SGT UNIVERSITY
SHREE GURU GOBIND SINGH TRICENTENARY UNIVERSITY
(UGC Approved) Gurugram, Delhi-NCR
Budhera, Gurugram-Badli Road, Gurugram (Haryana) – 122505 Ph. : 0124-2278183, 2278184, 2278185

Faculty of Medicine and Health Sciences

M.Sc

Syllabus

2017

YEAR –I

Basics of Anatomy.

General Anatomy

1. Anatomical terminology, Anatomical plane, Anatomical positions, Clinical positions, Terms related to movements
2. Basics of cytology: Structure of cell wall, Cell organelles, Junctional complexes
3. Musculoskeletal system:
   (a) Bones & c1assification, Morphology, ossification functions, blood supply (Osteology)
   (b) Muscles, Morphology, classification blood supply, innervations, functions (Myology)
4. Integumentary system: Thick Skin, Thin skin layers of dermis epidermis, Skin appendages, blood supply, innervations, functions
5. Cardiovascular system: Morphology of blood vessel, classification of blood vessels, blood capillaries, blood circulation, functions
6. Nervous system: Central Nervous system & Peripheral Nervous system, Gross basic Anatomy, Cranial nerves, Spinal nerves, Functions of nerves, Autonomic nervous system
7. Endocrine system: Classification, Hormone produced, Control of hormone secretion, basic functions
8. Lymphatic system: Formation of lymph, Lymphatic ducts, Thoracic duct, Lymph circulation, Functions

Regional Anatomy:-

1. Digestive system: Parts of digestive system, gross anatomy and functions
2. Excretory system: Parts of excretory system, gross a atomy of kidney, ureter, urinary bladder penis and their functions
3. Reproductive system: Male reproductive system - gross anatomy of testis, epididymis, vas-deferens, seminal vesicles and prostate. Female reproductive system- gross anatomy of ovaries, uterine tube, uterus, vagina, menstruation cycle
4. respiratory system:- Parts, Pleura & Lungs
5. Cardiovascular System:- Pericardium & Heart.
6. Nervous System:- Elementary Knowledge of cranial Nerves. Parts of Brain. Ventricles of the Brain.
7. Head & Neck:- Regions & organs, Glands, Nerves & vessels.
8. Basics of genetics: Cell division mitosis, meiosis, Cell cycle, Chromosomes

Gross anatomy (Elementary Anatomy):-

Gross anatomy would refer to elementary gross anatomy Anatomy of each part including functional, sectional and radiological anatomy

General Histology:-

Includes cell structure, cell division & basic tissues of the body e.g. epithelium, connective tissue, glands, bone and cartilage muscle- tissue, nervous tissue, vessels & lymphoid tissue, integumentary system

End

Kindly confirm whether the above course contents shall be common for all the following courses:

1. M.Sc. (Medical Anatomy) – 1st year
2. M.Sc. (Medical Biochemistry) – 1st year
3. M.Sc (Medical Microbiology) – 1st year
4. M.Sc (Medical Physiology) – 1st year
5. M.Sc (Medical Pharmacology) – 1st year

HODC Medical Anatomy) Yes / Amit Saxena

(Dr Amit Saxena)

GD UNIVERSITY C.O.E. GURGAON

Course Contents

Practical : Demonstration of the following

1. Anatomical terminology (anatomical plane, anatomical positions, other positions required in clinical practice, terms related to movements and sections etc.)
2. Basics of cytology
3. Musculoskeletal system
4. Integumentary system
5. Cardiovascular system
6. Nervous system
7. Endocrine system
8. Lymphatic system
9. Digestive system
10. Excretory system
11. Reproductive system
12. Basics of genetics (cell division, cell cycle)

Gross Anatomy on the dissected arts:-

1. Superior Extremities
   (a) Inferiors
   (b) Extremities
2. Thorax
   Abdomen
3. Pelvis
4. Head, Neck and face

Histology:

1. Microscopes – parts & functions of various components & how to use it.
2. Examination of common objects
3. Light microscopic structure of basic tissues of the body

Living anatomy:-

1. Includes body land marks, pressure points, palpation of various superficial arteries and Lymph node palpation
2. Demonstration of various movement of joints & individual muscles or muscle groups.

Surface marking:-

To mark the precise location of deeper structures in relation to the surface of the body.

Radiological anatomy:-

Normal study of plane x-rays in different views like AP, PA and Lateral etc.

This course content is applicable for all M.Sc. Courses except M.Sc. (Forensic Science). Pl confirm

HOD (Medical Anatomy) Yes Amit Saxena

(Dr Amit Saxena)

SGT UNIVERSITY C.O.E. GURGAON

M.Sc. (Medical Physiology) Year-I
BASICS OF PHYSIOLOGY

Course Code: MSC102 **L-5, T-0, P-0, S-I C-6**

Course Contents

1. **Cell Physiology**

   Cell Structure and membrane transport, Resting Membrane Potential, Composition of ECF and ICF, Nernst Equation, Equilibrium Potential, Goldmann Equation

2. **Nerve-Muscle and Biopotential**

   Neuron (structure, function and classification), Neuroglia, Action Potential, Neuromuscular junction, Skeletal Muscle (structure, mechanism of contraction and relaxation), Smooth Muscle (structure, mechanism of contraction and relaxation)

3. **Blood**

   Function and Composition, Erythrocytes, Haemoglobin, Blood groups, Leucocytes, Thrombocytes, Immunity

4. **Cardiovascular System**

   Cardiac Muscle, Physiological anatomy of heart and conduction system, Cardiac Action Potential, Normal ECG, Cardiac cycle, Heart sounds, Cardiac output and blood pressure, Coronary circulation

5. **Respiration**

   Functional anatomy of the respiratory system, Mechanism of breathing, Dead space, Surfactants

   Dynamic and static lung volumes and capacities, Transport of oxygen and carbon dioxide, Regulation of Respiration, Cyanosis, Hypoxia, Oxygen toxicity

6. **Gastrointestinal Tract**

   Functional anatomy, Salivary glands (secretion and function of saliva, deglutition), Stomach (composition, regulation of secretion and function of the gastric juice), Liver (secretion and function of bile), Pancreas (secretion and function), Intestines, Intestinal secretion (composition and function), Movements of Intestines, Hormones of GIT

7. **Excretory System**

   Function of kidney, Structure of nephron, Juxta glomerular apparatus, Formation of urine

   Counter current mechanism, Acidification of urine & role of kidney in maintenance of acid base balance, Renal function tests, Micturition

8. **Autonomic Nervous System**

   Organization of the ANS, Chemo-transmitters, Effect of sympathetic and parasympathetic stimulation on different organ systems

9. Central Nervous System

General organization of CNS & PNS, Sensory system :(General sensations, receptors, sensory pathways, sensory areas of brain)

Motor system: (muscle spindle, Golgi tendon organ, reflex arc, corticospinal and extra-pyramidal tracts)

Brain: Functions of: Cerebellum, thalamus, hypothalamus, basal ganglia, limbic system, reticular activating system; Higher Function: Sleep

10. Special Senses

Eye (functional anatomy, refractory indices of media, rods and cones, role of vitamin A, visual pathway), Ear (structure of internal ear, mechanism of hearing), Taste (distribution and structure of taste buds and taste papillae, primary taste modalities, taste pathway), Smell (olfactory epithelium and pathway)

11. Endocrine System

Mechanism of action of hormones, Functions of the following glands: Pituitary, thyroid, parathyroid, adrenal (cortex and medulla), pancreas

12. Reproductive System

General organization of male and female reproductive systems, Male: Spermatogenesis and actions of male sex hormones, Female: Sexual cycles and actions of female sex hormones, pregnancy, parturition and lactation. Family planning

Reference Books (Latest Edition)

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*, Elsevier Publication
4. Berne V, *Principles of Physiology*, Elsevier Mosby Publication.
5. Lippincott W &Wilkins, *Medical Physiology (Clinical Medicine)*, Rhodes &Bell.

