Course Content

Physiology **First M.B.B.S. (From August 2019)**

(Based on Medical Council of India, Competency based Undergraduate
Indian Medical Graduate, 2018. Vol. 1; page no.91-11

Teaching hours 25 Lectures(hours)-160 Self d

Small group teachings/tutorials/Integrated teaching/Practicals(hours)-310 Total(hours) -495 Early clinical exp
divided equally in all three subjects .

Competency No.	Topics & subtopics
1	**General Physiology**
PY. 1.1	Structure and Functions of a Mammalian Cell
PY. 1.2	Principles of Homeostasis
PY. 1.3	Intercellular communication
PY. 1.4	Apoptosis – Programmed cell death
PY. 1.5	Transport mechanisms across cell membranes
PY. 1.6	Fluid compartment of the body, its ionic composition & measurements
PY. 1.7	Concept of pH & Buffer systems in the body
PY. 1.8	Molecular basis of resting membrane potential and action potential in excitable tissue
PY. 1.9	Methods used to demonstrate the functions of the cells and its products, its communication Clinical care and research.
2	**Topic: Hematology**
PY. 2.1	Composition & functions of blood components
PY. 2.2	Original, forms, variations and functions of plasma proteins
PY. 2.3	Synthesis and functions of Hemoglobin & explain its breakdown. Describe variants of hemog

PY. 2.4	RBC formation (erythropoiesis & its regulation) and its functions
PY. 2.5	Types of anaemias & Jaundice
PY. 2.6	WBC formation (granulopoiesis) & its regulation
PY. 2.7	Formation of platelets, functions & variations
PY. 2.8	Physiological basis of hemostasis and anticoagulants. Describe bleeding & clotting disorders
PY. 2.9	Different blood groups and clinical importance of blood grouping, blood banking and transfu
PY. 2.10	Types of immunity , development of immunity and its regulation
PY. 2.11	Estimation Hb, RBC, TLC, RBC indices, DLC, Blood group, BT/CT
PY. 2.12	Tests for ESR, Osmotic fragility, Hematocrit , findings and interpretion of test results etc.
PY. 2.13	Steps for reticulocyte and platelet count
3	**Nerve and Muscle Physiology**
PY. 3.1	Structure and functions of a neuron and neuroglia; Nerve Growth Factor & other growth fac
PY. 3.2	Types, functions & properties of nerve fibers
PY. 3.3	Degeneration and regeneration in Peripheral nerves
PY. 3.4	Structure neuro-muscular junction and transmission of impulses
PY. 3.5	Action of neuro-muscular blocking agents
PY. 3.6	Pathophysiology of Myasthenia gravis
PY. 3.7	Types of muscle fibres and their structure
PY. 3.8	Action potential and its properties in different muscle types (skeletal & smooth)
PY. 3.9	Molecular basis of muscle contraction in skeletal and in smooth muscles

PY. 3.10	Mode of muscle contraction (isometric and isotonic)
PY. 3.11	Energy source and muscle metabolism
PY. 3.12	Gradation of muscular activity
PY. 3.13	Muscular dystrophy: myopathies
PY. 3.14	Ergography
PY. 3.15	Effect of mild, moderate and severe exercise and changes in cardiorespiratory parameters
PY. 3.16	Harvard Step test and impact on induced physiologic parameters in a simulated environmen
PY. 3.17	Strength-duration curve
PY. 3.18	Computer assisted learning (i) amphibian nerve – muscle experiments (ii) amphibian cardiac
4	**Gastro-intestinal Physiology**
PY. 4.1	Structure and functions of digestive system
PY. 4.2	Composition, mechanism of secretion, functions, and regulation of saliva, gastric, pancreatic secretion
PY. 4.3	GIT movements, regulation and functions ,defecation reflex. Role of dietary fibre.
PY. 4.4	Physiology of digestion and absorption of nutrients
PY. 4.5	Source of GIT hormones, their regulation and functions
PY. 4.6	Gut-Brain Axis
PY. 4.7	Structure and functions of liver and gall bladder
PY. 4.8	Gastric function tests, pancreatic exocrine function test & liver function tests
PY. 4.9	Physiology aspects of; peptic ulcer, gastro- oesophageal reflux disease, vomiting, diarrhea , ileus, Hirschsprung's disease
PY. 4.10	Clinical examination of the abdomen in a normal volunteer or simulated environment

