SYLLABUS FOR

M.D. PHYSIOLOGY
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PREAMBLE

The purpose of this program is to standardize Physiology teaching at Post Graduate level throughout the country so that it will benefit in achieving uniformity in undergraduate teaching as well.

Programme Objectives

A Candidate upon successfully qualifying in the M.D (Physiology) examinations, should be able to:

a) Be a competent Physiologist

b) Effectively teach undergraduate medical (and Paramedical) students, the basic physiological mechanisms of human body, with reference to their implications in the pathogenesis of diseases Patho physiology and the physiological basis of their management.

c) Conduct such clinical / experimental research as would have significant bearing on human health and patient care.

d) Interact with the allied departments by rendering services in advanced laboratory investigations.

e) Acquire skills in conducting collaborative research in the field of physiology & allied sciences.

f) Must be able to demonstrate to the students how the knowledge of physiology can be used in a variety of clinical settings to solve diagnostic and therapeutic problems.

Specific Learning Objectives

a) Effectively teach undergraduate medical students the basic physiological mechanisms of human body, with reference to their implications in the pathogenesis of diseases (pathophysiology) and their management.

b) Trained to conduct such clinical and experimental research, as would have a significant bearing on human health and patient care.

c) Encourage interaction with the allied departments by rendering services in advanced laboratory investigations and relevant expert opinion.

d) Encourage the student to participate in various workshops / seminars /journal clubs / demonstration in the allied departments, to acquire various skills for collaborative research.

e) Uphold the prestige of the discipline amongst the fraternity of doctors.
<table>
<thead>
<tr>
<th>Training Period</th>
<th>3 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st yr</td>
<td>Learns the basics in Physiology in the Department of Physiology, Takes practical classes for UG s Training in teaching methods (attends a workshop) Computer training in Word Processing, Power point presentation &amp; Internet Browsing</td>
</tr>
<tr>
<td>2nd yr</td>
<td>1st 6months: Posting in the clinical &amp; other basic Science Department Training in Research Methodology. Chooses topics for Dissertation &amp; submits to the University 2nd 6 months: Works on the Dissertation</td>
</tr>
<tr>
<td>3rd yr</td>
<td>Actively involves in U.G. teaching Prepare for the University Examinations Completion of Dissertation</td>
</tr>
</tbody>
</table>

**M.D. PHYSIOLOGY**

**DETAILS OF TRAINING SECOND YEAR**

| I. Medical Ward | : 15 days |
| II. Cardiology Department | : 15 days |
| III. Neurology Department | : 15 days |
| IV. Chest Medicine | : 15 days |
| V. ENT & Ophthal | : 15 days |
| VI. Medical Gastroenterology | : 15 days |
| VII. Department of Endocrinology | : 15 days |
| VIII. Central Lab | : 15 days |
| IX. Pathology + Microbiology | : 15 days |
| X. Blood Bank | : 15 days |
| XI. Anatomy (Histology Laboratory) | : 15 days |
| XII. Department of Biostatistics and Research Methodology | : 15 days |
| XIII. Department of Physiology | : 6 months |

**Total** : 12 months

*The past graduate Students will attend the clinical postings in the forenoon session between 10 a.m. to 1 p.m. and attend to his/her Departmental teaching work in the afternoon session.*
Post-Graduate Examinations:

The post-graduate examinations should be in 3 parts:

1) Thesis, to be submitted by each candidate at least 6 months before the date of Commencement of the theory examination
2) Theory: There shall be four theory papers- as given separately
3) Practicals and Viva/Oral following theory Examination

SYLLABUS
(Theory Only)

I. GENERAL PHYSIOLOGY:

1) Body fluids
2) Membrane Potentials & Action Potentials
3) Functional Morphology of Cell
4) Homeostasis
5) Aging

II. PHYSIOLOGY OF EXCITABLE TISSUE:

1) Nerve
2) Skeletal Muscle
3) Cardiac Muscle
4) Smooth Muscle

III. NEUROPHYSIOLOGY:

1) Synapse.Function & transmission
2) Initiation of Impulses of Sense organs
3) Reflexes
4) Cutaneous & Deep Visceral sensation
5) Control of Posture & Equilibrium
6) Sleep Arousal Mechanisms, the Electrical Activity of the Brain
7) Central Regulation of Visceral Function
8) The Autonomic Nervous System
9) Neural Basis of Instinctual Behavior & Emotions
10) Higherfunctions of the Nervous system: Conditioned Reflexes, learning It Related Phenomena.