Kindly confirm that the above course contents shall be common for all the following programmes

1. M.Sc (M. Anatomy) – 1st year.
2. M.Sc (Medical Biochemistry) – 1st year
3. M.Sc (Medical Microbiology) – 1st year
4. M.Sc (Medical Pharmacology) – 1st year
5. M.Sc (Medical Physiology) – 1st year.

3.9.14

HOD (Medical Physiology)

SGT UNIVERSITY C.O.E. GURGAON 3.9.14.

M.Sc. (MEDICAL ANATOMY) – 1ST YEAR

RESEARCH METHODOLOGY AND BIOSTATISTICS

Part- 1 (Research Methodology)

Section I

Meaning of Research – Purpose, Characteristics and Types of Research – Process of Research – Formulation of objectives – Formulation of Hypothesis – Types of Hypothesis – Methods of testing Hypothesis – Research plan and its components – Methods of Research (Survey, Observation, Case Study, Experimental, Historical and Comparative Methods) – Difficulties in Research Work.

Identification and Formation of research problem (Hypothesis), Elements in research methodology: Research design (CRD, RBD and LSD). Scientific databases: Science Direct and Pubmed.

Section II

Ethical, legal, social and scientific issues. A brief idea about the funding agencies such as DSF, DST, DBT, ICMR, CSIR and UGC. Role of IPR in Research and Development.

Writing of Research Proposal, Report and Research Paper: Meaning and types – Stages in preparation – Characteristics – Structure – Documentation: Footnotes and Bibliography – Editing the final draft – Evaluating the final draft – Checklist for a good proposal/report/research paper. Basic knowledge of organizing conferences, symposia, workshop, exhibition etc.

Part- 2 (Biostatistics)

Section – III

Type of Data : basic concepts of frequency distribution, Measure of central values – Mean, median and mode, Measures of dispersion, range, mean deviation and standard deviation Correlation and Regression analysis.

Probability : Theory, Classical definition of probability, Basic terms – Events, Trails, Mutually exclusive events, Favourable events, Exhaustive events etc, Baye's Theorems of probability, Addition Theorem, Multiplication Theorem, Conditional Probability & Coincidence Probabilities.

Variance – Coefficient of Variation, Moment, Skewness and kurtosis, binomial, distribution, Normal distribution, hyper geometric distribution, correlated measurements.

Discriminating power – Derivation, evaluation of evidence by discriminating powers, Combination of independent systems, correlated attributes, Transfer of evidence – likelihood ratio, probability of guilt correspondence probabilities, direction of transfer.

M.Sc. (MEDICAL PHARMACOLOGY) – 1st YEAR

RESEARCH METHODOLOGY AND BIOSTATISTICS

Part- 1 (Research Methodology)

Section I

Meaning of Research – Purpose, Characteristics and Types of Research – Process of Research – Formulation of objectives – Formulation of Hypothesis – Types of Hypothesis – Methods of testing Hypothesis – Research plan and its components – Methods of Research (Survey, Observation, Case Study, Experimental, Historical and Comparative Methods) – Difficulties in Research Work.

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Variance – Coefficient of Variation, Moment, Skewness and kurtosis, binomial, distribution, Normal distribution, hyper geometric distribution, correlated measurements.

Discriminating power – Derivation, evaluation of evidence by discriminating powers, Combination of independent systems, correlated attributes, Transfer of evidence – likelihood ratio, probability of guilt correspondence probabilities, direction of transfer.

BIOSTATISTICS AND RESEARCH METHODOLOGY

Part- 1 (Research Methodology)

Section I

Meaning of Research – Purpose, Characteristics and Types of Research – Process of Research – Formulation of objectives – Formulation of Hypothesis – Types of Hypothesis – Methods of testing Hypothesis – Research plan and its components – Methods of Research (Survey, Observation, Case Study, Experimental, Historical and Comparative Methods) – Difficulties in Research Work.

Identification and Formation of research problem (Hypothesis), Elements in research methodology: Research design (CRD, RBD and LSD). Scientific databases: Science Direct and Pubmed.

Section II

Ethical, legal, social and scientific issues. A brief idea about the funding agencies such as DSF, DST, DBT, ICMR, CSIR and UGC. Role of IPR in Research and Development.

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Part- 2 (Biostatistics)

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Variance – Coefficient of Variation, Moment, Skewness and kurtosis, binomial, distribution, Normal distribution, hyper geometric distribution, correlated measurements.

Discriminating power – Derivation, evaluation of evidence by discriminating powers, Combination of independent systems, correlated attributes, Transfer of evidence – likelihood ratio, probability of guilt correspondence probabilities, direction of transfer.

M.Sc. (Medical Physiology) Year-II
PHYSIOLOGY- I

Course Code: MSF201 **L-3, T-2, P-0, S-1 C-5**

Course Contents

Cell

Definition, structure of cell, organelles, and biological membranes, Transport across biological membranes, Composition of ECF and ICF, Nernst equation, equilibrium potential, Goldman field equation

Nerve, Muscle and Biopotential

Nerve: Structure of neuron , Classification of neuron, Properties of nerves, Neuroglia and its functions, Monophasic and biphasic action potential, Saltatory conduction, factors affecting conduction velocity, Local response, catelectrotonic and anelectrotonic potentials, Strength actio curve: chronaxie and rheobase, Compound action potential, Classification of nerve injury Degeneration and regeneration, Neuromuscular junction and synapse

Skeletal Muscle: Structure of skeletal muscle, contractile and regulatory protein, sarcoplasmic reticulum, Properties of muscles, Excitation and contraction coupling, Relaxation of skeletal muscle. Rigor mortis, Isotonic and isometric contraction, Length tension relationship, Oxygen debt mechanism, Fast (white) and slow (red) muscle fibers and their differences

Smooth Muscle: Structure and types of smooth muscle, Innervation of visceral and multiunit smooth muscle including chemotransmitters, Mechanism of contraction of smooth muscles
Properties of smooth muscles

Blood

Function and composition of blood, Structure of RBC, bone marrow, erythropoiesis, erythropoieti and factors regulating maturation of RBCs; Reticulocytes and their importance

Haemoglobin: Structure, function, synthesis; Abnormal hemoglobins and related diseases

Fate of hemoglobin, bilirubin metabolism, jaundice and their types, Iron metabolism

