SYLLABUS FOR

M.D. PHYSIOLOGY

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PREAMBLE

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

Programme Obiectives

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 / experimentar 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 totheir 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.

Training Period	3 yrs	
lst yr	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 & Internet Browsing	
lInd yr	1st 6months: Posting in the clinical & other basic Science Department-Training in Research Methodology. Chooses topics for Dissertation & submits to the University	2nd 6 months: Works on the Dissertation
IIIrd yr	Actively involves in U.G. teaching Prepare for the University Examinations	Completion of Dissertation

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. ENDOCRINOLOGV & 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
3) Bronchoscopy
4) 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 diferent 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 prodedures

XVI. ICU

Manging Acid-base disorders

XVII. OPTHALMOLOGY

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 :

I. 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 shalf 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

Theory	**Title**	**Duration**	**Marks**
Paper-I	General Physiology. Blood Digestion and Tissues of the Body	3hrs	100
Paper II	Circulation, Respiration, Environmental Physiology, Excretion & Comparative Physiology	3hrs	100
Paper III	Nervous System and Special Senses	3hrs	100
Paper IV	History of Medicine, Recent advances In clinical physiology, Endocrinology And Reproductive system	3hrs	100
		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)

	Marks	Duration
Mammalian (Dog) Graphs	20	l hr
Mammalian Isolated Organ	20	l hr
Amphibian - Heart or Skeletal Muscle	40	l hr
Haematology	40	l hr
Clinical Examinations	40	l hr
Clinical Experiments (Human)	40	l hr
Total	200	

Pedagogy	20	20 min
Log Book	20	1 hr
Orals	60	1 hr
Total	100	

NOTE: No. of candidates to be examined 4 per day for practical / viva

DlSSERTATION : **APPROVED/NOT APPROVED**

(No Marks)

“MARKS QUALIFYlNG FOR A PASS		**MAXIMUM MARKS**	**QUALIFYlNG FOR A PASS 50% MARKS**
1.	Theory Examination	400	200
2.	Practical Examination	200	100
3.	Oral/Viva, Pedagogy & Log Book	100	No Minimum
4.	Aggregate of Practical & Viva (2+3)	300	150
	Total	700	350

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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.
3. Samson Wright's Applied Physiology - Cyril A. Keele, Eric Weil., John B. .Jepson.
4. Review of Medical Physiology - Ganong, W.F.
5. Clinical Physiology - Camp Bell., Moran, E.J.
6. Mechanisms of Diseases - Guyton, G.
7. Anatomy Regional and applied - Last, R.J.
8. B.D.S. Text Book of Physiology - Emslie., Smith.
9. Text Book of Physiology - Beet Etal.
10. Clinical Neuro - Anatomy - Snell.

REFERENCE BOOKS

1. Brain's Clinical Neurology - Sir Rojer Bannister.
2. Essentials of Neurology - Sir John Walter.
3. E1ectrical Activity of the Nervous System - Mary A.B. Brazier.
4. Cardiovascular Physio1ogy / Berne and Levy.
5. Respiratory Physiology - Slonim and Chapin.
6. Gastro - Intestinal Physiology - Zeehout and Turtle.
7. The Kidney - An Outline of Normal and Abnormal Structure an Function - De Wardner.
8. Endocrinology - Williams.
9. Text Book of Surgical Physiology - Jamieson and Kay.
10. Practical Haematology - Dacie and Lewis.
11. Histology Text and Atlas - Ross.
12. Muscle Testing Hand Book - Pact.
13. Clinical Examination A Text Book for students and Doctors by Teachers of the Edinburgh Medical School-Maclood J. Munro J.
14. Hutchinsons's Clinical Methods - Danal Hunter, Bom Ford R. R., David G. Penington.
15. Wintrobes Haematology.

PRACTICAL TEXT BOOKS:

1. Text Book of Practical Physiology - Ransdae.
2. Practical Physiology - Ghai.
3. Manual of Experimental electrophysiology by I.C. Whitfield.
4. Pharmacological experiments on Intach isolated preparation L.J. Mcheod (2 Books).
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.
2. Annual Review of Neuroscience.
3. Annual Review of Biochemistry.

JOURNALS

1. Physiological Reviews.
2. Journal of Physiology.
3. American Journa1 of Physiology.
4. The New England Journal of Medicine.
5. J.A.M.A.
6. Journal of Roayal Society of Medicine.
7. Federation Proceedings.
8. Trends in Neuroscience.
