Pravara Institute of Medical Sciences
(Deemed to be University)
Loni Bk - 413 736, Tal. Rahata, Dist. Ahmednagar (M.S.)
NAAC Re-accredited with 'A' Grade (CGPA 3.17)

Established Under Section 3 of UGC Act 1956, Vide Govt. of India Notification No. F.9-11/2000-U.3, dated 29th September, 2003

Syllabus
M.Sc. Medical Physiology

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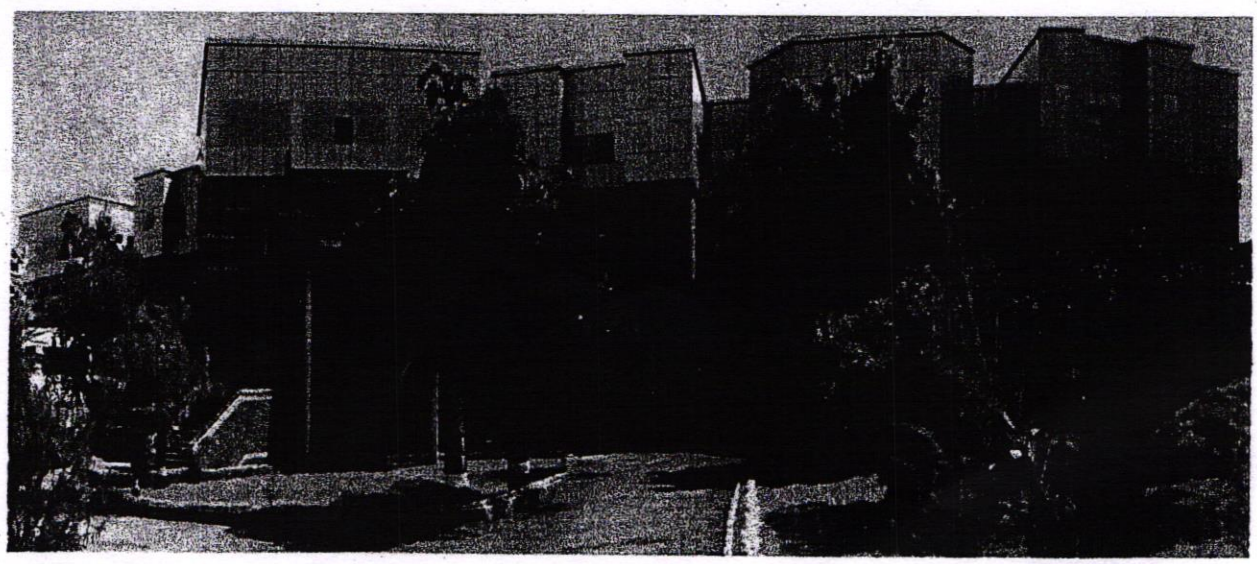
M.Sc Medical Physiology

Approved Vide Academic Council Resolution
No. 07 / AC / 2009 dated 15th Jan. 2009.



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Pravara Institute of Medical Sciences

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Syllabus in the M.Sc Human Physiology Post Graduate Teaching /Training course for M.Sc Degree.

Goal

The candidate qualifying or the award of M.sc (Physiology) should be able to:

1. Demonstrate comprehensive understanding of physiology as well as that of the applied disciplines;
2. Demonstrate adequate knowledge of the current developments in medical sciences as related to physiology;
3. Teach undergraduates and postgraduates in physiology;
4. Plan and conduct research
5. Plan educational programs in physiology utilizing modern methods of teaching and evaluation; and
6. Organize and equip physiology laboratories.

LEARNING OBJECTIVES :

At the end of training course a P.G. student have through 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.

Hematology 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 toward teaching profession.

II. COURSE DISCRIPTION

1) Eligibility B.Sc Zoology/Microbiology/Botany/Physiology

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 & half years.

COURSE CONTENT

Since the students would be working in the department for three & half 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 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.

3) **Research** :

- To attend and present Journal Club/ Seminars as per schedule.
- Visits to library and get acquainted with scientific journals.
- In first six months of first year- review of literature, to choose topic of

the dissertation and its submission in consultation of respective PG guide.

- To carry out research under supervision of PG guide and learn basic stastistical methods in consultation with concerned department.

4) 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 basic techniques of handling of laboratory animals, anesthesia, dissertation and instruments.

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

- Small group teaching in practicals and demonstrations
- should learn to use audio usual aids

Last Year (Third Year & Half Year) :

1) Research

- Completion and submission of dissertation after at the end of six terms (6 terms) of PG training and 6 months, prior to commencement of examination. If not submitted in stipulated time 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 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 exam.

2) **Teaching**

- To teach all practicals to U.G. students in presence of senior faculty
- To conduct micro teaching session for Ist year PG students in presence of

senior faculty.
- To teach theory topics in small groups for UG students.

3) **Practicals** :
- To carry animal experiments independently
- Journal completion
  - UG as usual
  - PG practicals

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 techniques)
- Effect of vagal stimulation and ablation
- Effects of Asphyxia
- Actions of Adrenaline
- Actions of Acetylcholine
- Clamping of carotid arteries
- Circulatory shock

2) Perfusion of mammalian heart (Rabbit/Guinea pig)
- Effects of various factors

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

4) Clinical examination

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

6) Interpretation of biochemical reports.

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 in consultation with concerned authorities of PIMS

10)Medical Educational Technology in consultation with concerned authorities of PIMS/MUHS.

Theory Topics:

In addition to regular UG topics

1) General Physiology :

- Biological membranes with details of membrane receptors
- Physiology of growth and aging.
- Principles and applications, 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, cathod ray socilloscope, 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

- 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, behavioral physiology,sleep and weak fullness)
  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
- Retinoscopy, fundoscopy, computerized perimetry
- Electrophysiology of retina, chochlea

14) Exercise Physiology :

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

15) Nutrition :

- Relationship of diet and and diseases, starvation, obesity

16) Stress relaxation technique:

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

17) Comparative physiology of of all systems.

18) Recent Advances

I. **Recommending reading :**

- 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
- Medical Education Technology

Journals:

- Annual review of physiology
- American J. 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,Reproduction.

3. III rd year :Fifth term – CNS,Special senses, Excretion.
   Sixth & seventh term – Theory+Practical examination as per PIM pattern.

- It is mandatory to send six monthly progress report of the student to Princip RMC signed by HOD Physiology as per proforma provided.
- Departmental evaluation will be based on securing minimum 35% separately 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 the heads 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 Physiology & Cellular Physiology, Applied Biochemistry, Biophysics & Biostatistics.

Paper I: Systemic & Applied Human Physiology

Paper III: History of Physiology, Biographics and Essay

Paper IV: Recent advances, Medical education technology(MET),Medical Eth

Instructions regarding weight age given to each system be communicated to pa setters and examiners.

B) Practical Examination : 200 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 20
- Amphibian 20
- Mammalian 20
- Hematology 25

- Clinical presentation 25
- Micro teaching 25
- Viva 50
- Biochemistry data 15

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