5	**Cardiovascular Physiology (CVS)**
PY. 5.1	Functional anatomy of heart including chambers sounds; and Pacemaker tissue and conduci
PY. 5.2	Properties of cardiac muscle including its morphology, electrical, mechanical and metabolic
PY. 5.3	Events occurring during the cardiac cycle
PY. 5.4	Generation, conduction of cardiac impulse
PY. 5.5	Physiology of electrocardiogram (E.C.G.), its applications and the cardiac axis
PY. 5.6	Abnormal ECG, arrhythmias, heart block and myocardial infarction.
PY. 5.7	Haemodynamics of circulatory system
PY. 5.8	Local and systemic cardiovascular regulatory mechanisms
PY. 5.9	Factors affecting heart rate, regulation of cardiac output & blood pressure
PY. 5.10	Regional circulation including microcirculation, lymphatic, coronary, cerebral, capillary, Skin, splanchnic circulation
PY. 5.11	Patho-physiology of shock, syncope and heart failure
PY. 5.12	Blood pressure & pulse recording at rest and in different grades of exercise and postures in a environment
PY. 5.13	Record and interpret normal ECG in a volunteer or simulated environment
PY. 5.14	Cardiovascular autonomic function tests in a volunteer or simulated environment
PY. 5.15	Clinical examination of the cardiovascular system in a normal volunteer or simulated enviro
PY. 5.16	Recording Arterial pulse tracing using finger plethysmography in a volunteer or simulated en
6	**Respiratory Physiology**
PY. 6.1	Functional anatomy of respiratory tract

PY. 6.2	Mechanics of normal respiration, pressure changes during ventilation, lung volume and capa tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs
PY. 6.3	Transport of respiratory gases: Oxygen and Carbon dioxide
	Regulation of respiration -- Neural & chemical
PY. 6.4	Physiology of high altitude deep sea diving
PY. 6.5	Principles of artificial respiration oxygen therapy, acclimatization and decompression sickne
PY. 6.6	Pathophysiology of dyspnea, hypoxia, cyanosis asphyxia; drowning, periodic breathing
PY. 6.7	Lung function tests & their clinical significance
PY. 6.8	Technique to perform & interpret Spirometry
PY. 6.9	Examination of the respiratory system in a normal volunteer or simulated environment
PY. 6.10	Technique to perform measurement of peak expiratory flow rate in a normal volunteer or si
7	**Renal Physiology**
PY. 7.1	Structure and function of kidney
PY. 7.2	Structure and functions of juxta glomerular apparatus and role of renin-angiotensin system
PY. 7.3	Mechanism of urine formation and processes involved
PY. 7.4	Significance & implication of Renal clearance
PY. 7.5	Renal regulation of fluid and electrolytes & acid-base balance
PY. 7.6	Innervations of urinary bladder, physiology of micturition and its abnormalities
PY. 7.7	Artificial kidney, dialysis and renal transplantation
PY. 7.8	Renal Function Tests
PY. 7.9	Cystometry and discuss the normal cystometrogram

8	**Endocrine Physiology**
PY. 8.1	Physiology of bone and calcium metabolism
PY. 8.2	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus
PY. 8.3	Physiology of Thymus & Pineal Gland
PY. 8.4	Function tests: Thyroid gland; Adrenal cortex, Adrenal medulla and pancreas
PY. 8.5	Metabolic and endocrine consequences of obesity & metabolic syndrome, Stress response. component pertaining to metabolic syndrome
PY. 8.6	Mechanism of action of steroid, protein and amine hormones
9	**Reproductive Physiology**
PY. 9.1	Sex determination; sex differentiation and their abnormalities and outline psychiatry and pr sex determination
PY. 9.2	Puberty: onset, progression, states; early and delayed puberty and outline adolescent clinic association
PY. 9.3	Male reproductive system: functions of testis and control of spermatogenesis & factors mod association with psychiatric illness
PY. 9.4	Female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle – hor ovarian changes
PY. 9.5	Physiological effects of sex hormones
PY. 9.6	Contraceptive methods for male and female. Discuss their advantages & disadvantages
PY. 9.7	Effects of removal of gonads on physiological functions
PY. 9.8	Physiology of pregnancy, parturition & lactation and outline the psychology and psychiatry- it