Anemia: Definition and classification, Polycythemia, Absolute values of blood and RBC indices
Blood groups (ABO & Rh systems). Erythroblastosis fetalis, blood transfusion, adverse reaction of mismatched transfusions, Leukocyte: Structure, types, functions of different types, leucopoiesis, Platelets: Blood Coagulation, Plasma Proteins, Immunity: Definition, types, immune response, immunoglobulins

Cardiovascular System

Cardiac Muscle: Structure and function, Physiological anatomy and structure of cardiac conducti system, activation sequence and conduction velocities, Cardiac potential: fast and slow type and their ionic bases, Effect of sympathetic and para-sympathetic stimulation on SA node; Action potential, chemotransmitters and ionic basis, Principles of ECG; Evolution of unipolar and bipolar lead system,

M.Sc. (MEDICAL MICROBIOLOGY) – 1st Year

RESEARCH METHODOLOGY AND BIOSTATISTICS

Part- 1 (Research Methodology)

Section I

Meaning of Research – Purpose, Characteristics and Types of Research – Process of Research – Formulation of objectives – Formulation of Hypothesis – Types of Hypothesis – Methods of testing Hypothesis – Research plan and its components – Methods of Research (Survey, Observation, Case Study, Experimental, Historical and Comparative Methods) – Difficulties in Research Work.

Identification and Formation of research problem (Hypothesis), Elements in research methodology: Research design (CRD, RBD and LSD). Scientific databases: Science Direct and Pubmed.

Section II

Ethical, legal, social and scientific issues. A brief idea about the funding agencies such as DSF, DST, DBT, ICMR, CSIR and UGC. Role of IPR in Research and Development.

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Part- 2 (Biostatistics)

Section – III

Type of Data : basic concepts of frequency distribution, Measure of central values – Mean, median and mode, Measures of dispersion, range, mean deviation and standard deviation Correlation and Regression analysis.

Probability : Theory, Classical definition of probability, Basic terms – Events, Trails, Mutually exclusive events, Favourable events, Exhaustive events etc, Baye's Theorems of probability, Addition Theorem, Multiplication Theorem, Conditional Probability & Coincidence Probabilities.

Variance – Coefficient of Variation, Moment, Skewness and kurtosis, binomial, distribution, Normal distribution, hyper geometric distribution, correlated measurements.

Discriminating power – Derivation, evaluation of evidence by discriminating powers, Combination of independent systems, correlated attributes, Transfer of evidence – likelihood ratio, probability of guilt correspondence probabilities, direction of transfer.

Section-IV

Tests of hypothesis – Tests of significant attributes, Z-test of signification and coefficient of correlation, Small sample test, T-test, Paired Test, Chi-square test, F test of equality of variance, Large sample test, Normal test.

Depolarization and repolarization sequence in single cardiac muscle fiber in volume conductor and reason for upright wave for repolarization (T wave),

Einthoven triangle Einthoven law, normal ECG (wave, interval, origin and duration).

Changes in configuration of ECG in 12 leads in a normal person, vector cardiography, principle vectors and vector loop generated during cardiac cycle, Mean electrical axis, method of its calculation, right and left axis deviation, physiological and pathological conditions for axis deviation, Conduction defects in heart and their ECG appearance, Atrial and ventricular arrhythmias, Cardiac cycle, Heart sounds, arterial pulse and jugular venous pressure changes during cardiac cycle, Cardiac output, its regulation and measurement, Peripheral circulation; Organization and innervations, Flow velocity and resistance (precapillary and post capillary

Biophysical principle applicable to blood vessels, Venous and lymphatic circulation, Regulation of peripheral circulation, Heart rate, vagal tone, regulation of heart rate. Blood pressure. factors affecting BP and determinants of blood pressure. Regulation of BP. High and low blood, pressure, shock. Circulation through different regions: cerebral, coronary, pulmonary, fetal, splanchnic.

M.Sc. (Medical Physiology) Year-II
PHYSIOLOGY- II

Course Code: MSF202 **L-3, T-2, P-0, S-1 C-5**

Course Contents
Respiratory System, Environmental, and Exercise Physiology

Functional anatomy of respiratory passage, airways resistance, bronchodilators and bronchoconstrictors, clinical applications, Mechanism of breathing (inspiration and expiration)

Dead space, Alveolar ventilation, intra- pleural, intra-alveolar and trans-pulmonary pressures

Surfactant, work done during breathing, Compliance, Blood flow in different zones of the lungs

Principal governing diffusion of gases in lungs, Transport of oxygen, oxygen dissociation curve and factors affecting it carbon dioxide transport chloride shift Haldane effect Lung function test, Regulation of respiration: Neural and chemical, Hypoxia: types, causes, characteristic features of each type, Cyanosis, dyspnoea, Oxygen therapy, Effect of hypoxia on body at different altitudes, acute mountain sickness, periodic breathing, apnoea, eupnoea, hyperpnoea, tachypnoea, Acclimatization, Effect of high barometric pressure on body, decompression sickness, Exercise physiology.

Gastrointestinal Tract

General organization of GIT and its sphincters, Sympathetic and parasympathetic innervations, Meissnes's and Auerbach plexuses, Salivary glands : Types, secretion, composition and functions of saliva, Regulation of salivary secretion, Deglutition: Phases, mechanism of each phase, effect of lesion of cranial nerve and deglutition center in medulla, Gross division of stomach, Type of gastric glands: Histology and percentage distribution, Mechanism of HCl and enzyme secretion

Composition of gastric secretion, Regulation of gastric secretion: Psychic of neural, gastric phase (hormonal), Intestinal phase, Interdigestive phase, Hyperacidity, hypoacidity (achlorhydria)

Effect of partial gastrectomy (Dumping syndrome), Drugs used in hyperacidity rationale

Mechanisms of gastric emptying and their regulation, Migrating motor complex, Hunger contraction, Sm. intestines, Histology of intestinal mucosa, Leiberkuhn glands and Brunner's glands, Intestinal secretion a.. composition, Regulation of intestinal secretion (neural and hormonal mechanism), Movement of small intestines, Applied aspects, Pancreas: Histology and mechanism of pancreatic juice secretion and regulation, Liver: Function, histology, mechanism of bile secretion and their regulation, function of bile, Large intestines: Histology, functions, movement of large intestines, defecation reflex, Hirchsprung's disease, Dietary fiber, Gastrointestinal hormones.