IV. SPECIAL SENCE

1) Vision
2) Hearing
3) Smell & Taste
V. **BLOOD:**
1) Composition and functions
2) Structure, functions and origin of blood cells
3) Immunity
4) Blood groups
5) Haemostasis
6) Reticuloendothelial System

VI. **ENDOCRINOLOGY & METABOLISM:**
1) Energy Balance, Metabolism & Nutrition
2) The Thyroid Gland
3) Endocrine functions of the Pancreas & Regulation of Carbohydrate Metabolism
4) The Adrenal Medulla & Adrenal Cortex
5) Hormonal Control of Calcium Metabolism & the Physiology of bone
6) The Pituitary Gland
7) The Gonads: Development & Functions of the Reproductive System
8) Other Endocrine Organs

VII. **GASTEROINTESTINAL FUNCTION:**
1) Innervation of GIT
2) Secretion
3) GI motility
4) Digestion & Absorption
5) Regulation of Gastrointestinal Function

VIII. **CIRCULATION:**
1) Circulating Body Fluids
2) Origin of the Heart beat & the Electrical activity of the Heart
3) The heart as a pump
4) Dynamics of Blood & Lymph Flow
5) Cardiovascular Regulatory Mechanisms
6) Circulation through Special Regions
7) Cardiovascular Homeostasis in Health & Diseases

IX. **RESPIRATION:**
1) Pulmonary Function
2) Gas Transport between the lungs & the Tissue
3) Regulation of Respiration
4) Respiratory Adjustments in Health & Diseases
5) Environmental Physiology
6) Bronchoscopy
7) ICD
X. **EXCRETORY SYSTEM**
1) Formation & Excretion of urine
2) Renal Function It Micturition
3) Regulation of Extracellular Fluid Composition & Volume
4) Skins its functions.

**SKILLS TO BE ACQUIRED DURING THE CLINICAL POSTINGS :-**

I. **MEDICAL WARD POSTINGS :**
1) General examination and Examination of a different systems in patient. Learning the pathophysiology of common medical problems
2) Should learn to carry out all investigative procedures
   a) Drawing of Blood
   b) Pleural tap
   c) Lumbar Puncture
3) Interpretation of Data
   a) X-rays
   b) ECG
   c) Special investigative procedures

II. **CARDIOLOGY DEPARTMENT**
1) Learn to record and interpret E.C.G., Echo, Doppler, Cardiac Monitor.
2) Learn the procedure of Cardiac Catheterisation, Resuscitation technique.

III. **NEUROLOGY DEPARTMENT**
1) Clinical Examination of neurology patient
2) Principles of EEG, EMG, ENMG, Evoked potential
3) Interpretation of EEG, EMG, ENMG, Evoked potential
4) Nerve conduction studies

IV. **CHEST MEDICINE**
(Pulmonary function Laboratory)
1) Pleural tapping
2) Spirometry - procedure & Interpretation
3) Bronchoscopy
4) ICD

V. **MEDICAL GASTROENTEROLOGY**
1) Endoscopy Technique
2) MRCP and other procedures

VI. **ENDOCRINOLOGY INCLUDING DIABETOLOGY**
1) Clinical Examination of endocrinology disorder patients
2) Discussion and treatment guidelines.
3) Radio immuno assay techniques
VII. CLINICAL BIOCHEMISTRY
1) Learn the methodology of all clinical Biochemical tests and basis of operation of various equipments and interpretation of data.

VIII. HAEMATOLOGY DEPARTMENT - CLINICAL PATHOLOGY
1) Procedure and discussion of results
2) Haematology Investigations

IX. BLOOD BANK
1) Collection, Storage, transfusion of blood.
2) Transfusion Reaction (Lecture) - 2 hrs
3) Blood grouping and cross matching

X. ANATOMY
(Histology Laboratory)
1) Section cutting, slide preparation, staining techniques, mounting of specimens.
2) Histology of normal structure, study of human body at various levels particularly Head, Neck, Thorax and Abdomen.

XI. COMMUNITY MEDICINE
A postgraduate candidate should BE TRAINED IN Basic Medical Statistics

XII. UROLOGY
1) Urodynamic study
2) Stenting
3) IVU

XIII. OBG
1) Fertility tests
2) HSG, USG Including FOLLICULAR STUDY
3) Tests for infertility

XIV. PAEDIATRICS
1) Nutrition problems in children

XV. ENT
Audiometry, Vertigo clinic, ENT procedures

XVI. ICU
Manging Acid-base disorders

XVII. OPHTHALMOLOGY
All Opthalmic Procedures

XVIII. STUDY AND TRAINING IN THE DEPARTMENT OF PHYSIOLOGY
DETAILS OF PRACTICALS

MAMMALIAN EXPERIMENTS:
(Rabbit/Guinea Pig/Rat)
1) In vitro experiments
   - Intestinal movements

AMPHIBIAN EXPERIMENTS: (Frog)
1) Vagal stimulation & action of atrophine & nicotine
2) Perfusion Experiments on isolated heart
3) Isometric contraction
4) Frogs skeletal muscle contraction experiments
5) Cardiac muscle experiments

SLIDES:
HISTOLOGY slides of all tissues and organs of the body

CHARTS:
Interpretation of recordings: ECG, EEG, EMG, ERG, AUDIOGRAM, SPIROGRAPH,
FTM, GTT, Electrophoresis, Blood Gas Analysis, Flow-Volume Curves

HAEMATOLOGY:
1) Red blood Cell count
2) Total White Cell count
3) Differential Leucocyte count
4) Reticulocyte count
5) Platelet count
6) Eosinophil count
7) Arneth index
8) Blood grouping & typing
9) Hb% estimation
10) BT & CT
11) ESR & PCV

HUMAN EXPERIMENTS:
1. Examination of:
   1. Respiratory system
   2. Cardiovascular system
   3. Nervous System
II. Perform or record & interpret the data or finding:

1) Autonomic Function Tests
2) ECG, EMG, EEG
3) Spirometry
4) Perimetry
5) Stethography
6) Respiratory efficiency & endurance
7) Recording of respiratory movements using stethograph and effects
   of: Hyperventilation, swallowing, speech, breath holding, exercise.

