

**1<sup>st</sup> PROFESSIONAL- SYLLABUS****(5) HUMAN PHYSIOLOGY INCLUDING BIO-PHYSICS****(i) Goal :**

The broad goal of teaching Physiology to undergraduate students aims at providing the student a comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the Physiological basis of health and disease.

**(ii) Objectives:****(a) KNOWLEDGE:**

At the end of the course, the student shall be able to:

1. Explain the normal functioning of all the organ systems and their interactions for well coordinated total body function.
2. Assess the relative contribution of each organ system to the maintenance of the milieu interior
3. Elucidate the Physiological aspects of normal growth and development
4. Describe the Physiological reasons and adaptations to environmental stresses.
5. List the Physiological principles underlying pathogenesis and treatment of disease.

**(b) SKILLS:**

At the end of the course, the student shall be able to

1. Conduct experiments designed for study of Physiological phenomena;
2. Interpret experimental / investigative data
3. Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

**(c) INTEGRATION:**

At the end of the integrated teaching the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

- 1) Source and functions of Reticulo-endothelial system;
- 2) Structure and sequence of events at Neuro-muscular junctions, Neuro-muscular blocking drugs and clinical disorders pertaining to Neuro-muscular junctions;
- 3) Structure of Gastric glands, composition and functions of gastric juice. Regulation of gastric secretion, Cytoprotection and peptic ulcer;
- 4) Gastro-intestinal hormones – Source of production, structure and functions;
- 5) Blood pressure – Structure of Blood Vessels – Neural regulation, Hormonal regulation;
- 6) Anatomical location of Respiratory centers – Neural & chemical regulation of respiration;

- 7) Microcirculation-Structure – Mechanism of filtration and regulation of Microcirculation;
- 8) Counter-current Multiplier and exchange system – functions – clinical importance;
- 9) Thyroid gland – structure, synthesis – Metabolism of Thyroid hormones – Actions of Thyroid hormones – Disorders of Thyroid glands;
- 10) Pituitary gland – histological structure – Hormones of Anterior pituitary;
- 11) Ovary – Structure, endocrinal regulation – Structure and mechanism of female sex hormones and contraception;
- 12) Histology of cerebral cortex, Neural circuits and their importance;
- 13) Histology of Retina – Synthesis of Photopigments – Light and dark adaptation – Central pathway and its lessons.

### BIOPHYSICS

#### (i) GOAL AND OBJECTIVES:

The broad goal of teaching Bio physics to undergraduate students is that they should understand basic physical principles involved in the functioning of body organs in normal and diseased conditions.

Total time for teaching Biophysics	- 5 hours
Out of which :	
a. Didactic lectures	- 3 hours
b. Tutorial/group discussion	- 1 hour
c. Practical	- 1 hour

#### (ii) Topic distribution :

- a. Didactic lectures:
  - (i) Physical principles of transport across cell membranes and across capillary wall.
  - (ii) Biopotentials
  - (iii) Physical principles governing flow of blood in heart and blood vessels.  
Also physical principles governing flow of air in air passages.
- b. Tutorial/group discussion: On the topics covered in didactic lectures.
- c. Practicals:
 

Demonstration of:

  - (i) Bio potential on oscilloscope
  - (ii) Electro Encephalogram (E.E.G)
  - (iii) Electro Myelogram (E.M.G)
  - (iv) Electro Cardiogram (E.C.G)

#### iii) Theory Syllabus ( Physiology ) :

Sl.No.	Name of the Unit	No.of Hours
1.	General Physiology	6
2.	Cell Physiology Muscle & Nerves	12
3.	Blood, Body fluids & RES	18
4.	Cardiovascular System	30
5.	Respiratory & Environmental Physiology	18

**Total 480 Hrs.**

6.	Digestive System	18
7.	Excretion & Skin	18
8.	Endocrines & Reproductive System	30
9.	Central Nervous System	30
10.	Autonomic Nervous System	3
11.	Special Senses	18
12.	Bio Physics	4

Total No. of Hours including Biophysics **210**

**Division of syllabus paperwise:**

**PAPER I**

Cell, Blood, Biophysics, CVS, Respiration, Digestion, Excretion, Regulation of body temperature, Body fluids and RES.