M.Sc. (Medical Physiology) Year-II
Physiology Practical I

Course Code MSF251 **L-0, T-0, P-24, S-0, C-12**

List of Practical

Haematology Lab Practical

- Clinical Significance of DLC
- Arneth count
- Blood Typing & Cross matching
- Assessment of Anemic Patients
- Tests for Hemostasis\
- Clinical significance of TLC(Total leukocyte count)

Clinical Lab Practical

- Recording of normal blood pressure
- Recording of effect of posture on normal blood pressure
- Recording of effect of exercise on normal blood pressure
- Demonstration of cold pressor test
- Clinical examination of cardiovascular system
- Vitalography
- Stethography and effect of deglutition, coughing, talking and hyperventilation on respiratory movements and determine breath holding time after normal respiration and hyperventilation
- Clinical examination of respiratory system
- Examination of abdomen

Amphibian Lab demonstration & Practical

- Study of apparatus and various connection used in experimental lab
- Demonstration of sciatic nerve-gastrocnemius muscle preparation and simple muscle twitch with its time relation
- Demonstration of effect of temperature on muscular contraction
- Demonstration of phenomenon of fatigue in a nerve muscle preparation
- Demonstration of effect of increasing strength of stimulus on muscular contraction
- Demonstration and determination of rate of transmission of nerve impulse
- Demonstration of effect of two successive and several successive stmuli on muscular contraction (genesis of complete and incomplete tetanus)
- Demonstration of effect of load on muscular contraction in free loaded and after loaded muscle

M.Sc. (Medical Physiology) Year-II
TEACHING METHODOLOGY

Course Code: MSC201 **L- 2, T-1, P-0, S-1 C-3**

Course Contents

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

M.Sc. (Medical Physiology) Year-II
FUNDAMENTALS OF COMPUTER (LAB)

Course Code: MSC251 **L-0, T-0, P-2, S-0 C-1**

Course Contents

Unit – I

Basic computer organization functionality computer codes computer classification Boolean algebra, primary storage, secondary storage devices, input-output devices, computer software, computer languages, operating system, business data processing concepts, data communication and networks and advances

Unit – II

Planning the computer program, algorithm, flowcharts, and decision tables.

Unit – III

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'.

Unit – IV

MS Office (Word, Excel, PowerPoint), Basic Database concept and classification, operations performed on database, using MS-Access. Internet Features.

Unit – V

Computer applications in physiology 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.

* Latest editions of all the suggested books are recommended.

M.Sc. (Medical Physiology) Year-III
PHYSIOLOGY- III

Course Code: MSF301 **L- 3, T-2, P-0, S-1 C-5**

Course Contents

Excretory System

Functions of kidney, Structure of kidney, Nephrons: Type & parts, Juxtaglomerular apparatus, Glomerul filtration and mechanism of urine formation, Function of renal tubules – selective reabsorption and secretion, Counter current mechanism and concentration of urine, Acidification of urine and role of kidney in regulation of acid-base balance, Renal function tests Mechanism of micturiton along with applied aspects.

Central Nervous System

General Considerations, General organization of CNS and PNS, General function of CNS: Higher function (speech, memory, sleep, learning), Sensory functions, Motor functions, Brain: thalamus, hypothalamus, basal ganglion, cerebellum, limbic system, reticular activating system, emotion and instinctive behavior

Sensory System

General sensations, stimuli evoking general sensations, cutaneous receptors and properties, Afferent pathways for individual sensation, Sensory areas in brain, Effect of lesions at different levels in sensory pathway, Brown sequard syndrome and syringomyelia

Motor System

Structure and innervations of muscle spindle and Golgi tendon organ, Reflex arc and its properties, reflex action, Corticospinal (pyramidal) and extra Pyramidal tracts and their lesions

Brain

Cerebellum, thalamus, hypothalamus, basal ganglion, limbic system, emotion and instinctual behaviour, reticular activating system

Higher Function

Speech, Learning and Conditioned reflexes, Memory, sleep (REM, NREM), EEG: types of waves, epilepsy

Autonomic Nervous System

General organization of ANS, Synthesis, storage and release of chemo transmitters, Sympathetic nervous system: organ innervations, types of receptors, Effect of sympathetic stimulation on organ system: receptors involved, parasympathetic nervous system: Organs innervated

Effect of parasympathetic stimulation on organ system and receptors involved.

M.Sc. (Medical Physiology) Year-III

PHYSIOLOGY- IV

Course Code: MSF302 **L- 3, T-2, P-0, S-1 C-5**

Course Contents

Special Senses

The nature of receptors and modality of stimulation, the organs housing these receptors

Eye: Physiological anatomy, refractory indices of media, image formation, Diaopteric power of refractory surfaces, Details structure of retina, optic disc, and macula, Photochemistry of rods and cones, adaptation of rods and cones, Photopic and scotopic vision, role of vitamin A, Electrophysiology of retina, Visual pathway and its lesions, Field of vision- peripheral vision and central vision, Acuity of vision, stereoscopic vision and color vision

Ear: Physiological anatomy of external and middle ear, Function of external ear and middle ear ossicles, impedance matching, Detailed structure of internal ear (cochlea), Transmission of sound and traveling waves hypothesis, Endolymphatic and cochlear microphonic potentials, Acoustic stimulation, auditory pathway, Bells and decibel units, Hearing disorders- conduction and neural defect, audiometry, Organs of equilibrium, Structure of utricle, saccule and semicircular canal Stimulation mechanism of otolith organ and semicircular canal, Vestibular pathways, linear and angular acceleration, nystagmus

Smell: Location and structure of olfactory epithelium, Olfactory pathway, Odoriferous substances. Mechanisms of receptors stimulation and impulse generation, Pathway of smell. Parosmia and anosmia, olfactory hallucination

Taste: Primary taste modalities, Chemical nature of taste evoking substances, Distribution and structure of taste papillae and taste buds, Physiology of taste arousal, Taste pathway

Skin and Temperature Regulation: Structure and function of skin, Body temperature- shell and core temperature and their variation

Regulation of body temperature, Anterior and posterior hypothalamus, Adaptation to cold and l... weather, Heat stroke

Endocrine System: Introduction: neurocrine, paracrine and autocrine cells, Classification of hormones, Synthesis, storage and secretion of hormones, Transport and metabolism, Regulation of secretion of hormones- neural and feed back, Mechanism of action of hormones, Hypothalamic releasing and inhibiting hormones, Anterior pituitary hormones, Posterior hormones, Thyroid hormones- T4, T3 and RT3, Parathyroid hormones, Adrenal cortical and adrenal medulla hormones, Pancreas (Islets of Langerhans) hormones.

Reproductive System: Physiological anatomy of male and female reproductive system, Embryological differentiation of male female reproductive organs, Karyosome, male and female chromosomes and diseases due dysjuntion of sex chromosomes, Male sex hormones- secretion, transport, biological action and mechanism of action, regulation of secretion, Female hormone - secretion, transport, biological action and mechanism of action, Pituitary-gonadal axis, ovarian and menstrual cycle, Physiology of pregnancy, parturition and lactation, Family planning-methods. indication and practice

M.Sc. (Medical Physiology) Year-III
TEACHING PRACTICE

Course Code: MSC351 **L-0, T-0, P-6, S-0 C-3**

Objectives:

- Acquire competence to plan for instructions and delivery of curriculum
- Obtain feedback both about teaching as well as student learning
- To develop broad understanding of modern principles and procedures used in medical science education
- Development of essential skills for practicing modern medical science teaching

For teaching practice student shall take classes as decided and allocated by the Department. For evaluation purpose, a board of three examiners comprising of one internal and two external examiners will be appointed by the Vice Chancellor from the panel of examiners recommended by the Principal of the College. All the three examiners will assess the student separately and average of these marks shall be awarded as final marks to the student concerned.

