

INTEGRAL UNIVERSITY, LUCKNOW

**INTEGRAL INSTITUTE OF MEDICAL
SCIENCES & RESEARCH**



**SYLLABUS
FOR**

**M.Sc. Medical Physiology
(EFFECTIVE FROM, 2019-20)**

**INTEGRAL UNIVERSITY, LUCKNOW
DASAULI, P.O. BAS-HA KURSI ROAD,
LUCKNOW – 226026**

Website: www.iul.ac.in

STUDY & EVALUATION SCHEME
M.Sc. Medical Anatomy
(w.e.f. July 2019)

Programme: M.Sc. Medical Physiology

Year I

Sl. No	Course Code	Course Title	Periods			Evaluation Scheme				Total (Marks)
			L	T/S/D	P	Internal Assessment		External Assessment		
						Theory	Practical	Theory	Practical	
1	ANY101	Essentials of Anatomy I	03	01	-	30	-	70	-	100
2	ANY102	Essentials of Anatomy II	02	01	-	30	-	70	-	100
3	HPY104	Essentials of Physiology I	02	01	-	30	-	70	-	100
4	HPY105	Essentials of Physiology-II	02	01	-	30	-	70	-	100
5	BCY107	Essentials of Biochemistry I	01	01	-	30	-	70	-	100
6	BCY108	Essentials of Biochemistry-II	01	01	-	30	-	70	-	100
7	ANY103	Anatomy Practical	-	-	08	-	60		40	100
8	HPY106	Physiology Practical	-	-	06	-	60		40	100
9	BCY109	Biochemistry Practical	-	-	02	-	60		40	100
		TOTAL	11	06	16	180	180	420	120	900

L = Lecture
1L = 1hr

T = Tutorial
1T = 1hr

S = Seminar
1S = 1hr

D = Demonstration
1D = 1hr

P = Practicals
1P = 1hr

INTERNAL ASSESSMENT:

	Sessional			Average of Best Two	Continuous Assessment	Attendance	Total
	Terminal 1	Terminal 2	Pre Univ.				
THEORY	20	20	20	20	05	05	30
PRACTICALS	30	30	30	30	25	05	60

STUDY & EVALUATION SCHEME
M.Sc. Medical Anatomy
(w.e.f. July 2019)

Programme: M.Sc. Medical Physiology

Year II

Sl. No	Course Code	Course Title	Periods			Evaluation Scheme		Total (Marks)
			L	T/S/D	P	Internal Assessment	External Assessment	
1	HPY 201	Physiology-I	03	03	00	30	70	100
2	HPY 202	Physiology-II	03	03	00	30	70	100
3	TMY204	Teaching Methodology	02	00	00	30	70	100
4	RMV205	Research Methodology	02	00	00	30	70	100
5	FCY206	Fundamental of Computers	00	00	02	20	30	50
6	HPY 203	Physiology Practical	00	00	20	60	40	100
		TOTAL	10	06	22	200	350	550

L = Lecture T = Tutorial S = Seminar D = Demonstration P = Practicals
 1L = 1hr 1T = 1hr 1S = 1hr 1D = 1hr 1P = 1hr

INTERNAL ASSESSMENT:

	Sessional			Average of Best Two	Continuous Assessment	Attendance	Total
	Terminal 1	Terminal 2	Pre Univ.				
THEORY	20	20	20	20	05	05	30
PRACTICALS	30	30	30	30	25	05	60

STUDY & EVALUATION SCHEME
M.Sc. Medical Anatomy
(w.e.f. July 2019)

Programme: M.Sc. Medical Physiology

Year III

S. No	Course Code	Course Title	Periods			Evaluation Scheme		Total (Marks)
			L	T/S/D	P	Internal Assessment	External Assessment	
1	HPY 301	Physiology-I	03	01	00	30	70	100
2	HPY 302	Physiology-II	02	01	00	30	70	100
3	HPY 303	Physiology-III	01	01	00	30	70	100
4	HPY304	Physiology Practical	-	-	24	60	40	100
5	HPY305	Dissertation	-	-	-	50	50	100
TOTAL			06	03	24	200	300	500

❖ Will be based on dissertation work, presentation, viva voce & discussion

L = Lecture

T = Tutorial

S = Seminar

D = Demonstration

P = Practicals

1L = 1hr

1T = 1hr

1S = 1hr

1D = 1hr

1P = 1hr

INTERNAL ASSESSMENT:

	Sessional			Average of Best Two	Continuous Assessment	Attendance	Total
	Terminal 1	Terminal 2	Pre Univ.				
THEORY	20	20	20	20	05	05	30
PRACTICALS	30	30	30	30	25	05	60

INTEGRAL UNIVERSITY, LUCKNOW
INTEGRAL INSTITUTE OF MEDICAL SCIENCES
& RESEARCH

SYLLABUS

FOR

M.Sc. (MEDICAL PHYSIOLOGY),
FIRST YEAR

SESSION-2019-20

(DEPARTMENT OF PHYSIOLOGY)

SUBJECT- ESSENTIALS OF ANATOMY-I
SUBJECT CODE- ANY101
(w.e.f July 2019)

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COURSE CONTENTS:

I. BASICS OF GENERAL ANATOMY:

- Brief description of Anatomy, subdivisions of anatomy, Anatomical planes, terms of position and movements.
- Structure of Cell and cell organelles
- Introduction to basic tissues of the body.
- Skin – Structure and types
- Superficial and deep fascia- Definitions, functions and modifications.
- Skeletal system – Function, classification of bones, gross structure of a typical long bone, parts of a growing long bone. Cartilage- Definition, classification, functions & location.
- Joints – Definition, structural and functional classification, brief outline of synovial joint along with their classification
- Muscles – Basic properties of muscle, types of muscle and their features.
- Cardiovascular system- Components of cardiovascular system
- Lymphatic system – Lymph and lymphatic vessel, basic knowledge of lymphatic tissue.
- Nervous system – Definition, classification, structure of a neuron. Brief outline of sympathetic and parasympathetic nervous system.

II. BASICS OF GENERAL HISTOLOGY:

- Definition of histology, types of microscopes, components of Light microscope.
- Cell structure – Introduction, cell membrane, cell organelles and their function.
- Epithelium- Definition, function and classification of epithelium with examples,
- Glands- Definition and Classification
- Connective tissue –Basic framework, enumerate- fibres, cells and functions.
- Cartilage – Definition, outline of its components, brief description of different types of cartilage
- Bone – Definition, outline of its components, brief description of types of bones and their classification.

