SYLLABUS OF MD (HUMAN PHYSIOLOGY)

1. GOAL

The aim of the course is to prepare P.G. student in the subject of Human Physiology who shall

1. Teach and train future undergraduate and postgraduate medical students in Human Physiology in Medical Colleges and Research Institutions.
2. Carry out and guide research and contribute to advancement of the subject,

LEARNING OBJECTIVES:

At the end of training course a P.G. student have thorough knowledge of the body with respect to

1. Cognitive domain

All the systems of the body should be studied with respect to:

a) Historical aspect
b) Evolution and development
c) Structure-gross and electron microscopic and functions at cellular level
d) Quantitative and quantitive aspects
e) Regulating mechanisms
f) Variations in physiological and pathological conditions
g) Applied physiology
h) Recent advances

2. Psychomotor domain :

P.G. students should be able -

a) To perform human and animal (mammalian and amphibian) experiments, Haematology experiments based on biophysical principles.
b) To acquire history taking and clinical examination skills.

3. **Affective domain :**

a) The P.O. students should develop communication skills to interact with students, colleagues, superiors and other staff members.

b) They should be able to work as a member of a team to carry out leaching as well as research activities.

c) They should have right attitude (medical ethics) toward teaching profession.

2. COURSE DISCRIPTION

1. Eligibility M.B.B.S.
2. Selection shall be through a competitive written examination of the objective variety conducted by state entrance board.
3. Duration of course shall be three years.

3. COURSE CONTENT

Since the students would be working in the department for three years, the time plan and proposed division of course content will be on the following lines.

First Year:

1. **Theory:**
   - ❖ To attend the U.G. lectures and study in detail the following topics; Topics - General physiology. Environmental physiology, Nerve, Muscle, Blood, Endocrines, Reproduction, Alimentary system. Also lectures on Metabolism in Biochemistry.
   - ❖ To attend P.O. lectures.

2. **Practicals:**
   - ❖ To attend the practicals and demonstrations tought by senior teachers for U.G. students.

     First Term: Haematology, Nerve, Muscle, Heart.

     Second Term: Clinical examination.
   - ❖ To learn basic techniques and instruments used for U.G. practicals.
   - ❖ Micro teaching sessions for practicals,

3. **To learn evaluation techniques.**
4. **Research :**

- ❖ To attend and present Journal Club/Seminars.
- ❖ Visits to library and get acquainted with scientific journals.
- ❖ Second half of First year-review of literature to choose the topic of the dissertation.

5. **Exposure to Medical Education and Technology Workshops.**

Second Year:

1. **Theory:**
   - ❖ To attend the U.G. lectures and study in detail the following topics.
     Topics - Renal physiology, Cardio Vascular System, Respiratory system, Exercise physiology, Special senses. Central Nervous System.
   - ❖ To attend demonstrations and lectures in Anatomy in CNS,
   - ❖ To attend the P.G. lecture.

2. **Practical:**
   - ❖ To perform amphibian and mammalian experiments, inclusive of basic techniques of handling of laboratory animals, anaesthesia, dissertation and instruments

3. **To learn in-details the teaching learning methods and the methods of evaluation in practicals and theory.**

4. **Teaching :**
   - ❖ Small group teaching in practical and demonstrations.
   - ❖ Should learn to use audiovisual aids.
5. **Research:**
   - ❖ To carry out dissertation work and to learn basic topics in statistics.

6. To attend meeting organized by clinical departments
    - ❖ Two months clinical posting (In Medicine- 1 month, elective-1 month such as Family Planning, Radiodiagnosis, Chest, Blood Bank etc) Posting in Medicine to understand Pathophysiology of disease processes, Also leant the basic principles of diagnostic technique and management,

Third Year:

1. **Research:**
    - ❖ Completion and submission of dissertation after completing 2 years (4 terms) of PG and 6 months, prior to commencement of examination. If not submitted in stipulated time a term may be extended.
    - ❖ Writing articles for publication.

2. **Teaching:**
    - ❖ To teach all practicals to U.G. students.
    - ❖ To conduct microteaching sessions for Ist year P.O. students.
    - ❖ To teach theory topics in small groups for U.G. students.

3. **Practicals:**
    - ❖ To carry animal experiments independently.
    - ❖ Journal completion

      - UG as usual

      - PG practicals

      - Clinical posting record.

THEORY TOPICS:

In addition to U.G. syllabus

1) General Physiology:

- Biological membranes with details of membrane receptors.
- Physiology of growth and senescence,
- Principles and applications- Genetics

2) Environmental Physiology:

- Physiology of deep sea diving
- Space physiology
- High altitude physiology
- Temperature regulation-Hypothermia, Hyperthermia
- Polution — air, noise

3) Nerve:

- Experimental techniques to study bioelectrical phenomena (Voltage clamp technique, cathod ray socilloscope, S.D. curve, nerve conduction studies)
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4) Muscle:

- E.M.G. details.
- Smooth muscle
- Pathophysiology of muscle disorders

5) Blood:

- Immunity - details.
- Plasmin system
- Tissue typing

6) Cardio Vascular System:

- Echocardiography and vector cardiography, ECG.
- Stress test, CT scan.
- Cardiac catheterisation and other invasive procedures.
- Flowmeters/Ultrasonography