PY. 9.9	Interpret a normal semen analysis report including (a) sperm court, (b) sperm morphology and (c) sperm motility, as per WHO guidelines and d
PY. 9.10	Physiological basis of various pregnancy tests
PY. 9.11	Hormonal changes and their effects during perimenopause and menopause
PY. 9.12	Common causes of infertility in a couple and role of IVF in managing a case of infertility
10	**Neurophysiology**
PY. 10.1	Organization of nervous system
PY. 10.2	Functions and properties of synapse, reflex, receptors
PY. 10.3	Somatic sensations & sensory tracts
PY. 10.4	Motor tracts, mechanism of maintenance of tone, control of body movements, posture and apparatus
PY. 10.5	Structure and functions of reticular activating system, autonomic nervous system (ANS)
PY. 10.6	Spinal cord, its functions, lesion & sensory disturbances
PY. 10.7	Functions of cerebral cortex, basal ganglia thalamus, hypothalamus. Cerebellum and limbic s abnormalities
PY. 10.8	Behavioural and EEG characteristics during sleep and mechanism responsible for its product
PY. 10.9	Physiological basis of memory, learning and speech
PY. 10.10	Chemical transmission in the nervous system. (Outline the psychiatry element)
PY. 10.11	Clinical examination of the nervous system: Higher functions, sensory system, motor system in a normal volunteer or simulated environment
PY. 10.12	Normal EEG forms
PY. 10.13	Perception of smell and taste sensation

PY. 10.14	Patho-physiology of altered smell and taste sensation
PY. 10.15	Functional anatomy of ear and auditory pathways & physiology of hearing
PY. 10.16	Pathophysiology of deafness. Hearing tests
PY. 10.17	Functional anatomy of eye, physiology of image formation, physiology of vision including co errors, colour blindness, physiology of pupil and light reflex
PY. 10.18	Physiological basis of lesion in visual pathway
PY. 10.19	Auditory & visual evoke potentials
PY. 10.20	(i) Testing of visual acuity, colour and field of vision and (ii) hearing (iii) Testing for smell and volunteer/ simulated environment
11	**Integrated Physiology**
PY. 11.1	Mechanism of temperature regulation
PY. 11.2	Adaptation to altered temperature (heat and cold)
PY. 11.3	Mechanism of fever, cold injuries and heat stroke
PY. 11.4	Cardio-respiratory and metabolic adjustment during exercise; physical training effects
PY. 11.5	Physiological consequences of sedentary lifestyle
PY. 11.6	Physiology of Infancy
PY. 11.7	Physiology of aging; free radicals and antioxidants
PY. 11.8	Cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state environmental conditions (heat and cold)
PY. 11.9	Interpretation of growth charts
PY. 11.10	Interpretation of anthropometric assessment of infants
PY. 11.11	Concept, criteria for diagnosis of Brain death and its implications
PY. 11.12	Physiological effects of meditation

PY. 11.13	History taking and general examination in the volunteer / simulated environment
PY. 11.14	Basic Life Support in a simulated environment

Paper wise distribution of topics

Year: First MBBS Subject: Physiology

Paper	Section	Topics
I	A	MCQs on all topics of the paper I
	B & C	General Physiology
		Blood
		Respiratory System
		Cardio Vascular System,
		Cardio-respiratory and metabolic adjustment during exercise
		Renal system
		Gastro intestinal system
		Life style, aging, Meditation
		AETCOM module no. 1.2 & 1.3
		Scenario based / application questions can be on any topic of the paper I
		For long answer question and scenario based / application questions , topics will not be repeated
II	A	MCQs on all topics of the paper II
	B & C	Endocrine Physiology
		Reproductive System, Physiology of Infancy
		Special senses
		Central nervous system including brain death Temperature Regulation & applied
		Nerve muscle physiology
		Scenario based / application questions can be on any topic of the paper II
		For long answer question and scenario based / application questions , topics will not be repeated

Internal Assessment

Physiology

Applicable w.e.f August 2019 onwards examination for batches admitted from

Sr. No	I-Exam (December)			II-Exam (March	
	Theory	Practical (Including 05 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 05 Marks for Journal & Log Book
1	100	50	150	100	50

Sr. No	Preliminary Examinations			Sr. No	Remedial internal asses	
	III-Exam (July)				Non - eligib Octo	
	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks		Theory	Practical Inc Marks for J Log B
1	200	100	300	1	200	10