- Muscular tissue – Brief description of types of muscular tissue and their histological differences.
- Circulatory system – microscopic structure of arteries & veins.
- Nervous tissue- Structure of neuron, classification of neuron, microscopic structure of peripheral nerve.

III. BASICS OF GENERAL EMBRYOLOGY:

- Importance of embryology, Cell division –mitosis & meiosis.
- Spermatogenesis, Oogenesis,
- Menstrual cycle and its phases in brief.
- Concept of Fertilization, cleavage, morula, blastocyst,
- Formation of germ layers, notochord and neural tube, intraembryonic coelom, yolk sac, folding of embryo.
- Implantation, decidua, enumerate types of chorionic villi, functions of placenta.

IV. BASICS OF UPPER LIMB

- General orientation and different regions of superior extremity
- Pectoral region: Enumerate muscles and nerves, Clavipectoral fascia, Mammary gland in detail.
- Axilla: Boundaries of axilla and enumerate its contents, Enumerate branches of axillary artery, Axillary group of lymph nodes in brief, Brachial plexus in detail.
- Back and scapular region : Enumerate muscles and nerves of back and scapular region, Spaces of back- Boundaries and contents, Rotator cuff in brief, Anastomosis around scapula
- Arm : Enumerate compartments of arm, its muscles and nerves, Enumerate branches of brachial artery, Anastomoses around elbow joint, Cubital fossa in detail
- Forearm : Enumerate compartments of forearm, enumerate muscles and nerves, Flexor retinaculum and structures passing deep to it, Extensor retinaculum and structures passing deep to it
- Hand: Enumerate muscles of hand and their nerve supply.
- Joints: Enumerate and classify - joints of upper limb. Shoulder joint and Elbow joint in detail

V. BASICS OF LOWER LIMB:

- General orientation, different regions of inferior extremity,
- Deep fascia of thigh.
- Great Saphenous vein,
- Enumerate compartments of thigh, its muscles and nerve supply.
- Femoral Triangle in detail,
- Adductor canal in detail.
- Gluteal region- Enumerate muscles and their nerve supply
- Hamstring muscles in detail
- Popliteal fossa in detail.
- Compartmentalization of leg - Enumerate muscles and nerve supply,
- Extensor and flexor retinaculum, attachments and structures passing deep to it
- Enumerate and classify - joints of inferior extremity, Hip joint and Knee Joint in detail
- Enumerate muscles, vessels and nerves of Sole

RECOMMENDED BOOKS:

1. Clinical Anatomy for Medical Students, by: Richard S. Snell
2. General Anatomy, by: Vishram Singh
3. General Anatomy, by: B.D.Chaurasia
4. Embryology for Medical Students, by: Inderbir Singh
5. Text Book of Histology, by: Inderbir Singh

SUBJECT- ESSENTIALS OF ANATOMY-II
SUBJECT CODE- ANY102
(w.e.f July 2019)

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COURSE CONTENTS:

I. BASICS OF THORAX:

- General orientation of thorax and thoracic cavity – Boundaries, inlet, outlet and wall,
- Intercostal space in detail,
- Pleura and its part, pleural cavity.
- Lung- external features
- Elementary idea of Trachea and tracheobronchial tree.
- Concept of Mediastinum, its subdivision and enumerate its content.
- Basic concept of Pericardium and its sinuses,
- External features and chambers of Heart with Right atrium in detail,
- Blood vessels of Heart in detail,
- Aorta and its branches,
- Enumerate and classify joints of thorax

II. BASICS OF ABDOMEN & PELVIS:

- General orientation of Abdomeno-Pelvic cavity,
- Surface landmarks, Concept of Regions and quadrants,
- Enumerate the layers of Anterior abdominal wall,
- Anterolateral abdominal muscles, external oblique, internal oblique and transversus abdominis in detail, Inguinal canal in detail
- Concept of Peritoneum- definition, parts, peritoneal cavity, retroperitoneal structures, nerve supply and functions,
- Liver, spleen, pancreas – location, borders & surfaces,
- Stomach- Location, Parts, Blood supply, Lymphatic drainage in detail,
- Enumerate the components of Extrahepatic biliary apparatus
- Kidney in detail
- Different parts of small and large Intestine, difference between small and large intestine
- Pelvis – true and false pelvis, inlet, outlet, cavity and enumerate its contents
- Detailed anatomy of Uterus
- Detailed anatomy of Urinary bladder
- Perineum- definition, boundaries and its subdivision.

III. BASICS OF HEAD AND NECK:

- General orientation of head and neck region, Surface landmarks,
- Scalp in detail,
- Facial artery and vein, enumerate muscles of facial expressions, nerve supply of face,
- Parotid gland in detail
- Deep Cervical fascia – enumerates different layers, enumerate boundaries and contents of anterior triangle, sternocleidomastoid muscle and Posterior triangle in detail
- Vertebral canal- boundaries and enumerate its contents
- Cranial cavity- enumerate layers of meninges, enumerate paired & unpaired dural venous sinuses and their location,
- Orbit- enumerate contents of orbit, enumerate extraocular muscle, nerve supply,
- Temporal and infratemporal fossa - boundaries and enumerate its contents,
- Muscles of mastication in detail.
- Submandibular salivary gland- location, borders & surfaces
- Enumerate suprahyoid muscles,
- Thyroid gland in detail,
- Oral cavity - General orientation of oral cavity and its contents, Tongue in detail.
- Palate - Enumerate the muscle of palate,
- Nasal cavity - General orientation of nasal cavity, Lateral wall of nose in detail
- paranasal sinuses - Enumerate paranasal sinuses, maxillary sinus in brief
- Pharynx - General orientation of pharynx, its subdivisions and enumerate circular and longitudinal muscles, Palatine Tonsil in brief.
- Larynx - General orientation of larynx, enumerate cartilages and muscles.

IV. Basics of Brain:

- Enumerate meninges of brain & its characteristics features in brief
- Enumerate subarachnoid space & cisterns
- Cerebrum - Poles, surfaces, borders & lobes of cerebral hemisphere, Enumerate Important sulci, gyri and functional cortical areas
- White matter of cerebrum, corpus callosum in brief, internal capsule in detail.

- External features of Midbrain, Pons, medulla oblongata and cerebellum.
- External features of spinal cord and formation of spinal nerve
- Elementary idea of Cavities of brain
- Enumerate Cranial nerves and their attachment on the surface of brain.

