ul style="list-style-type: none"><li>• Endocrinology</li><li>• Reproductive system</li><li>• Central Nervous system</li><li>• Higher Functions</li><li>• Special Senses</li><li>• Peripheral Nervous System (Reflexes, synapse, Receptors)</li><li>• Excretory system</li></ul>

## **Final University Physiology Examination**

Theory (Paper Scheme)

### **Paper I**

#### **Section I**

- Q1. Explain in detail (any 2 out of 3) 5 marks each. Total 10 marks
- Q2. (A) Write briefly on (any 2 out of 3) 3 marks each. Total 6 marks  
(B) Write briefly on (any 1 out of 2) 3 marks each. Total 3 marks
- Q3. Write briefly on (any 2 out of 3) 3 marks each. Total 6 marks

#### **Section II**

- Q4. Explain in detail (any 2 out of 3) 5 marks each. Total 10 marks
- Q5. (A) Write briefly on (any 2 out of 3) 3 marks each. Total 6 marks  
(B) Write briefly on (any 1 out of 2) 3 marks each. Total 3 marks
- Q6. Write answer to the point in 2-3 sentences. (any 6 out of 10) 1 marks each. Total 6 marks

### **Paper II**

#### **Section I**

- Q1. Explain in detail (any 2 out of 3) 5 marks each. Total 10 marks
- Q2. (A) Write briefly on (any 2 out of 3) 3 marks each. Total 6 marks  
(B) Write briefly on (any 1 out of 2) 3 marks each. Total 3 marks
- Q3. Write briefly on (any 2 out of 3) 3 marks each. Total 6 marks

#### **Section II**

- Q4. Explain in detail (any 2 out of 3) 5 marks each. Total 10 marks
- Q5. (A) Write briefly on (any 2 out of 3) 3 marks each. Total 6 marks  
(B) Write briefly on (any 1 out of 2) 3 marks each. Total 3 marks
- Q6. Write answer to the point in 2-3 sentences. (any 6 out of 10) 1 marks each. Total 6 marks



# Subject 3. Biochemistry

## **BIOCHEMISTRY: DISTRIBUTION OF TOPICS IN PAPER I & II**

### **PARER - I**

Cell membrane, chemistry and metabolism of Fat and Carbohydrates and porphyrins, Enzymes Body Fluids, pH buffers. Acid-base balance and regulation, Biological oxidation, Body defense mechanism and its application in medicine. Environmental Biochemistry and Cancer Biochemistry, Organ Function Tests, Newer Techniques.

### **PAPER – II**

Protein chemistry and Metabolism, Nucleic acids and Transcription, Replication, Molecular Biology, Genetic Engineering, Bio-Technology, Integration of Metabolism, Purine, Pyrimidine Chemistry, And Metabolism; Vitamins, Minerals and Nutrition.

<b>SCHEME FOR PAPER- I</b>		<b>50 MARKS</b>
<b>Section – I</b>		
Q-1 Applied aspects of topics covered under paper-I course.	2 short notes out of three	2 X 5 = 10
Q-2 Enzymes Porphyrins, Carbohydrates and Fat chemistry	3 short notes out of five	3 X 3 = 9
Q-3 pH, Homeostasis, body fluids cell, organ function test, newer techniques.	2 short notes out of three	2 X 3 = 6
		25
<b>Section – II</b>		
Q-4 Fat and carbohydrate metabolism	2 short notes out of three	2 X 5 = 10
Q-5 Body defense mechanism, Biological oxidation, environmental Bio-chemistry, Cancer Bio-chemistry	3 short notes out of five	3 X 3 = 9
Q-6 Interpretative clinical chemistry with case report OR short explanatory objective questions	6 out of eight	6 X 1 = 6
		25
<b>SCHEME FOR PAPER-2</b>		<b>50 MARKS</b>
<b>Section-I</b>		
Q-1 Applied aspects of topics covered under paper-II course	2 short notes out of three	2 X 5 = 10
Q-2 Nucleic acids, Chemistry and metabolism, molecular Biology	3 Short notes out of five	3 X 3 = 9
Q-3 Integration of metabolism and Nutrition	2 Short notes out of three	2 X 3 = 6
		25
<b>Section-II</b>		
Q-4 Protein metabolism, minerals and Protein chemistry	2 Short notes out of three	2 X 5 = 10
Q-5 Vitamins, Purine, Pyrimidine, chemistry and metabolism	3 Short notes out of five	3 X 3 = 9
Q-6 Interpretive chemistry with case report OR short explanatory objective questions	6 out of eight	6 X 1 = 6
		25

## Biochemistry Marks Calculation

Theory			Practical	
		Marks		Marks
Final University Exam	Paper -1	50	Final University Exam	40
	Paper – 2	50		
Internal		20	Internal	20
Oral Viva	Paper 1 Topics (10 marks)	20		
	Paper 2 Topics (10 marks)			
Total Theory Marks		140	Total Practical Marks	60
<b>Grand Total (Theory + Practical) Marks – 200</b>				

## BIOCHEMISTRY PRACTICAL EXAMINATION SCHEME

	Duration	Marks	Topics	
Practical No.1	1 Hour	20	Quantitative of Urea, Creatinine, Sugar, Cholesterol Bilirubin total proteins, alanine, transaminase, alkaline phosphatase, amylase, iron, electrolytes etc.	
Practical No.2	1 Hour	20	14	Quantitative test of Carbohydrates, proteins, reactions of milk, egg White, composition of gastric juice, saliva, C.S.F, normal urine, estimation of free and total acidity in gastric juice, Titrable acidity and ammonia in urine, Abnormal urine
			6	Interpretation of biochemical finding of patient( case report). Or selected tests

## Duration of MBBS Course for the Batch 2012

		Subjects	Duration	Date:
1	First MBBS	1) Human Anatomy 2) Human Physiology 3) Biochemistry	1 Year	1/08/2012 to 31/07/2012
2	Second MBBS	1) Pathology 2) Microbiology 3) Pharmacology 4) Forensic Medicine	1½ Years	1/08/2013 to 31/01/2015
3	Third MBBS	Part I 1) Ophthalmology 2) Oto-Rhino-Laryngology (ENT) 3) Community Medicine	1 Year	1/02/2015 to 31/01/2016
		Part II 1) Medicine 2) General Surgery 3) Obstetrics & Gynecology 4) Paediatrics	1 Year	1/02/2016 to 31/01/2017
		Total	4½ Years	
4	Internship		1 Year	February -March 2017 to February -March 2018