M.Sc. (Medical Physiology) Year-III
Physiology Practical II

Course Code MSF351 **L-0, T-0, P-24, S-0, C-12**

Course Contents

Haematology Lab Practical

- Total red blood cell count
- Platelet count-Direct & Indirect
- Absolute eosinophil count
- Reticulocyte count
- Osmotic fragility of RBC
- ESR and PCV
- Absolute values

Clinical Lab Practical

- Examination of sensory nervous system
- Examination of motor nervous system
- Examination of cranial nerves
- I and II cranial nerve (perimetry)
- Visual acuity and color vision
- III, IV and VI cranial nerve along with light reflex and accommodation reflex
- V and VII cranial nerve
- VIII cranial nerve
- IX, X, XI, and XII cranial nerves
- General examination of the body
- Mosso's ergography
- Electrocardiography (ECG)

Amphibian Lab Practicals

- Recording of normal cardiogram of frog's heart in situ
- Observation on extrasystole, compensatory pause and refractory period
- To observe effect of temperature on heart
- To observe the effect of stannous ligature on heart and study of properties of heart muscle
- To observe Staircase phenomenon
- To observe all or none law
- To observe effect of stimulation of vagus nerve and WCL on heart
- To identify drugs by noting their action on frog's heart
- To observe the effect of ions Na+, K+, Ca2+) on frog's heart

M.Sc. (Medical Physiology) Year-III

THESIS

Course Code: MSF352 **L-0, T-01, P-0, S- C-12**

Guidelines

Each M.Sc. Medical student will carry out research work under the supervision of a faculty member (Guide) with post-M.D./ Ph.D. teaching experience of three years or more in the subject. However, a teacher with M.D./ Ph.D. degree in the subject or related subjects shall be qualified for being taken in as Co-guide.

The Guide will be allotted to each student at the commencement of second year. The student will prepare a Plan of Thesis under the supervision of the Guide, and submit it to the university within two months of commencement of second year. The university will convey approval/disapproval of the Plan within one month.

In case the Plan is disapproved, a fresh Plan must be submitted within one month. After approval of the Plan, the student will begin work on the thesis.

The progress of work will be monitored regularly by the Guide. The thesis not exceeding 100 pages typed on A4 paper on one side only in double spacing is to be submitted to the university through the Guide six months before the date of III year University examination.

It will be evaluated by a panel of examiners (2 external & 1 internal at least) approved by the Vice Chancellor. The approval of the thesis by the panel will be a pre-requisite for the candidate to appear in the written/practical examination of III year. If the thesis is returned for revision, the suggested revision must be done and the revised thesis submitted for evaluation to the examiner(s) who has/ have suggested for the revision.

After approval of revised thesis, the candidate can appear in the next 3rd year examination provided the approval is received one month before the examination. If the thesis is disapproved, the entire process from submission of a new Plan to submission of Thesis is to be repeated. On approval of new thesis, the candidate can appear in the next 3rd year examination provided there is a one month gap between the receipt of approval and commencement of examination.

Note: A student is required to submit four hard copies of the thesis alongwith the soft copy in the prescribed format given by the college.

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M.Sc. (Medical Physiology)

Programme : M.Sc. (Med. -Physiology)
Duration : 3 years full time (annual system)
Medium : English

Eligibility :

a) MBBS from MCI recognized Medical College.
b) BDS from DCI recognized Dental College or
c) Graduation in any related medical/science / life science field with a minimum of three years degree course including MAMS, BHMS, BPT, B Sc Nursing & B.Sc MLT from any UGC approved university.

Objectives:

The candidate qualifying for the award of M.Sc. (Physiology) should be able to:

1. Demonstrate comprehensive understanding of physiology as well as that of the applied disciplines
2. Demonstrate adequate knowledge of the current developments in medical sciences as related to physiology
3. Teach undergraduates and postgraduates in physiology
4. Plan and conduct research
5. Plan educational programs in physiology utilizing modern methods of teaching and evaluation
6. Organize and equip physiology laboratories. learning activities & training:

Learning activities & training :

(a) Didactic teaching :-

Topics in gross anatomy, micro anatomy, embryology, neuro anatomy and genetics along with related practical sessions.

(b) Communication Skills:-

journal club. Seminars (c) Hand on experience:-

(c) Hand on experience :-

Techniques in micro anatomy, museum specimens & embalming, and experimental work.

(d) Teaching assignments :-

Taking U.G. classes, demonstrations & practical for one semester. Preparation of A.V. aids for teaching, presentations, and setting objective questions - SAQs / MCQs. Participation in symposia, seminars & workshops.

(e) Research :-

Project / thesis - Project should be submitted 6 month before the final examination.

Evaluation :-

Written and practical assessment every semester. Internal assessment tests of 25 marks each for theory & practical shall be conducted in the 1st & 2nd years of M.Sc course and 50 marks in the third year course.

University examination shall be gheld by the university at the end of each year which is as follow :-

H O D
Department of Physiology
S. G. T. Medical College
Budhera, Gurgaon, HARYANA

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M.Sc. (Medical Physiology)

Course Contents

1. Cell Physiology
Cell Structure and membrane transport, Resting Membrane Potential, Composition of ECF and ICF, Nernst Equation, Equilibrium Potential, Goldman Equation

2. Nerve-Muscle and Biopotential
Neuron (structure, function and classification), Neuroglia, Action Potential, Neuromuscular junction, Skeletal Muscle (structure, mechanism of contraction and relaxation), Smooth Muscle (structure, mechanism of contraction and relaxation)

3. Blood
Function and Composition, Erythrocytes, Haemoglobin, Blood groups, Leucocytes, Thrombocytes, Immunity

4. Cardiovascular System
Cardiac Muscle, Physiological anatomy of heart and conduction system, Cardiac Action Potential, Normal ECG, Cardiac cycle, Heart sounds, Cardiac output and blood pressure, Coronary circulation

5. Respiration
Functional anatomy of the respiratory system, Mechanism of breathing, Dead space, Surfactants Dynamic and static lung volumes and capacities, Transport of oxygen and carbon dioxide, Regulation of Respiration, Cyanosis, Hypoxia, Oxygen toxicity

6. Gastrointestinal Tract
Functional anatomy, Salivary glands (secretion and function of saliva, deglutition), Stomach (composition, regulation of secretion and function of the gastric juice), Liver (secretion and function of bile), Pancreas (secretion and function), Intestines, Intestinal secretion (composition and function), Movements of Intestines, Hormones of GIT

7. Excretory System
Function of kidney, Structure of nephron, Juxta glomerular apparatus, Formation of urine Counter current mechanism, Acidification of urine & role of kidney in maintenance of acid base balance, Renal function tests, Micturition

8. Autonomic Nervous System
Organization of the ANS, Chemo-transmitters, Effect of sympathetic and parasympathetic stimuli on different organ systems

9. Central Nervous System
General organization of CNS & PNS, Sensory system :(General sensations, receptors, sensory pathways, sensory areas of brain)
Motor system: (muscle spindle, Golgi tendon organ, reflex arc, corticospinal and extra-pyramidal tracts)
Brain: Functions of: Cerebellum, thalamus, hypothalamus, basal ganglia, limbic system, reticular activating system; Higher Function: Sleep

10. Special Senses
Eye (functional anatomy, refractory indices of media, rods and cones, role of vitamin A, visual pathway), Ear (structure ofintemal ear, mechanism of hearing), Taste (distribution and structure of taste buds and taste papillae, primary taste modalities, taste athway). Smell (olfactory epithelium and pathway)

11. Endocrine System
Mechanism of action of hormones, Functions of the following glands: Pituitary, thyroid, parathyroid, adrenal (cortex and medulla), pancreas

12. Reproductive System

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General organization of male and female reproductive systems, Male: Spermatogenesis and actions of male sex hormones, Female: Sexual cycles and actions of female sex hormones, pregnancy, parturition and lactation, Family planning.