RECOMMENDED BOOKS:

1. Clinical Anatomy for Medical Students, by: Richard S. Snell
2. General Anatomy, by: Vishram Singh
3. General Anatomy, by: B.D.Chaurasia
4. Embryology for Medical Students, by: Inderbir Singh
5. Text Book of Histology, by: Inderbir Singh

SUBJECT- ANATOMY PRACTICAL
SUBJECT CODE- ANY103
(w.e.f July 2019)

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COURSE CONTENTS:

- Identification, side determination and anatomical position of Bones of superior extremity, inferior extremity, Thorax, Abdomen & Pelvis and Head & Neck
- Identification and side determination of organs and viscera.
- Identification of muscles, Nerves and Blood vessels on prosections of different regions of body.

RECOMMENDED BOOKS:

1. Clinical Anatomy for Medical Students, by: Richard S. Snell
2. General Anatomy, by: Vishram Singh
3. General Anatomy, by: B.D.Chaurasia
4. Embryology for Medical Students, by: Inderbir Singh
5. Text Book of Histology, by: Inderbir Singh

SUBJECT- ESSENTIALS OF PHYSIOLOGY-I
SUBJECT CODE- HPY104
(w` .e.f July 2019)

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COURSE CONTENTS:

UNIT-I GENERAL AND CELLULAR PHYSIOLOGY: (08)

Cell as the living unit of the body, the internal environment, control system, homeostasis, organization of the cell, physical structure of the cell, transport across the cell membrane, resting membrane potential, Nernst equation, equilibrium potential, Goldman equation, composition of ECF and ICF.

UNIT-II NERVE AND MUSCLE PHYSIOLOGY: (12)

Neuron structure, function and classification, neuroglia, resting membrane potential of nerve and muscle, action potential, nerve conduction, classification of nerve fiber, degeneration and regeneration of nerve, functional anatomy of skeletal muscle, neuromuscular junction, transmission and its blockers. Excitation - contraction coupling, mechanism of muscle contraction, smooth muscle.

UNIT-III BLOODS: (24)

Function and composition of blood, Structure and function of RBC, formation of hemoglobin, Destruction and fate of RBC, Anemia, polycythemia, Leucocytes (WBC) general characteristics, genesis and life span of WBC, Classification and function of each type of WBC, leucocytosis, leucopenia, leukemia. Blood groups, classification, immunoglobins, antigenicity, agglutination, blood typing, transfusion, mismatched transfusion and its effects, Rh factor, Rh incompatibility, components of Hemostasis, coagulation factors, mechanism of coagulation, coagulation tests, anticoagulants, immunity innate and acquired immunity, allergic reactions, immunodeficiency.

UNIT –IV RESPIRATORY PHYSIOLOGY: (20)

Functional anatomy of respiratory system, pleura, mechanism of breathing, dead space, surfactants, dynamic and static lung. volume capacity, pulmonary and alveolar ventilation, principles of gas exchange, oxygen and carbon dioxide transport, surfactant, regulation of respiration, hypoxia, oxygen therapy and toxicity, artificial respiration, high altitude physiology, deep sea diving, abnormal breathing.

UNIT-V RENAL PHYSIOLOGY:

(18)

Functional anatomy of Kidney, Structure of nephron, functions of kidney, Juxtaglomerular apparatus, urine formation, counter current mechanism, acidification of urine, renal handling of glucose, sodium potassium bicarbonates and other substances. Regulation of acid base balance, Micturition, diuretics, renal function test, renal failure.

UNIT-VI GASTROINTESTINAL SYSTEM:

(18)

Functional anatomy, general principles and organization of GI functions, salivary glands secretion, function of saliva, deglutition, esophageal motility, vomiting, functions of stomach, functions composition and regulation of gastric juices, gastric mucosal barrier, pancreatic juice composition secretion and functions, hepato biliary system functions of liver its physiological anatomy, bile composition and function, GIT motility, digestion and absorption functions of small and large intestines defecation reflex, GIT hormones.

RECOMMENDED BOOKS:

1. Guyton. A. Text Book of Medical Physiology, Elsevier Publication
2. Ganong, W.F. Reviews of Medical Physiology Lange Publication
3. Khurana I, Text Book of Physiology
4. Berne V Principal of Physiology Elsevier Mosby Publication
5. A. K. Jain Text Book of Physiology
6. A. K. Jain Practical Physiology
7. C. L. Ghai Practical Physiology
8. Neurophysiology Kandel
9. Human Physiology from cells to system aurelee Sherwood
10. Human Physiology Best and Tylor

SUBJECT- ESSENTIALS OF PHYSIOLOGY-II
SUBJECT CODE- HPY105
(w.e.f July 2019)

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COURSE CONTENTS:

UNIT-I CARDIOVASCULAR PHYSIOLOGY: [24]

Cardiac muscle, physiological anatomy of heart and conduction system, cardiac action potential, Nutrition and metabolism of heart, generation and conduction of cardiac impulse, ECG, Arrhythmias, cardiac cycle, heart sound, cardiac output, principle of hemodynamic, neurohumoral regulation of cardiovascular function, microcirculation and lymphatic system, regional circulation; cardiac failure, circulatory shock.

UNIT-II CENTRAL NERVOUS SYSTEM: [26]

General organization of CNS and PNS, interneuronal communication, Classification of somatic senses, sensory receptors, sensory transduction information processing, structure of spinal cord, sensory modalities, sensory pathways, somatosensory cortex, association areas, pain, motor system (muscle spindle, golgi tendon organ, reflex arc, reflexes) motor cortex, corticospinal and extra pyramidal tracts, brain stem and cortical control of motor function, cerebellum, thalamus, hypothalamus, basal ganglia, maintenance of posture and equilibrium, limbic system, RAS higher function, sleep. Organisation of ANS, sympathetic and parasympathetic nervous system, Neuro transmitter, effects of sympathetic and parasympathetic stimuli.

UNIT -III SPECIAL SENSES: [12]

(Functional anatomy, refractive errors, visual pathway lesions of visual pathway rod and cone and there functions, dark and light adaptation, accommodation reflex,) Ear (functional anatomy middle ear and internal ear, mechanism of hearing, auditory pathway, deafness.) Taste and olfaction.