PEDAGOGY:

The teaching skills of the candidate will be assessed. The candidate will be given a topic by
the 4 Examiners at the end of the first day of the practical examination for a Lecture presentation
on the next day to an imaginary audience. The Examiners shall evaluate the candidate’s ability
(Trial class room lecture for under graduate students)

PATTERN OF EXAMINATION: *

FOUR PAPERS -100 Marks each  3 Hours duration each

<table>
<thead>
<tr>
<th>Theory</th>
<th>Title</th>
<th>Duration</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Paper-I</td>
<td>General Physiology. Blood</td>
<td>3hrs</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Digestion and Tissues of the Body</td>
<td></td>
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<tr>
<td>Paper II</td>
<td>Circulation, Respiration, Environmental Physiology, Excretion &amp; Comparative Physiology</td>
<td>3hrs</td>
<td>100</td>
</tr>
<tr>
<td>Paper III</td>
<td>Nervous System and Special Senses</td>
<td>3hrs</td>
<td>100</td>
</tr>
<tr>
<td>Paper IV</td>
<td>History of Medicine, Recent advances In clinical physiology, Endocrinology And Reproductive system</td>
<td>3hrs</td>
<td>100</td>
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Total 400

Distribution of Marks:

2 Essays 2 x 20 = 40 Marks
10 Short Notes 10 x 6 = 60 Marks
Total 100 Marks
## PRACTICAL EXAMINATION (2 days)

<table>
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<tr>
<th>Activity</th>
<th>Marks</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Mammalian (Dog) Graphs</td>
<td>20</td>
<td>1 hr</td>
</tr>
<tr>
<td>Mammalian Isolated Organ</td>
<td>20</td>
<td>1 hr</td>
</tr>
<tr>
<td>Amphibian - Heart or Skeletal Muscle</td>
<td>40</td>
<td>1 hr</td>
</tr>
<tr>
<td>Haematology</td>
<td>40</td>
<td>1 hr</td>
</tr>
<tr>
<td>Clinical Examinations</td>
<td>40</td>
<td>1 hr</td>
</tr>
<tr>
<td>Clinical Experiments (Human)</td>
<td>40</td>
<td>1 hr</td>
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<td><strong>Total</strong></td>
<td><strong>200</strong></td>
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<table>
<thead>
<tr>
<th>Activity</th>
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<tbody>
<tr>
<td>Pedagogy</td>
<td>20</td>
<td>20 min</td>
</tr>
<tr>
<td>Log Book</td>
<td>20</td>
<td>1 hr</td>
</tr>
<tr>
<td>Orals</td>
<td>60</td>
<td>1 hr</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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**NOTE**: No. of candidates to be examined 4 per day for practical / viva

## DISSERTATION: APPROVED/NOT APPROVED

(No Marks)

### “MARKS QUALIFYING FOR A PASS”

<table>
<thead>
<tr>
<th></th>
<th>Maximum Marks</th>
<th>Qualifying Marks for a Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Theory Examination</td>
<td>400</td>
<td>200</td>
</tr>
<tr>
<td>2. Practical Examination</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>3. Oral/Viva, Pedagogy &amp; Log Book</td>
<td>100</td>
<td>No Minimum</td>
</tr>
<tr>
<td>4. Aggregate of Practical &amp; Viva (2+3)</td>
<td>300</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>700</strong></td>
<td><strong>350</strong></td>
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List of Books, Periodicals and Journals

(Only a short list has been provided. The postgraduate candidate should widen his knowledge by exhaustive reading.)

TEXT BOOKS

1. Text Book of Medical Physiology - Guyton. C.
2. Best and Taylor Physiological Basis of Medical Practice John B. West.
4. Review of Medical Physiology - Ganong, W.F.
5. Clinical Physiology - Camp Bell., Moran, E.J.
7. Anatomy Regional and applied - Last, R.J.

REFERENCE BOOKS

5. Respiratory Physiology - Slonim and Chapin.
10. Practical Haematology - Dacie and Lewis.
13. Clinical Examination A Text Book for students and Doctors by Teachers of the Edinburgh Medical School-Maclood J. Munro J.
15. Wintrobes Haematology.
PRACTICAL TEXT BOOKS:
1. Text Book of Practical Physiology - Ransdae.
2. Practical Physiology - Ghai.
5. Liddle & Sherrington.
6. Experimental Physiology by B.L. Andrew D.Se.
7. Experimental Physiology for medical students by Harnis D.T.

PERIODICALS
1. Annual Review of Physiology.

JOURNALS
1. Physiological Reviews.
5. J.A.M.A.
7. Federation Proceedings.
8. Trends in Neuroscience.

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