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M.Sc. (Medical Physiology) Year-I
BASICS OF PHYSIOLOGY (PRACTICALS)

Course Contents

- Study of microscope
- Preparation and staining of blood film and identification of different blood cells
- Differential leukocyte count
- Determination of blood group
- Estimation of haemoglobin
- Haemin crystal
- Determination of bleeding and clotting time
- Total leukocyte count

M.Sc. (Medical Physiology) Year -I
PHYSIOLOGY - I

Course Contents

1. Cell

Definition, structure of cell, organelles, and biological membranes, Transport across biological membranes, Composition ofECF and ICF, Nernst equation, equilibrium potential, Goldman field equation

2.Nerve, Muscle and Biopotential

Nerve: Structure of neuron, Classification of neuron, Properties of nerves, Neuroglia and its functions, Monophasic and biphasic action potential, Saltatory conduction, factors affecting conduction velocity, Local response, catelectrotonic and a electrotonic potentials, Strength duration curve: chronaxie and rheobase, Compound action potential, Classification of nerve injury; Degeneration and regeneration, Neuromuscular junction and synapse Skeletal Muscle: Structure of skeletal muscle, contractile and regulatory protein, sarcoplasmic reticulum, Properties of muscles, Excitation and contraction coupling, Relaxation of skeletal muscle, Rigor mortis, Isotonic and isometric contraction, Le gth tension relationship, Oxygen debt mechanism, Fast (white) and slow (red) muscle fibers and their differences
Smooth Muscle: Structure and types of smooth muscle, Innervation of visceral and multiunit smooth muscle including chemotransmitters. Mechanism of c ntraction of smooth muscles Properties of smooth muscles

3.Blood

Function and composition of blood, Structure of RBC, bone marrow, erythropoiesis, erythropoietin and factors regulating maturation of RBCs; Reticulocytes and their importance Haemoglobin: Structure, function, synthesis; Abnormal hemoglobins and related diseases
Fate of hemoglobin, bilirubin metabolism, jaundice and their types, Iron metabolism Anemia: Definition and classification, Polycythemia, Absolute values of blood and RBC indices Blood groups (ABO & Rh systems), Erythroblastosis fetalis, blood transfusion, adverse reaction of mismatched transfusions, Leukocyte: Structure, types, functions of different types, leucopoiesis, Platelets: Blood Coagulation, Plasma Proteins, Immunity: Definition, types, immune response, immunoglobulins

4.Cardiovascular System

Cardiac Muscle: Structure and function, Physiological anatomy and structure of cardiac conduction system, activation sequence and conduction velocities, Cardiac potential: fast and slow type and their ionic bases, Effect of sympathetic and para-sympathetic stimulation on SA node; Action potential, chemotransmitters and ionic basis, Principles of ECG; Evolution of unipolar and bipolar lead system, Depolarization and repolarization sequence in single cardiac muscle fiber in volume conductor and reason for upright wave for repolarization (T wave). Einthoven triangle Einthoven law, normal ECG (wave, interval, origin and duration).
Changes in configuration ofECG in 12 leads in a normal person, vector cardiography, principle vectors and vector loop generated during cardiac cycle, Mean electrical axis, method of its calculation, right and left axis deviation, physiological and pathological conditions for axIS deviation, Conduction defects in heart and their ECG ap earance, Atrial and ventricular arrhythmias, Cardiac cycle, Heart sounds, arterial pulse and jugular venous pressure changes during cardiac cycle, Cardiac output, its regulation and measurement, Peripheral circulation; Organization and innervations, Flow velocity and resistance (precapillary and post capillary Biophysical principle applicable to blood vessels, Venous and lymphatic circulation, Regulation of peripheral circulation, Heart rate, vagal tone, regulation of heart rate, Blood pressure, factors affecting BP and determinants of blood pressure, Regulation of BP. High and low blood, pressure, shock, Circulation through different regions: cerebral, coronary, pulmonary, fetal, splanchnic.

M.Sc. (Medical Physiology) Year-II
TEACHINGMETHODOLOGY

General Course Contents

- Challenges for teachers in Medical Education
- Teaching strategies
  - Lecture method
  - Small group teaching
  - Inquiry and problem solving methods
  - Case study
  - Team projects
  - Presentation
  - Seminar
  - Field visit
  - Simulation
  - Computer based instructions
  - Bed side learning
  - One to one teaching
  - Self directed teaching

- Preparation of lesson
- Selection of teaching methods
- Identification and review of literature
- Identification of teaching resources
- Developing teaching aids for instructional activities that link research and theory to practice
- Contact development; key element of curriculum design and evaluation
- Implementation and monitoring of curriculum transaction a d student's evaluation
- Student feedback: designing and implementation
- Research paper writing

Course Contents

1. Respiration
Functional anatomy of the respiratory system, Mechanism of breathing, Dead space, Surfactants Dynamic and static lung volumes and capacities, Transport of oxygen and carbon dioxide, Regulation of Respiration, Cyanosis, Hypoxia, Oxygen toxicity

2. Gastrointestinal Tract
Functional anatomy, Salivary glands (secretion and function of saliva, deglutition), Stomach (composition, regulation of secretion and function of the gastric juice), Liver (secretion and function of bile), Pancreas (secretion and function), Intestines, Intestinal secretion (composition and function), Movements of Intestines, Hormones of GIT

3. Excretory System
Function of kidney, Structure of nephron, Juxta glomerular apparatus, Formation of urine Counter current mechanism, Acidification of urine & role of kidney in maintenance of acid base balance, Renal function tests, Micturition

4. Autonomic Nervous System
Organization of the ANS, Chemo-transmitters, Effect of sympathetic and parasympathetic stimuli on different organ systems

5. Central Nervous System
General organization of CNS & PNS, Sensory system :(General sensations, receptors, sensory pathways, sensory areas of brain)
Motor system: (muscle spindle, Golgi tendon organ, reflex arc, corticospinal and extra-pyramidal tracts)
Brain: Functions of: Cerebellum, thalamus, hypothalamus, basal ganglia, limbic system, reticular activating system; Higher Function: Sleep

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M.Sc. (Medical Physiology) Year-II
Practical

List of Practical

Haematology Lab Practical

- Clinical Significance ofDLC
- Arneth count
- Blood Typing & Cross matching
- Assessment of Anemic Patients
- Tests for Hemostasis\
- Clinical significance ofTLC (Total leukocyte count) Clinical Lab Practical
- Recording of normal blood pressure
- Recording of effect of posture on normal blood pressure
- Recording of effect of exercise on normal blood pressure
- Demonstration of cold pressor test
- Clinical examination of cardiovascular system
- Vitalography
- Stethography and effect of deglutition, coughing, talking and hyperventilation on respiratory movements and determine breath holding time after normal respiration and hyperventilation
- Clinical examination of respiratory system
- Examination of abdomen