UNIT-IV ENDOCRINE SYSTEM: [24]

Classification of hormones, mechanism of hormones actions, pituitary gland, hypothalamus, thyroid glands, parathyroid glands ,calcitonin, vitD and calcium metabolism, adrenal gland, endocrine pancreas, Pathophysiology of diabetes, penial gland.

UNIT –V REPRODUCTIVE SYSTEM:

[14]

General organization of male and female reproductive system, male spermatogenesis and action of testosterone, male sex hormones, hyper and hypogonadism, menstrual cycle, female sex hormones, pregnancy and lactation, function of placenta, parturition, lactation.

RECOMMENDED BOOKS:

1. Guyton. A. Text Book of Medical Physiology, Elsevier Publication
2. Ganong, W.F.Reviews of Medical Physiology Lange Publication
3. Khurana I, Text Book of Physiology
4. Berne V Principal of Physiology Elsevier Mosby Publication
5. A. K. Jain Text Book of Physiology
6. A. K. Jain Practical Physiology
7. C. L. Ghai Practical Physiology
8. Neurophysiology Kandel
9. Human Physiology from cells to system aurelee Sherwood
10. Human Physiology Best and Tylor

SUBJECT- PHYSIOLOGY PRACTICAL
SUBJECT CODE- HPY106
(w.e.f July 2019)

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COURSE CONTENTS:

I. HAEMATOLOGY:

- To study different parts of Compound Microscope and its uses
- To draw and study the different types of blood cells in a stained blood film.
- To do differential leucocyte count (DLC) of your own blood.
- To study haemocytometer and calculation for total leucocyte count and total RBC count.
- To do total leucocyte count (TLC) of your own blood.
- To do total RBC count of your own blood.
- Estimation of haemoglobin content of your own blood by sahli's method
- To calculate haematological indices of your own blood.
- To do reticulocyte count of your own blood.
- To do platelet count of your own blood.
- To find out the blood group of your own blood.
- To prepare haemin crystal of your own blood.
- To find out the bleeding time and clotting time of your own blood.
- To determine the erythrocyte sedimentation rate of the blood sample

II. EXPERIMENTAL LAB (STUDY THE GRAPHS):

- General apparatus used in experimental physiology lab.
- To study a simple muscle twitch and to find out the time interval of various phases of a simple muscle curve.
- To study the effect of temperature on the frog muscle nerve preparation.
- To study the effect of strength of stimuli on muscle contraction of sciatic nerve gastronemius muscle preparation of the frog.
- To study the effect of summation of stimuli..
- To study the effect of two successive stimuli in a m.n.p. resulting in summation of effect.
- To study the genesis of tetanus.
- To study freeload and afterload.
- To study the phenomenon of fatigue gastronemius muscle preparation of the frog.

- To study the conduction velocity of sciatic nerve in the frog.
- To study the normal cardiogram of frog and study the effect of temperature on it.
- To study the effect of drugs on frogs heart.
- To study the graph of extrasystole and compensatory pause.
- To study the graphs of properties of cardiac muscle: All or none law and threshold.
- To study the effects of sympathetic and parasympathetic stimulation on smooth muscle motility.

III. CLINICAL PHYSIOLOGY:

- Introduction to lab, general examination including vitals, communication skills and ethics.
- Examination of arterial pulse and study the effect of exercise on it.
- Recording of blood pressure.
- To study the effect of change of posture on blood pressure.
- To study the effect of exercise on blood pressure.
- Examination of cardiovascular system.
- Recording of Electrocardiogram.
- To record vital capacity using Vitalograph.
- Examination of respiratory system.
- Examination of abdominal system (basics).
- Examination of Nervous system: Higher functions, Cranial nerves, sensory and motor system examination, reflexes.

RECOMMENDED BOOKS:

1. Guyton. A. Rext Book of Medical Physiology, Elsevier Publication
2. Ganong, W.F.Reviews of Medical Physiology Lange Publication
3. Khurana I, Text Book of Physiology
4. Berne V Principal of Physiology Elsevier Mosby Publication
5. A. K. Jain Text Book of Physiology
6. A. K. Jain Practical Physiology
7. C. L. Ghai Practical Physiology
8. Neurophysiology Kandel
9. Human Physiology from cells to system aurelee Sherwood
10. Human Physiology Best and Tylor

SUBJECT- ESSENTIALS OF BIOCHEMISTRY-I
SUBJECT CODE- BCY107
(w.e.f July 2019)

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COURSE CONTENTS:

1. Cell composition, subcellular organelles, nucleus, endoplasmic reticulum, Golgi apparatus, lysosomes, peroxisomes, mitochondria, fluid mosaic model, cytoskeleton, transport mechanisms, facilitated diffusion, Ion channels, active transport, sodium pump. [12]

2. Chemistry, basic properties, type, structure, classification and functions of carbohydrates, lipids, amino acids, proteins, nucleotides, nucleic acids, hormones, chemistry of blood, hemoglobin and plasma proteins, chemistry of respiration. [14]

3. Classification of enzymes, co-enzymes, mode of action of enzymes, Michaelis constant, enzyme kinetics, factors influencing enzyme activity, enzyme inhibition: competitive inhibition, non-competitive inhibition, suicide inhibition, Specificity of enzymes, Clinical enzymology. [14]

4. Calorific value of food, Basal Metabolic Rate, specific dynamic action, nutritional requirements, dietary fibres. Protein Energy Malnutrition, obesity. Fat soluble vitamins (A, D, E, K) – chemistry functions, requirements and deficiency manifestations. Water soluble vitamins (B, C) – chemistry functions, requirements and deficiency manifestations. Functions, requirements and deficiency manifestations of major and trace elements. [14]

5. Redox potential, Biological oxidation, high energy compounds, organization of electron transport chain, flow of electrons, Oxidative phosphorylation, Chemi-osmotic theory, ATP synthase, inhibitors of ATP synthesis, Uncouplers of Oxidative phosphorylation. Free radicals, Reactive oxygen species, free radical scavenger systems, Lipid peroxidation, Chain breaking anti-oxidants, Preventive anti-oxidants. [14]

6. Mechanisms of Acid-base balance, Henderson-Hasselbalch equation, buffers, Acidosis and Alkalosis. Electrolyte concentration of body fluid compartments, regulation of sodium and water balance, hypotonic contraction and expansion, isotonic contraction and expansion. [12]

RECOMMENDED BOOKS:

1. Lubert Stryer (Ed.), Biochemistry, W.H.Freeman & Company, New York.
2. Lehninger, Nelson & Cox (Ed.), Harpers Biochemistry, CBS Publishers & Distributors.
3. Murray R.K. & P.A. Mayes (Ed.) Harpers Biochemistry, D.K. Granner.
4. Thomas M. Devlin (Ed.), Text book of Biochemistry with Clinical Correlations, Wiley Liss Publishers.
5. Benjamin Lewin (Ed.), Genes VI, Oxford University Press.
6. Srivastava & Moudgal (Ed.), Text Book of Medical Biochemistry and Human Biology

SUBJECT- ESSENTIALS OF BIOCHEMISTRY-II
SUBJECT CODE- BCY108
(w.e.f July 2019)

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COURSE CONTENTS:

1. Digestion and absorption of carbohydrates, proteins and lipids. Digestion of medium chain fatty acids, absorption of amino acids. [12]
2. Major and minor metabolic pathways of glucose: Glycolysis, Gluconeogenesis, Glycogen synthesis and breakdown. Hexose mono phosphates shunt pathways, Uronic acid pathway, galactose, mannose and fructose metabolism. Metabolism of fatty acids. Synthesis of triglycerides, Cholesterol, Lipoproteins and Amino acid metabolic, uric cycle. Citric acid cycle, significance of TCA cycle, amphibolic role, regulation, metabolic adaptations during starvation and metabolic profile in organs. Detoxification and biotransformation of Xenobiotics. [20]
3. Basics of purine and pyridine nucleotides metabolism. Basics of replication of DNA, transcription, post-transcriptional processing, genetic code, translation, post-translational processing. Recombinant DNA technology. Molecular biology techniques: blotting techniques, DNA finger printing, RFLP, DNA sequencing, PCR, hybridoma technology. [16]
4. Basics elements of Immunology, structure of immunoglobulins, classes of immunoglobulins, immunodeficiency states, molecular structure of antigens, HLA antigens, cytokines and lymphokines. [16]
5. Body fluids and its composition: milk, colostrums, Aqueous humor, cerebrospinal fluid, amniotic fluid, urine-normal and abnormal constituents. Tissue proteins in health and disease. Liver and gastric function tests: Makers of epatic dysfunction, tests for lever function tests for gastric function. Markers of obstructive liver disease, assessment of free and total acidity in gastric juice. [16]

RECOMMENDED BOOKS:

1. Lubert Stryer (Ed.), Biochemistry, W.H.Freeman & Company, New York.
2. Lehniger, Nelson & Cox (Ed.), Harpers Biochemistry, CBS Publishers & Distributors.
3. Murray R.K. & P.A. Mayes (Ed.) Harpers Biochemistry, D.K. Granner.
4. Thomas M. Devlin (Ed.), Text book of Biochemistry with Clinical Correlations, Wiley Liss Publishers.
5. Benjamin Lewin (Ed.), Genes VI, Oxford University Press.
6. Srivastava & Moudgal (Ed.), Text Book of Medical Biochemistry and Human Biology.

SUBJECT- BIOCHEMISTRY PRACTICAL
SUBJECT CODE-BCY109
(w.e.f July 2019)

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COURSE CONTENTS:

1. Introduction: Handling of chemicals, preparation of reagents pipetting etc
2. Tests of carbohydrates
3. Tests for Lipids
4. Tests for proteins
5. Precipitation reactions of protein
6. Individual proteins – Albumin, Gloulin, Casein & Gelatin
7. Unknown protein identification
8. Milk analysis
9. Starch digestion by salivary amylase and products
10. Normal constituents of urine
11. Abnormal constituents of urine and reporting of abnormal urine
12. Estimation of free and total acidity in the gastric juice, gastric function test.
13. Glucose estimation in urine
14. Ascorbic acid (Vitamin C) estimation
15. Verification of Beer's Lambert Law. Principles of colorimetry and spectrophotometry in Quantitative analysis of biomolecules
16. Estimation of serum acids.
17. Estimation of total plasma protein and albumin levels and calculation of A/G Ratio
18. Estimation of Amino Acids
19. Estimation of Serum Urea level
20. Estimation of Serum Uric Acid level
21. Estimation of Serum Creatinine level
22. Estimation of Macro elements-Na. K, Copper
23. Estimation of Micro elements – Iron, Zinc, Copper
24. Vitamin - C saturation test
25. Estimation of RNA in terms of Ribose sugar
26. Estimation of DNA in terms of deoxy-ribose sugar

RECOMMENDED BOOKS:

1. Brutis & Ashwood W.B. (Ed.). Tietz Textbook of Clinical Chemistry, Saunders Company
2. Keith Wilson & John Walker (Ed.) Principles & Techniques of Practical Biochemistry, Cambridge University, Press.
3. Varley's Practical Clinical Biochemistry Vol. I & II.

INTEGRAL UNIVERSITY, LUCKNOW
**INTEGRAL INSTITUTE OF MEDICAL SCIENCES
& RESEARCH**

SYLLABUS

FOR

**M.Sc. (MEDICAL PHYSIOLOGY),
SECOND YEAR**

SESSION-2019-20

(DEPARTMENT OF PHYSIOLOGY)

SUBJECT- PHYSIOLOGY-I
SUBJECT CODE- HPY201
(w.e.f July 2019)

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COURSE CONTENTS:

GENERAL AND CELL PHYSIOLOGY:

UNIT-I

Cell as the living unit of the body, the internal environment, control system, homeostasis, positive and negative feedback.

UNIT-II

Organization of the cell, physical structure of the cell, cell organelle, transport across the cell membrane diffusion, osmosis, active transport, secondary active transport, vesicular transport, G protein.

UNIT-III

Resting membrane potential, Nerst equation, equilibrium potential, gibbs and donnnan effect, goldman equation, Action potential.

UNIT-IV

Body water and body fluids, introduction, distribution of total body water, extracellular and intra cellular fluid, measurement of body fluid, ionic composition of body fluid, Moles, equivalent, Osmoles, concept of pH and hydrogen ion concentration.

NERVE AND MUSCLE PHYSIOLOGY:

UNIT-I

Neuron structure, function and classification, myelinated and unmyelinated nerves, neuroglia, nerve growth factor, metabolism in the nerve fiber, Physiological properties of nerve fibre.

UNIT-II

Resting membrane potential genesis of, action potential, origin, phases, properties electrotonic potential, extracellular recording-biphasic and monophasic.

UNIT-III

Nerve conduction, classification of nerve fiber, properties of mixed nerves, degeneration and regeneration of nerve.

