Pravara Institute of Medical Sciences
(Deemed University)

Loni Bk - 413 736, Tal. Rahata, Dist. Ahamadanagar (M.S.)

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Syllabus
M.D. (Human Physiology)

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SYLLABUS IN M.D. HUMAN PHYSIOLOGY POST GRADUATE TEACHING / TRAINING COURSE FOR M.D. DEGREE

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 should 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) Comparative physiology
d) Structure – gross and electron microscopic and functions at cellular level
e) Qualitative and quantitative aspects
f) Regulating mechanisms
g) Variations in physiological and pathological conditions
h) Applied physiology
i) 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.G. 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 teaching as well as research activities.

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

II. 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.

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,Renal physiology, Cardiovascular physiology,Respiratory system, Exercise physiology,Special senses,Central nervous system. Also lectures on Metabolism in Biochemistry.
- To attend P.G. lectures at other faculty/P.G. centers. in consultation with concerned authority.

2) Practicals:

- To attend the practicals and demonstrations taught by senior teachers for U.G. students.
  First Term: Hematology, Nerve, Muscle, Heart.
  Second Term : Clinical examination.

- To learn basic techniques and instruments used for U.G. practicals.

- Micro teaching sessions for practicals for UG in presence of senior faculty.

3) **To learn evaluation techniques.**

4) **Research :**

- To attend and present Journal Club/ Seminars.
- Visits to library and get acquainted with scientific journals.
- In first three months of first term- review of literature to choose the topic of the dissertation and its submission in consultation of respective PG guide.
- To carry out research under supervision of PG guide and to learn basic statistical methods in consultation with concerned department.

5) **Exposure to Medical Education and technology Workshops, held either by local faculty members or PIMS.**

Second Year:

1. **Theory :**

- To attend demonstrations and lectures in anatomy in CNS in consultation with HOD anatomy.
- To attend the P.G. lectures at other P.G. centers in consultation with concerned authority.

2. **Practicals:**

- To perform amphibian and mammalian experiments including of basic techniques of handling of laboratory animals, anesthesia, dissection and instruments.

3. To learn in details the teaching learning methods and the methods of evaluation in practicals and theory to be covered in MET session.

4. **Posting in other departments:**

- Two months of clinical posting - First month in medicine, second month will include posting of one week duration each in family planning(OBGy), Radiology,Chest & Blood Bank. Posting in medicine, to understand pathophysiology of disease processes. Also learn the basic principles of diagnostic technique and management.
- During first month of posting(medicine) students have to maintain a log book ,in which he/she has to enter minimum ten (10) cases to be signed by HOD medicine. Details of second month posting should be mentioned in the same log book.

Last Year (Third Year) :

1) Research

- Completion and submission of dissertation (four copies) at the end of V th term of PG training and 6 months, prior to commencement of examination. If not submitted in stipulated time a term may be extended.
- (As per ref no: **PIMS/COE-II/A15/2008/1416,Date:19.12.2008)**
- At the time of submission of Dessertation & Exam form that a student will be granted a term provided he /she have 80% attendence.
- It is necessary to publish at least one research paper based on his work in reputed National / International Journal before he submits his/her Dissertation. **OR**
- He / she should present his / her research paper based on his work in at least one state / National level conference before appearing for the exams.
- The list of National / International conference / Publications of paper in National /International Journals should be attached with examination form. If there is no publication / paper presentation by the student, he / she will not be eligible to appear for university exam.

2) Practicals :

- To carry animal experiments independently.
- Journal completion
  - UG as usual (With applied approach)
  - PG practicals
  - Clinical posting record.

THEORY TOPICS

In addition to UG syllabus

1) General Physiology :

- Biological membranes with details of membrane receptors
- Physiology of growth and aging.
- Principles and applications of genetics.