Amphibian Lab demonstration & Practical

- Study of apparatus and various connection used in experimental lab
- Demonstration of sciatic nerve-gastrocnemius muscle preparation and simple muscle twitch with its time relation
- Demonstration of effect of temperature on muscular contraction
- Demonstration of phenomenon of fatigue in a nerve muscle preparation
- Demonstration of effect of increasing strength of stimulus on muscular contraction
- Demonstration and determination of rate of transmission of nerve impulse
- Demonstration of effect of two successive and several successive stmulion muscular contraction
- (genesis of complete and incomplete tetanus)
- • Demonstration of effect of load on muscular contraction in free loaded and after loaded muscle

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M.Sc. (Medical Physiology) Year-III

Course Contents

1.Special Senses

The nature of receptors and modality of stimulation, the organs housing these receptors

Eye: Physiological anatomy, refractive indices of media, image formation, Diopteric power of refractive surfaces, Details structure of retina, optic disc, and macula, Photochemistry of rods and cones, adaptation of rods and cones, Photopic and scotopic vision, role of vitamin A, Electrophysiology of retina, Visual pathway and its lesions, Field of vision- peripheral vision and central vision, Acuity of vision, stereoscopic vision and color vision

2.Ear: Physiological anatomy of external and middle ear, Function of external ear and middle ear ossicles, impedance matching, Detailed structure of internal ear (cochlea), Transmission of sound and traveling waves hypothesis, Endolymphatic and cochlear microphonic potentials, Acoustic stimulation, auditory pathway, Bells and decibel units, Hearing disorders- conduction and neural defect, audiometry, Organs of equilibrium, Structure of utricle, saccule and semicircular canal, Stimulation mechanism of otolith organ and semicircular canal, Vestibular pathways, linear and angular acceleration, nystagmus

3.Smell: Location and structure of olfactory epithelium, Olfactory pathway, Odoriferous substances, Mechanisms of receptors stimulation and impulse generation, Pathway of smell, Parosmia and anosmia, olfactory hallucination

4.Taste: Primary taste modalities, Chemical nature of taste evoking substances, Distribution and structure oftaste papillae and taste buds, Physiology oftaste arousal, Taste pathway

5.Skin and Temperature Regulation: Structure and function of skin, Body temperature- shell and core temperature and their variation Regulation of body temperature, Anterior and posterior hypothalamus, Adaptation to cold and hot weather, Heat stroke

6.Endocrine System: Introduction: neurocrine, paracrine and autocrine cells, Classification of hormones, Synthesis, storage and secretion of hormones, Transport and metabolism, Regulation of secretion of hormones- neural and feed back, Mechanism of action of hormones, Hypothalamic releasing and inhibiting hormones, Anterior pituitary hormones, Posterior hormones,
Thyroid hormones-' T4, T3 and RT3, Parathyroid hormones, Adrenal cortical and adrenal medulla hormones, Pancreas (Islets of Langerhans) hormones,

Reproductive System: Physiological anatomy of male and female reproductive system, Embryological differentiation of male female reproductive organs, Karyosome, male and female chromosomes and diseases due dysjuntion of sex chromosomes, Male sex hormones- secretion, transport, biological action and mechanism of action, regulation of secretion, Female hormones secretion, transport, biological action and mechanism of action, Pituitary-gonadal axis, ovarian and menstrual cycle, Physiology of pregnancy, parturition and lactation, Family planning-methods, indication and practice.

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M.Sc. (Medical Physiology) Year-III
TEACHING PRACTICE

Objectives:

- Acquire competence to plan for instructions and delivery of curriculum
- Obtain feedback both about teaching as well as student learning
- To develop broad understanding of modern principles and procedures used in medical science education
- Development of essential skills for practicing modern medical science teaching

For teaching practice student shall take classes as decided and allocated by the Department. For evaluation purpose, a board of ~~three~~ examiners comprising of two internal and two external examiners will be appointed by the Vice Chancellor from the panel of examiners recommended by the Principal of the College. All the four examiners will assess the student separately and average of these marks shall be awarded as final marks to the student concerned. .

M.Sc. (Medical Physiology) Year-III
Practical

Course Contents

Haematology Lab Practical

- Total red blood cell count
- Platelet count-Direct & Indirect
- Absolute eosinophil count
- Reticulocyte count
- Osmotic fragility of RBC
- ESRand PCV
- Absolute values

Clinical Lab Practical

- Examination of sensory nervous system
- Examination of motor nervous system
- Examination of cranial nerves
- I and II cranial nerve (perimetry)
- Visual acuity and color vision
- III, IV and VI cranial nerve along with light reflex and accommodation reflex
- V and VII cranial nerve
- VIII cranial nerve
- IX, X, XI, and XII cranial nerves
- General examination of the body
- Mosso's ergography
- Electrocardiography(ECG)

Amphibian Lab Practicals

- Recording ofnormal cardiogram of frog's heart in situ
- Observation on extrasystole, compensatory pause and refractory period
- To observe effect of temperature on heart
- To observe the effect of stannous ligature on heart and study of properties of heart muscle
- To observe Staircase phenomenon
  - To observe all or none law
  - To observe effect of stimulation of vagus nerve and WCL on heart
  - To identify drugs by noting their action on frog's heart
  - To observe the effect of ions Na+, K+, Ca2+) on frog's heart

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M.Sc. (Medical Physiology) Year-III
THESIS

Guidelines

Each M.Sc. Medical student will carry out re'3earch work under the supervision of a faculty member (Guide) with post-M.D.! Ph.D teaching experience of three years or more in the subject. However, a teacher with M.D./Ph.D. degree in the subject or related subjects shall be qualified for being taken in as Co-guide.

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It will be evaluated by a panel of examiners (2 external & 1 internal at least) approved by the Vice Chancellor. The approval of the thesis by the panel will be a pre-requisite for the candidate to appear in the written/practical examination of III year. If the thesis is returned for revision, the suggested revision must be done and the revised thesis submitted for evaluation to the examiner(s) who has / have suggested for the revision.

After approval of revised thesis, the candidate can appear in the next 3rd year examination provided the approval is received one month before the examination. If the thesis is disapproved, the entire process from submission of a new Plan to submission of Thesis is to be repeated. On approval of new thesis, the candidate can appear in the next 3rd year examination provided there is a one month gap between the receipt of approval and commencement of examination.

Note: A student is required to submit four hard copies of the thesis along with the soft copy in the prescribed format given by the college.