**PAPER II**

Endocrines, reproduction, Muscle and Nerve, CNS, ANS and Special senses.

iv) Practicals in Physiology:

Sl.No.	Name of the Unit	No. of practicals
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**a. Human Practicals:**

1.	Introduction – Use of Microscope and Laboratory Protocol	1
2.	R.B.C.Count	1
3.	Total Leucocyte Count	1
4.	Bleeding Time & Clotting Time	1
5.	Blood Groups	1
6.	E.S.R.	1
7.	Estimation of Hemoglobin	1
8.	Hematological Indices	1
9.	Recording of Pulse & Blood Pressure	1
10.	Effect of Posture & Exercise on Blood Pressure	1
11.	Lung Function Tests – Spirometry & PEF	1
12.	Clinical Examination of Cardiovascular System	1
13.	Clinical Examination of Respiratory System	1
14.	Clinical Examination of Sensory Nervous System	1
15.	Clinical Examination of Motor Nervous System	1
16.	Clinical Examination of Cranial Nerve Functions	1
17.	Reflexes	1
18.	Tests for Hearing-Rinne's & Weber's Tests	1
19.	Acuity of vision & Tests for colour vision	1
20.	Platelet Count	1
21.	Reticulocyte Count	1

**b. Amphibian practical demonstrations & Interpretation of Graphs & Charts**

1.	Recording of simple Muscle Twitch	1
2.	Effect of Two successive stimuli of Muscle contraction	1
3.	Effect of Fatigue on Muscle-Nerve preparation	1
4.	Effect of Increasing strength of stimuli on Muscle contraction	1

5.	Genesis of Tetanus	1
6.	Effect of Temperature variation of Muscle contraction	1
7.	Effect of After load and Free load on Muscle twitch	1
8.	Determination of velocity of Nerve conduction	1
9.	Recording of normal Cardiogram	1
10.	Effect of Temperature variation on Heart beat	1
11.	Refraction period on beating Heart	1
12.	Properties of Cardiac Muscle-Stannius Legature, Summation, All-or-None Law, Treppe	1
13.	Effect of Vagosympathetic Stimulation on Frog's Heart	1
14.	Effect of Ions & Drugs on perfused frog's heart	1

**c. General Demonstrations**

1.	E.C.G.	1
2.	Pregnancy test	1
3.	E.M.G.	1
4.	Perimetry	1
5.	Ophthalmoscope	1
6.	E.E.G.	1
7.	Mosso's ergography	1
8.	Bicycle ergography	1
9.	Treadmill	1
10.	Pulmonary function tests	1
11.	Applied Physiology 30 x 2 = 60	30
12.	Tutorial and group discussions 60 x 2 = 120	60

Total no. of hours for practicals :  $135 \times 2 = \mathbf{270}$

**Recommended Text Books.**

1. Text book of Physiology – Dr.A.K.Jain II Vol.III Edn. Avichal Pub.
2. Concise Med. Physiology – Chaudhari
3. Human Physiology – Sharada III Edn. Subramanyam, H.D.singh
4. Understanding physiology III Edn. – Bijilani

**Practical Books:**

1. Practical Physiology – C.L.Ghai
2. Text book of practical physiology – Dr.A.K.Jain.
3. A manual of practical Physiology – Pravathi Paul.

**Reference books:**

1. Medical Physiology – Guyton + Hall 10<sup>th</sup> edn.
2. Review of Medical Physiology – A.F.Ganong – 21<sup>st</sup> Edn.
3. Anatomy & Physiology – Tora – Tora
4. Physiologic Basis of Medical Practice – Best & Taylor – 10<sup>th</sup> Edn.