1. There will be 3 internal assessment examinations in the academic year. The structure should be similar to the structure of University examination.
2. There will be only one additional examination for absent students (due to genuine reason) after Committee Constituted for the same. It should be taken after preliminary examination and befor internal assessment marks to the University.
3. First internal assessment examination will be held in December, second internal assessment exa in March and third internal assessment examination will be held in July.
4. Internal assessment marks for theory and practical will be converted to out of 40. Internal assess Conversion, should be submitted to university by 7th of August.
5. The student must secure at least 50% marks for total marks (combined in theory and practical / 40% marks in theory and practical separately) assigned for internal assessment in a particular su eligible for appearing at the final university examination of that subject. Internal assessment ma separate head of passing at the summative examination.
6. **Remedial internal assessment examination for Non - eligible students**: Student who were not e than 50% combined or less than 40% in any theory or practical, will re appear as repeater studen which will be conducted before Supplementary Exam. His/her internal assessment will be calcula this Examination marks only. Students who will not be eligible in this Examination will appear wi repeater student.
7. The internal assessment marks of the remedial examination alone shall be considered and conve
8. Conversion **Formula for calculation of marks in internal assessment examinations**

	First IA	Second IA	Third IA (Prelim)	Total	Internal assessment marks: Conversion formula (out of 40)	Eligibility to appear for final (after conversion out of 40) (40% Separately in Theory a
Theory	100	100	200	400	$\frac{\text{Total marks obtained}}{10}$	16 (minimum)
Practical	50	50	100	200	$\frac{\text{Total marks obtained}}{5}$	16 (minimum)

9. Conversion formula for calculation of marks in Remedial internal assessment examination

	Remedial Exam (Prelim)	Int. Assess. marks conversion formula (out of 40)	Eligibility to appear for Su (after conversion out of 4 (40% Separately in Theor Combined)
Theory	200	$\frac{\text{Total marks obtained}}{5}$	16 (minimum)
Practical	100	$\frac{\text{Total marks obtained}}{2.5}$	16 (minimum)

While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustr

Internal Assessment Marks	Final rounded marks
15.01 to 15.49	15
15.50 to 15.99	16

First Year MBBS Practical Mark's Structure Internal Assessment Examinations
for batch admitted in M.B.B.S Course from Academic Year 2019-20 &

Physiology			
	Hematology	Clinical Examination/Human Physiology expt. / Short exercises	Journal/ Logbook
	A	B	C
Max. Marks	15	20	5

First Year MBBS Physiology Practical Mark's Structure (Pr

(Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019

Seat No.	Exercise 1				Exercise 2	Exercise 3 *	Exercise 4**		Practi (Total
	Clinical Examination								
	C.V.S	R.S	C.N.S. & Special Senses	General Exam & Abdomen	Hematology	Short exercise	Human Physiology Experiment	Journal & Log book	
	A	B	C	D	E	F	G	H	I
Max. Mark's	10.0	10.0	10.0	10.0	10.0	15.0	15.0	10.0	90

***Short exercises 3 marks each(3X5)**

1. Case based scenarios/ endocrine disorders photographs .2. Interpretation of function tests. 3. One skeletal graph

4. One cardiac graph 5. Calculation

**** Exercise 4: Human Physiology Experiment** 1. Basic Life Support in a simulated environment 2. ECG 3. Spirometry 4 Ergography 7. Harward step test 8. Perimetry

*** Suggested Methods of Assessment**

Preclinical exam & OSPE

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-2 Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

First Year MBBS Physiology Practical Mark's Structure(MU

(Applicable w.e.f August 2019 onwards examination for batches admitted from June 2019

	Exercise 1				Exercise 2	Exercise 3 *	Exercise 4**	Practical (Total)	Oral/V (Total
	Clinical Examination								
	C.V.S	R.S	C.N.S. & Special Senses	General Exam & Abdomen	Hematology	Short exercises	Human Physiology Experiment		
	A	B	C	D	E	F	G	H	I
Max. Mark's	10.0	10.0	10.0	10.0	10.0	15.0	15.0	80	20.

***Short exercises 3 marks each(3X5)**

1. Case based scenarios/ endocrine disorders photographs .2. Interpretation of function tests. 3. One skeletal graph

4. One cardiac graph 5. Calculation

**** Exercise 4: Human Physiology Experiment** 1. Basic Life Support in a simulated environment 2. ECG 3. Spirometry 4
6. Ergography 7. Harward step test 8. Perimetry

*** Suggested Methods of Assessment**

Clinical exam & OSPE

(Please Note - The above examination pattern will be applicable to the students admitted from Academic Year 2019-20 Medical Colleges vide University letter No MUHS /X-1 /UG /1692 /2020 Date: 28/02/2020)