M.Sc. COURSES

SCHEMES OF EXAMINATIONS

1. **Distribution of Marks**

1.1 **M.Sc. (Medical Anatomy)**

1st Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0102101	Basics of Anatomy	100	20	20	140
0102102	Basics of Physiology	100	20	20	140
0102103	Basics of Biochemistry	100	20	20	140
0102104	Biostatistics & Research Methodology	80	20	-	100
0102105	Basics of Anatomy (Practical)	40	20	-	60
0102106	Basics of Physiology (Practical)	40	20	-	60
0102107	Basics of Biochemistry (Practical)	40	20	-	60
Total		**500**	**140**	**60**	**700**

2nd Year

1. **Course prescribed in the 3rd year will be taught in both 2nd & 3rd years, but there will be no formal examination in 2nd year.**
2. **The student will conduct Research, collect literature for Dissertation, and give seminars during second year.**

3rd Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0102301	Anatomy as Applied to Various Clinical Disciplines Including Radiological & Forensic Medicine	75	60	40	100
0102302	Gross Human Anatomy, Comparative Anatomy & Statistics	75			100
0102303	Developmental & Microanatomy	75			100
0102304	Neuroanatomy & Recent Advances in Anatomy	75			100
0102305	Anatomy (Practical)	150	50	-	200
Total		**450**	**110**	**40**	**600**

1.2 M.Sc. (Medical Physiology)

1st Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0103101	Basics of Anatomy	100	20	20	140
0103102	Basics of Physiology	100	20	20	140
0103103	Basics of Biochemistry	100	20	20	140
0103104	Biostatistics & Research Methodology	80	20	-	100
0103105	Basics of Anatomy (Practical)	40	20	-	60
0103106	Basics of Physiology (Practical)	40	20	-	60
0103107	Basics of Biochemistry (Practical)	40	20	-	60
Total		**500**	**140**	**60**	**700**

2nd Year

1. Course prescribed in the 3rd year will be taught in both 2nd & 3rd years, but there will be no formal examination in 2nd year.
2. The student will conduct Research, collect literature for Dissertation, and give seminars during second year.

3rd Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0103301	CVS, Blood & Lymph, Skin & Temperature Regulation	75	60	40	100
0103302	Respiratory System, Endocrine, Reproduction, Family Planning, and Physiology of Pregnancy	75			100
0103303	Central Nervous System, Autonomic Nervous System & Special Senses	75			100
0103304	General Physiology, Muscle & Nerve Physiology, Biophysics, Gastrointestinal System, Renal Physiology	75			100
0103305	Physiology (Practical)	150	50	-	200
Total		**450**	**110**	**40**	**600**

1.3 M.Sc. (Medical Biochemistry)

1st Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0104101	Basics of Anatomy	100	20	20	140
0104102	Basics of Physiology	100	20	20	140
0104103	Basics of Biochemistry	100	20	20	140
0104104	Biostatistics & Research Methodology	80	20	-	100
0104105	Basics of Anatomy (Practical)	40	20	-	60
0104106	Basics of Physiology (Practical)	40	20	-	60
0104107	Basics of Biochemistry (Practical)	40	20	-	60
Total		500	140	60	700

2nd Year

1. Course prescribed in the 3rd year will be taught in both 2nd & 3rd years, but there will be no formal examination in 2nd year.
2. The student will conduct Research, collect literature for Dissertation, and give seminars during second year.

3rd Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0104301	General Biochemistry & Instrumentation	75	60	40	100
0104302	Metabolism & Nutrition	75			100
0104303	Clinical Biochemistry	75			100
0104304	Molecular Biology, Biotechnology & Recent Advances in Clinical Biochemistry	75			100
0104305	Biochemistry (Practical)	150	50	-	200
Total		450	110	40	600

(25)

1.4 M.Sc. (Medical Pharmacology)

1st Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0105101	Basics of Anatomy	100	20	20	140
0105102	Basics of Physiology	100	20	20	140
0105103	Basics of Biochemistry	100	20	20	140
0105104	Biostatistics & Research Methodology	80	20	-	100
0105105	Basics of Anatomy (Practical)	40	20	-	60
0105106	Basics of Physiology (Practical)	40	20	-	60
0105107	Basics of Biochemistry (Practical)	40	20	-	60
Total		**500**	**140**	**60**	**700**

2nd Year

1. **Course prescribed in the 3rd year will be taught in both 2nd & 3rd years, but there will be no formal examination in 2nd year.**
2. **The student will conduct Research, collect literature for Dissertation, and give seminars during second year.**

3rd Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0105301	General Pharmacology Principles & Applied Sciences	75	60	40	100
0105302	Systematic Pharmacology, Chemotherapy & Therapeutics	75			100
0105303	Experimental Pharmacology, Bioassay & Recent Advances	75			100
0105304	Clinical Pharmacokinetics & Recent Advances	75			100
0105305	Pharmacology (Practical)	150	50	-	200
Total		**450**	**110**	**40**	**600**

1.5 **M.Sc. (Microbiology)**

1st Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam.	IA	Viva	Total
0106101	Basics of Anatomy	100	20	20	140
0106102	Basics of Physiology	100	20	20	140
0106103	Basics of Biochemistry	100	20	20	140
0106104	Biostatistics & Research Methodology	80	20	-	100
0106105	Basics of Anatomy (Practical)	40	20	-	60
0106106	Basics of Physiology (Practical)	40	20	-	60
0106107	Basics of Biochemistry (Practical)	40	20	-	60
Total		**500**	**140**	**60**	**700**

2nd Year

1. **Course prescribed in the 3rd year will be taught in both 2nd & 3rd years, but there will be no formal examination in 2nd year.**
2. **The student will conduct Research, collect literature for Dissertation, and give seminars during second year.**

3rd Year

Paper Code	Subject	Evaluation Scheme			
		Univ. Exam	IA	Viva	Total
0106301	General Bacteriology & Immunology	75	60	40	100
0106302	Systematic Bacteriology and Mycology	75			100
0106303	Virology & Parasitology	75			100
0106304	Applied Microbiology and Recent Advances in Microbiology	75			100
0106305	Microbiology (Practical)	150	50	-	200
Total		**450**	**110**	**40**	**600**

c) The question paper in all courses except Research Methodology and Biostatistics shall consist of 06 questions. The questions may be divided into two or more parts, as deemed proper by the examiners.

d) All the questions in all courses except Research Methodology and Biostatistics are compulsory.

e) The question paper of Research Methodology and Biostatistics will consist of five Sections. Sections I-IV each will have two questions from the corresponding Sections of the syllabus. Candidates will be required to attempt one question from each Section. Each question in Sections I-IV will carry 15 marks. Section V will compulsory. It will carry 20 marks and will consist of 10 questions of short answer type questions (not more than five lines or fifty words), each of 2 marks. The questions in this Section will be set from the entire syllabus i.e. all Sections. The student will be required to attempt all the questions in Section V.

f) Questions can be short answer, long answer and MCQ type.

g) Question paper should be set from the entire syllabus.

h) Marks should be indicated against the question.

i) There should be no repetition of question.

j) Half of the question papers will be set by the External Examiners and half by Internal Examiners.

k) Examination will be coordinated and moderated by the senior most Internal Examiner.

l) Papers set by the External Examiners and the Internal Examiners will be evaluated by them jointly.

m) Paper Setter should refer to the sample question papers for guidance to be sent by the Controller of Examinations to the examiner.

(B) **Practicals:**

a) Maximum marks and their distribution shall be as given under relevant Sections of Clause 1 (Distribution of Marks) above.

b) Board of 04 examiners shall conduct the practical examinations, wherever applicable. The Board shall consist of 02 internal and 02 external examiners.