7) Respiratory system;

- Lung function tests- details
- Blood gas analysis
- Hyperberic oxygen
- Artificial respiration/Cardiopulmonary resuscitation

8) Endocrines:

- Radio immune assay

9) Reproductive System:

- Invitro fertilization
- Contraceptives - details
- Neonatal and foetal physiology

10) Alimentary System:

- Gastro intestinal hormones - details
- Gastro intestinal motility - details
- Absorption of nutrients

11) Renal Physiology:

- Artificial kidney
- Acid-base balance - details
- Cystometry

12) Central Nervous system:

- Higher function

  (Speech, memory, learning, behavioural physiology, sleep and wakefulness)
- Voluntary movements

- Details of the following topics covering physiological anatomy, connection- Intrinsic, Extrinsic, methods of study of functions With diagnostic techniques, functions
- Physiological basis of manifestations of the diseases of the following
    i. Cerebral cortex
    ii. Basal ganglia
    iii. Cerebellum
    iv. Reticular formation
    v. Thalamus
    vi. Hypothalamus
    vii. A.N.S.
    viii. Limbic system
- Any recent techniques - principles and their applications
- CT scan, MRI

13) Special senses:

- Audiometry
- Relinoscopy, fundoscopy, computerized perimetry
- Electrophysioiogy of retina, chochlea

14) Exercise Physiology:

- Concept of health fitness
- Physical fitness, its coponents and evaluation
- Adaptions due to prolonged conditioning

15) Nutrition:

- Relationship of diet anddiseases, starvation., obesity

16) Stress relaxation technique:

- Principles of various stages of yoga, breathing exercises, Meditation and others.

PRACTICALS:

In addition to UG syllabus: To be able to perform hematology demonstrations-Reticulocyte count, platelet count. Interpretation of peripheral and bone marrow smear.

1) Recording of blood pressure and respiration in mammalian animal.

- ❖ Effects of vagal stimulation and ablation
- ❖ Effects of Asphyxia
- ❖ Actions of Adrenalin
- ❖ Actions of Acctylcholme
- ❖ Clamping of carotid arteries
- ❖ Circulatory shock

2) Perfusion of mammalian heart

- ❖ Effects of various factors

3) Recording of smooth muscle activities and effects of various factors

4) Clinical presentations — common cases

5) Human experiments - EMG> ECG, Spirometry, Ergography, Nerve conduction

6) Interpretation of biochemical reports.

3. TEACHING LEARNING METHODS:

The teaching learning activities would consists of

1) Attending U.G, lectures

2) Attending P.G. lectures

3) Microteaching sessions

4) Journal clubs moderated by teachers

5) Seminars, symposia, panel discussion of suitable topics moderated by teachers

6) Lectures and practicals prepared and presented by students under supervision

7) Attend and participate in conferences, workshops and share knowledge and Experiences with others.

8) Visits to various clinical departments to gain the knowledge of various techniques used lo study the functions of various systems,

9) Educational exchange programme

4. **Recommending reading:**

Text book, of Physiology:

- Text book of Medical Physiology- Guyton & Hail
- Review of Medical Physiology - William Ganong
- Berne and Levy – Physiology
- S, Weight's Applied Physiology
- Vander's Human Physiology
- Best and Taylor
- Monographs
- Comparative Physiology - Prosser and Brown
- Biostatistics
- Medical Education Technology:

Journals:

- Annual review of physiology
- American J, of Physiology
- Physiological review
- Recent advances in Physiology
- Indian j- of Phy. and other related clinical journals ,
- British Medical Bulletin

5. EVALUATION:

UNIVERSITY EXAMINATIONS

- After successful completion 3 Years' residency

Theory Examination: Each paper 100 marks – 3 hrs duration sections with marks

	Sections with marks
Paper I	General Physiology, Cellular Physiology, Applied Biochemistry, Biophysics & Biostatistics, History of Physiology, Comparative Physiology– I **Total = 100 Marks**
Paper II	Nerve Muscle, Blood, Cardio Vascular system, Respiratory system, Gastrointestinal system, Renal Physiology – II **Total = 100 marks**
Paper III	Endocrine, Special senses, Nervous system, Reproductive system – III **Total = 100 marks**
Paper IV	Applied Physiology, Exercise Physiology, Nutrition, Recent advances, Physiology of Yoga, Medical Education Technology & Medical Ethics – IV **Total = 100 marks**
	TOTAL THEORY = 400

Exam Pattern Marks Distribution for each paper –

Q. 1 Long Answer Questions (20 marks)

Q. 2 Long Answer Questions (20 marks)

Q. 3 Write notes on (Any Six out of Seven) (60 marks) (6 X 10)

Total = 100 marks

Minimum passing marks in each head 40% and aggregate: 50% in all papers

Practical Examination:

Sr. No.	Description	Marks	Preparation time	Assessment time
1	Human experiment • Long Experiment-50 marks • Short Experiment-25 marks	75		
2	Amphibian	25		
3	Mammaliam	25		
4	Hematology	50		
5	Clinical presentation • Long Case- 50 marks • Short Case- 25 marks	75		
6	Microteaching	50		
7	Viva	100		
	TOTAL PRACTICAL	**400**		

Minimum passing marks: 50% separate in practical and viva