UNIT-IV

Functional anatomy of skeletal muscle, neuromuscular junction, transmission and its blockers, excitation - contraction coupling, mechanism of muscle contraction, energy sources of muscle contraction.

UNIT-V

Smooth muscle general features, single unit and multi unit, properties of smooth muscle, nerve supply, Excitatory junctional potential, denervation hyper sensitivity, effect of various agents on membrane potential of intestinal smooth muscle.

BLOOD:

UNIT-I

Function and composition of blood, serum, plasma proteins and their functions, Structure of hemoglobin, formation of hemoglobin, types of hemoglobin.

UNIT-II

Structure and function RBC, RBC indices, Erythropoiesis and Destruction and fate of RBC, Anemia, polycythemia. Leucocytes (WBC) general characteristics, genesis and life span of WBC, Classification and function of each type of WBC, leucocytosis, leucopenia, leukemia.

UNIT-III

Platelets, structure, count, and variations, thrombopoiesis, functions, components of hemostasis, coagulation factors, mechanism of coagulation, coagulation test, anticoagulant.

UNIT-IV

Blood group, classification, immunoglobins, antigenicity, agglutination, blood typing, transfusion, mismatched transfusion and its effect, Rh factor, Rh incompatibility.

UNIT-V

Immunity innate and acquired immunity, allergic reactions, immunological tolerance, recognition of self, autoimmunization, organ transplant, immunodeficiency.

SUBJECT- PHYSIOLOGY-II
SUBJECT CODE- HPY202
(w.e.f July 2019)

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COURSE CONTENTS:

RESPIRATORY PHYSIOLOGY:

UNIT-I

Passage of air, Tracheobronchial tree, properties of gases, non respiratory functions of respiratory system.

UNIT-II

Mechanism of breathing, pressure changes during ventilation, dead space, dynamic and static lung volume capacity, alveolar surface tension, surfactants compliance, work done during breathing, airway resistance, pulmonary and alveolar ventilation, V/P ratio, Diffusion capacity of lung.

UNIT-III

Principles of gas exchange, oxygen and carbon dioxide transport, Oxygen hemoglobin dissociation curve.

UNIT-IV

Regulation of respiration, Nervous regulation, respiratory centers, genesis of respiration, chemical regulation of respiration, chemoreceptors, dyspea, breath holding, asphyxia, drowning, periodic breathing.

UNIT-V

Hypoxia, high altitude physiology, oxygen therapy and toxicity, artificial respiration deep sea diving. Pulmonary function test.

RENAL PHYSIOLOGY:

UNIT-I

Functions of kidney, Structure of nephron, types of neurons, juxta glomerular apparatus, renal blood vessels, peculiarities of renal circulation.

UNIT-II

Glomerular filtration GFR, filtration fraction, reabsorption and secretion in renal tubules glucose potassium, bicarbonates, hydrogen, ions, urine formation.

UNIT-III

Renal clearance, significance, measure of GFR, tubular secretory capacity, RPF, RBF, osmotic and free water clearance.

UNIT-IV

Counter current mechanism, multiplier and exchange, role of urea. acidification of urine, Regulation of acid base balance.

UNIT-V

Definition of Micturition, anatomy nerve supply and postural activity of urinary bladder, Micturition reflex, mechanism of voluntary Micturition and its reflex control, diuretics, renal function test, renal failure.

CARDIOVASCULAR SYSTEM:

UNIT-I

Physiological anatomy of heart conduction system, properties of cardiac muscle cardiac action potential, Nutrition and metabolism of heart, generation and conduction of cardiac impulse.

UNIT-II

Normal ECG, electrocardiograph, cardiac vector, heart block, extra systole, Arrhythmias, WPW syndrome, Myocardial infarction, effect of changes in the ionic composition of blood.

UNIT-III

Cardiac cycle, heart sound, JVP, HR, cardiac output, Heterometric and homometric regulation of cardiac output. Methods of CO measurements.

UNIT-V

Principle of hemodynamics, arterial blood pressure, cardiovascular regulatory mechanism, Baroreceptor and chemoreceptors.

UNIT-IV

Microcirculation and lymphatic system, regional circulation; cardiac failure, circulatory shock.

RECOMMENDED BOOKS:

1. Guyton, Text Book of Medical physiology, Elsevier Publication
2. Ganong Review of Medical physiology Lange Publication
3. Khurana Indu, Medical Physiology for Undergraduate Students
4. Berne V Principal of physiology Elsevier Mosby Publication
5. A.K. Jain Text Book of Physiology, Arya Publication
6. Neurophysiology Kandel
7. Human physiology from cells to system Lauralee Sherwood
8. Human physiology Best and Taylor
9. Human Physiology, CC Chaterjee
10. Fundamentals of medical physiology, L Prakasam Reddy

SUBJECT- PHYSIOLOGY PRACTICAL
SUBJECT CODE- HPY203
(w.e.f July 2019)

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COURSE CONTENTS:

(a) Haematology:

- To study the different parts of a compound microscope and its uses.
- To draw and study the different types of blood cells in a stained blood film.
- To do differential leucocyte count (DLC) of your own blood.
- To do an Arneht count of your own blood.
- To study haemocytometer and calculations for total leucocyte count and total RBC count.
- To do total leucocyte count (TLC) of your own blood.
- To do total RBC count(TRBC) of your own blood

(b) Experimental lab:

- General apparatus used in experimental physiology lab
- To study graph of simple muscle twitch and to find out the time interval of various phases of a simple muscle curve.
- To study the effect of temperature on the frog muscle nerve preparation.
- To study the effect of strength of stimuli on muscle contraction of sciatic nerve gastronemius muscle preparation of the frog.
- To study the effect of summation of stimuli.
- To study the effect of two successive stimuli in a muscle nerve preparation resulting in summation of effect.
- To study the genesis of tetanus.

(c) Human Physiology:

- Examination of cardiovascular system.
- Examination of arterial pulse and to study the effect of exercise on it
- Recording of arterial pulse.
- Recording of Electrocardiogram.
- Recording of human blood pressure
- To study the effect of change of posture on blood pressure.
- To study the effect of exercise on blood pressure.
- To determine Vital capacity
- Determine the basic metabolic rate.