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*						2. Subject Code	:	***Appendix - a***
3. Subject (PSP)	:	**Anatomy / Physiology / Biochemistry**								
(TT)	:									
4. Paper :	:	***I***	5. Total Marks	:	**100**	6. Total Time	:	**3 Hrs.**	7. Remu. (PS)	:	**Rs. 300/-**
									8. Remu. (PM)	:	**Rs. 350/-**
9. Web Pattern	:	[ ]	10. Web Skeleton	:	[ ]	11. Web Syllabus	:	[ ]	12. Web Old QP	:	[ ]

Instructions:

SECTION "A" MCQ

1) *Fill ● (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

Q1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

One SAQ has to be on AETCOM Module ***(For Anatomy 1.1, 1.5, For Physiology 1.2.,1.3& For Biochemistry, 1.4) &***
Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

a) b) c) d) e) f) g) h) i)

4. Long Answer Questions (Any Two out of Three) (2x 10= 20)

a) b) c)

Note: All questions should be structured .Wherever necessary; split up of marks should be specified.

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**First MBBS** *(applicable w.e.f. Sept. 2020& onwards examinations)*						2. Subject Code	: ***Appendix - a***
3. Subject (PSP)	:	**Anatomy / Physiology / Biochemistry**							
(TT)	:								
4. Paper :	:	***II***	5. Total Marks	: **100**	6. Total Time	: **3 Hrs.**		7. Remu. (PS)	: **Rs. 300/-**
								8. Remu. (PM)	: **Rs. 350/-**
9. Web Pattern	: [ ]		10. Web Skeleton	: [ ]	11. Web Syllabus	: [ ]		12. Web Old QP	: [ ]

Instructions:

SECTION "A" MCQ

1) *Fill ● (dark) the appropriate empty circle below the question number once only.*
2) *Use **blue/black** ball point pen only.*
3) *Each Question carries **One mark.***
4) *A student will not be allotted any marks if he/she overwrites, strikes out or puts white ink on the circle once filled (darkened)*
5) *Do not write anything on the blank portion of the question paper if written anything, such type of act will be considered as an attempt to resort to unfair means.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) ***(4 MCQ Should be clinical application based)*** (20x1=20)

a) b) c) d) e) f) g) h) i) j)
k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answer book for all sections.*

SECTION "B" (80 Marks)

2. Brief answer questions (Any Ten out of Eleven) (10x 2= 20)

a) b) c) d) e) f) g) h) i) j) k)

3. Short Answer Questions (Any Eight out of Nine) (8x5= 40)

Minimum 2 SAQs should be Case Based Questions/ Clinically applied Questions.

4. a) b) c) d) e) f) g) h) i) (2x 10= 20)

Long Answer Questions (Any Two out of Three)

i) b) c)

Note: All questions should be structured .Wherever necessary, split up of marks should be specified.

MARKLIST FOR PRACTICAL / ORAL / VIVA VOCE

(Summer / Winter – 20...Exam (MBBS UG Courses)

(Applicable for batch admitted in M.B.B.S Course from Academic Year 2019-20 & onwards)

Course : FIRST MBBS
CENTRE :
Date : / /20

Subject : Physiology
Marks : (Practical = Practical/Clinical + Viva) Min. 50 Max. 100
Batch :

Practical									Oral/Viva	Total
Seat No.	C.V.C	R.S	C.N.S. & Special senses	Abdomen	Exercise (2) Hematology	Exercise (3) Short Exercise	Human Physiology Experiment	Practical (Total)	Oral/Viva Total	PR/Oral Total
	A	B	C	D	E	F	G	H	I	J
Max. Marks	10	10	10	10	10	15	15	80	20	100

Note : Both Examiners should jointly conduct practical examination for each student.
Verified above entries from Answerbooks and we hereby certify that the marks entered against each Seat Number are found correct.

	NAME OF EXAMINER	COLLEGE	SIGNATURE WITH DATE	
1			Convener	
2			Internal	
3			External	
4			External	

1) Textbooks of Physiology :

Guyton - Textbook of Physiology Ganong -
Review of Medical Physiology
S. Wright - Applied Physiology

2) Reference Books :

Best and Taylor - Physiological basis of medical practice
Berne & levy. - Principles of Physiology
Dr. V.G. Ranade - Laboratory Manual and Journal of Physiology Practicals
Ghai's VP Varshney, Mona Bedi- Textbook of Physiology -9 th Edition2019.
G.K. Pal-Comprehensive Text Book of Medical Physiology.
Dr.Amarnath B. Solepure - Fundamental Human Neurophysiology-First Edition 2018.