2)Environmental Physiology

- Physiology of deep sea diving
- Space physiology
- High altitude physiology
- Temperature regulation – Hypothermia, Hyperthermia
- Pollution – air, noise.
- Radiation physiology

3) Nerve:

- Experimental techniques to study bioelectrical phenomena (Voltage clamp technique, cathode ray oscilloscope, S.D. curve, nerve conduction studies)

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.
- Flow meters/ Ultrasonography

7) Respiratory system :

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

8) Endocrines :

- Radio immuno assay

9) Reproductive system

- In vitro fertilization
- Contraceptives – details
- Neonatal and fetal 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 functions
  (Speech, memory, learning, behavioral physiology,sleep and wakefulness)
  Voluntary movements
- Details of the following topics covering physiological anatomy, connections-intrinsic, extrinsic, methods of study of functions with diagnostic techniques, functions and 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
- Retinoscopy, fundoscopy, computerized perimetry
- Electrophysiology of retina, chochlea

14) Exercise Physiology :

- Concept of health fitness
- Physical fitness, its components and evaluation
- Adaptations due to prolonged conditioning

15) Nutrition :

- Relationship of diet and diseases, starvation, obesity

16) Stress relaxation technique:

- Principles of various types of yoga, breathing exercises, Meditation and biofeedback techniques.

17) **Comparative physiology of all systems**

18) **Recent Advances.**

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) Interpretation of graph showing recording of blood pressure and respiration in mammalian animal (graphs/computer aided teaching-simulation techqnique)

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

2) Perfusion of mammalian heart (Rabbit/Guinea pigs)

- 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.

II TEACHING LEARNING METHODS

The teaching learning activities would consists of

1) Attending U.G. lectures
2) Attending P.G. lectures
3) Micro teaching 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 to study the functions of various systems.
9) Educational exchange programme.
10) Medical Educational Technology in consultation with concerned authorities of PIMS/MUHS.

I. Recommended reading :

Text book of Physiology :

- Text book of Medical Physiology- Guyton & Hall
- Review of Medical Physiology – William Ganong
- Berne and Levy – Physiology
- S. Wright's Applied Physiology
- Vander's Human Physiology
- Best and Taylor
- Monographs
- Comparative Physiology – Prosser and Brown
- Biostatistics -Mahajan
- Medical Education Technology

Journals:

- Annual review of physiology
- American journal of Physiology
- Physiological review
- Recent advances in Physiology
- Indian Journal of Physiology and Pharmacology and other related clinical journals
- British Medical Bulletin

IV. EVALUATION:

- Students will be evaluated by conducting:

1. Ist year : I terminal + Preliminary examination with UG students
2. IInd year : Third term – theory examination on CVS,RS,Blood,Gen.Phy.
   Fourth term – theory examination on Nerve muscle, Endocrines,GIT,Repro.
3. III rd year :Fifth term – CNS,Special senses,Excretion
   Sixth term – Theory+Practical examination as per UIMS pattern.

- It is mandatory to send six monthly progress report of the student to Principal RMC signed by HOD Physiology as per proforma provided.
- Departmental evaluation will be based on securing minimum 35% separately in theory and practicals by by the student as eligibility criteria for appearing in University examination.

Heads of passing : A) Theory **B) Practical + Viva**

Standard of Passing : A candidate shall obtain in each head of passing 50% of the total marks.

A) Theory Examination : 4 Papers, each of 100 marks
Duration of each paper : 3 hrs.

Each paper will have 3 long questions (20 marks each) and 1 short note question with 4 notes (10 marks each), covering all topics included in the syllabus

Paper I General and cellular physiology, applied Biochemistry, Biophysics and Biostatistics

Paper II Advanced systemic Physiology and environmental Physiology.

Paper III History of Physiology, Comparative Physiology and Applied Physiology.

Paper IV Recent advances,Medical Education Technology(MET), Medical ethics.

Instructions regarding weightage given to each system be communicated to paper setters and examiners.

B) Practical Examination : 400 Marks

1) Amphibian and Mammalian experiments, graphs
2) Clinical case presentation and discussion
3) Human experiments
4) Hematology experiments

Distribution of Marks (Practicals)

- Human experiment (I & II) : 50
- Amphibian : 30
- Mammalian : 50
- Hematology (I & II) : 60
- Clinical presentation : 50
- Micro teaching : 30
- Viva :100
- Biochemistry Data : 30

Total : 400

C) Viva Examination: Duration – 1 hour per student
(Combined viva by all examiners)

1. General Viva — 30 minutes
2. Viva on dissertation — 20 minutes
3. Micro teaching — 10 minutes