RECOMMENDED BOOKS:

1. A.K. Jain Practical Physiology
2. C.L. Ghai Practical Physiology

SUBJECT- TEACHING METHODOLOGY
SUBJECT CODE- TMY204
(w.e.f July 2019)

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COURSE CONTENTS:

1. Challenges for teachers in medical Education
2. Teaching strategies
 - Lecture method
 - Small group teaching
 - Inquiry and problem solving methods
 - Case study Team project
 - Presentation
 - Seminar
 - Field visit
 - Simulation
 - Computer based instructions
 - Bed side learning
 - One to one teaching
 - Self directed teaching
3. Preparation of lesson
4. Selection of teaching methods
5. Identification and review of literature
6. Identification of teaching resources
7. Developing teaching aids for instructional activities that link research and theory to practice
8. Contact development: key element of curriculum design and evaluation
9. Implementation and monitoring of curriculum transaction and student's evaluation
10. Student feedback: designing and implementation
11. Research paper writing

SUBJECT- RESEARCH METHODOLOGY
SUBJECT CODE- RMY205
(w.e.f July 2019)

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COURSE CONTENTS:

1. Methods of collection of data, classifications and graphical representation of data. Binomial and normal probability distribution. Polygon, histogram, measure of central tendency. Signification of statistical methods, probability, degree of freedom, measure of variation – Standard deviation, Standard error.
2. Sampling, sample size and power. Statistical inference and hypothesis. Tests for statistical significance: t-test, Chi-square test, confidence level, Null hypothesis.
3. Linear regression and correlation. Analysis of variance (one way and two ways) Factorial designs (including fraction factorial design). Theory of probability, Permutation and Combination, Ratios, Percentage and Proportion. Two ways ANOVA and Multiple comparison procedures.
4. Non-parametric tests, Experimental design in clinical trials, Statistical quality control, validation, optimization techniques and screening design. Correlation and regression, least square method, significance of coefficient of correlation, nonlinear regression.
5. Report Preparation: Types and Layout of Research Report, Precautions in Preparing the Research Report. Bibliography and Annexure in the Report: Their Significance, Drawing Conclusions, Suggestions and Recommendations to the Concerned Persons. Use of SPSS in Data Analysis.

RECOMMENDED BOOKS:

1. Cooper & Schindler, Business Research Methods, Tata McGraw Hill
2. Saunders Research Methods for Business Student, Pearson Education
3. Malhotra Naresh K., Marketing Research, Pearson Education.
4. Fisher, R.A., Statistical Methods for Research Works, Oliver & Boyd, Edinburgh.
5. Chow, Statistical Design and Analysis of Stability Studies, Marcel Dekker, New York.
6. Finney, D.J., Statistical Methods in Biological Assays, Hafner, New York.
7. Montgomery, D.C., Introduction to Statistical Quality Control, Willy.
8. Lipschutz, Introduction to Probability and Statistics, McGraw-Hill.

SUBJECT- FUNDAMENTALS OF COMPUTER
SUBJECT CODE- FCY206
(w.e.f July 2019)

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COURSE CONTENTS:

1. Basic computer organization functionally computer codes computer classification Boolean algebra, primary storage, secondary storage devices, input-output device, computer software, computer languages, operating system, business data processing concepts, data communication and networks and advances.
2. Planning the computer program, algorithm, flowcharts and decision tables.
3. Writing simple programs in 'C', Numeric constants and variables. Arithmetic Expressions, Input & Output in 'C' Programs, conditional statements, implementing loops in programs, arrays, logical expressions and control statements such as switch, break and continue functions, processing character strings, files in 'C'.
4. MS Office (Word, Excel, Power Point), Basic Database concept and classification, operations performed on database, using MS Access. Internet Features.
5. Computer applications in Biochemistry and clinical studies.

RECOMMENDED BOOKS:

1. Sinha, R.K. Computer Fundamentals, BPB Publications
2. Raja Raman, V, Computer Programming in 'C', PHI Publication
3. Hunt N & Shelley J., Computers and Common Sense, PHI Publication

INTEGRAL UNIVERSITY, LUCKNOW
**INTEGRAL INSTITUTE OF MEDICAL SCIENCES
& RESEARCH**

SYLLABUS

FOR

**M.Sc. (MEDICAL PHYSIOLOGY),
THIRD YEAR**

SESSION-2019-20

(DEPARTMENT OF PHYSIOLOGY)

SUBJECT- PHYSIOLOGY-I
SUBJECT CODE- HPY301
(w.e.f July 2019)

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COURSE CONTENTS:

CENTRAL NERVOUS SYSTEM:

UNIT-I

General organization of CNS and PNS, interneuronal communication.

UNIT-II

Classification of somatic senses, sensory receptors, sensory transduction, information processing.

UNIT-III

Structure of spinal cord, sensory modalities, sensory pathways, somatosensory cortex, association areas, pain.

UNIT-IV

Motor system (muscle spindle, golgi tendon organ, reflex arc, reflexes) motor cortex, corticospinal and extra pyramidal tracts, brain stem and cortical control of motor function.

UNIT-V

Cerebellum, thalamus, hypothalamus, basal ganglia, maintenance of posture and equilibrium, limbic system, RAS, higher function, sleep.

ANS, SPECIAL SENSES:

UNIT-I

Organisation of ANS, sympathetic and parasympathetic nervous system, neurotransmitter, effect of sympathetic and parasympathetic stimuli.

UNIT-II

Eye (functional anatomy, refractive errors, visual pathway lesions of visual pathway rod and cone and their functions, dark and light adaptation, accommodation reflex,).

UNIT-III

Ear Functional anatomy middle ear and internal ear, properties of the sound, mechanism of hearing, auditory pathway, deafness. Tests of hearing.

UNIT-IV

Taste receptors or taste buds, physiology of taste, taste pathway, applied.

UNIT-V

Olfaction olfactory receptor, olfactory pathway, physiology of olfaction, applied.

RECOMMENDED BOOKS:

1. Guyton, Text Book of Medical physiology, Elsevier Publication
2. Ganong Review of Medical physiology Lange Publication
3. Khurana Indu, Medical Physiology for Undergraduate Students
4. Berne V Principal of physiology Elsevier Mosby Publication
5. A.K. Jain Text Book of Physiology, Arya Publication
6. Neurophysiology Kandel
7. Human physiology from cells to system Lauralee Sherwood
8. Human physiology Best and Taylor
9. Human Physiology, CC Chaterjee
10. Fundamentals of medical physiology, L Prakasam Reddy

SUBJECT- PHYSIOLOGY-II
SUBJECT CODE- HPY302
(w.e.f July 2019)

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COURSE CONTENTS:

GASTROINTESTINAL SYSTEM:

UNIT-I

Functional anatomy general principals and organization of Gastrointestinal system, function, salivary glands secretion, function of saliva, and control of salivary secretion.

UNIT-II

Mastication, deglutition, esophageal motility, vomiting, Aerophagia, achlasia cardia, function of stomach, function composition and regulation of gastric juices, gastric function test, mucosalmucosal barrier, peptic ulcer.

UNIT-III

Pancreatic juice composition, secretion and function and regulation of pancreatic secretion, hepato biliary system functions of liver its physiological anatomy, bile composition and function.

UNIT-IV

GIT motility, digestion and absorption of food.

UNIT-V

Functions of small and large intestine, defecation reflex, GIT hormones.

ENDOCRINE SYSTEM:

UNIT-I

Classification of hormones, mechanism of hormones action and regulation of secretion of hormone.

UNIT-II

Pituitary gland, anatomy, Anterior pituitary (action, and control of secretion, of growth hormone, gigantism, acromegaly, dwarfism, physiology of growth, actions and control of secretion of Prolactin, Posterior pituitary, actions and control of secretion of ADH and oxytocin, SIADH, diabetes insipidus Pituitary insufficiency, hypothalamus.

UNIT-III

Thyroid gland physiology anatomy, formation secretion, transports metabolism actions. Goiter, myxoedema, cretinism, graves' disease, anti thyroid drugs, thyroid

function test, parathyroid gland calcitonin, vitD and calcium metabolism and parathyroid disorder.

UNIT-IV

Adrenal gland, adrenal cortex hormones, formation secretion, transport regulation and metabolism actions, Cushing syndrome, primary and secondary, hyperaldosteronism (Conn's Addison's syndrome) adrenal cortex function test adrenal medulla physiological anatomy, formation secretion, transport metabolism actions and its application.

UNIT-V

The endocrine pancreas, insulin and glucagon formation secretion, transport regulation and metabolism actions, Pathophysiology of diabetes, pineal gland melatonin, local hormones and Autocoids.

RECOMMENDED BOOKS:

1. Guyton, Text Book of Medical physiology, Elsevier Publication
2. Ganong Review of Medical physiology Lange Publication
3. Khurana Indu, Medical Physiology for Undergraduate Students
4. Berne V Principal of physiology Elsevier Mosby Publication
5. A.K. Jain Text Book of Physiology, Arya Publication
6. Neurophysiology Kandel
7. Human physiology from cells to system Lauralee Sherwood
8. Human physiology Best and Taylor
9. Human Physiology, CC Chatterjee
10. Fundamentals of medical physiology, L Prakasam Reddy
11. Fundamentals of medical physiology, L Prakasam Reddy

SUBJECT- PHYSIOLOGY-III
SUBJECT CODE- HPY303
(w.e.f July 2019)

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COURSE CONTENTS:

REPRODUCTIVE SYSTEM:

UNIT-I

Physiology of reproduction, sex determination and differentiation, abnormality of human sex development, puberty reproductive hormone, gonadotrophin hormones (FSH,LH)

UNIT-II

General organization of male and female reproductive system, male spermatogenesis and action of testosterone, male sex hormones, hyper and hypogonadism, menstrual cycle, female sex hormones, pregnancy and lactation, function of placenta, parturition, fetal circulation and changes after birth.

UNIT-III

Physiology of Coitus and Contraceptive Measures. Life; Nutrition of the new born infant; the breast and lactation.

RECOMMENDED BOOKS:

1. Guyton, Text Book of Medical physiology, Elsevier Publication
2. Ganong Review of Medical physiology Lange Publication
3. Khurana Indu, Medical Physiology for Undergraduate Students
4. Berne V Principal of physiology Elsevier Mosby Publication
5. A.K. Jain Text Book of Physiology, Arya Publication
6. Neurophysiology Kandel
7. Human physiology from cells to system Lauralee Sherwood
8. Human physiology Best and Taylor
9. Human Physiology, CC Chaterjee
10. Fundamentals of medical physiology, L Prakasam Reddy

SUBJECT- PHYSIOLOGY PRACTICAL
SUBJECT CODE- HPY304
(w.e.f July 2019)

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COURSE CONTENTS:

(A) Hematology:

1. Estimation of haemoglobin content of your own blood by sahli's method.
2. To calculate hematological indices or absolute value of your own blood.
3. To do platelet count of your own blood.
4. To find out the blood group of your own blood.
5. To prepare haemin crystal of your own blood.
6. To find out the bleeding time and clotting time of your own blood.
7. To determine the erythrocyte sedimentation rate of the blood sample.

(B) Experimental lab:

1. General apparatus used in experimental physiology lab.
2. To study a simple muscle twitch and to find out the time interval of various phases of a simple muscle curve.
3. To study the effect of temperature on the frog muscle nerve preparation.
4. To study the effect of strength of stimuli on muscle contraction of sciatic nerve gastronemius muscle preparation of the frog.
5. To study the effect of summation of stimuli..
6. To study the effect of two successive stimuli in a m.n.p. resulting in summation of effect.
7. To study the genesis of tetanus.
8. To study freeload and afterload.
9. To study the phenomenon of fatigue gastronemius muscle preparation of the frog.
10. To study the conduction velocity of sciatic nerve in the frog.
11. To study the normal cardiogram of frog and study the effect of temperature on it.
12. To study the effect of drugs on frogs heart.
13. To study the graph of extrasystole and compensatory pause.
14. To study the graphs of properties of cardiac muscle: All or none law and threshold.
15. To study the effects of sympathetic and parasympathetic stimulation on smooth muscle motility.

RECOMMENDED BOOKS:

3. A.K. Jain Practical Physiology
4. C.L. Ghai Practical Physiology

SUBJECT- DISSERTATION
SUBJECT CODE- HPY305
(w.e.f July 2019)

COURSE CONTENTS:

Course HPY305 consists of dissertation, Students are allocated individually to internal, external faculty or research scientist. The format for dissertation is similar to the thesis style incorporating introduction, materials and methods, results, discussion and bibliography. A candidate will select a topic on current researches in the field of Medical Physiology at the beginning of year III. A candidate has to get approved the short synopsis and title to the dissertation/ research project within the first six months. The research project work has to be completed within the last six months of year III. The dissertation will be submitted in a type written and bound form and a copy of each dissertation is submitted to the Department for permanent record towards the end of year III.