

KERALA UNIVERSITY OF HEALTH SCIENCES (KUHS)

THRISSUR – 680 596

DEGREE OF MASTER OF SCIENCE IN MEDICAL PHYSIOLOGY

(M. Sc MEDICAL PHYSIOLOGY)

(With effect from 2014-2015 admission onwards)

Regulations, Scheme and Syllabus
3 year course

Syllabus

The syllabus is prepared in conformation & standards of National Institute like AIIMS, Delhi & it is therefore insisted that the course be conducted only in a teaching institution attached to a hospital with research facilities and has to be taught by medical faculty.

A. General Information

I. Name of the Course - Master of Science- Medical Physiology.

2. Objectives: The candidate qualifying for the award of M.Sc. Medical Physiology should be able to

- Demonstrate comprehensive understanding of human body as related to physiology.
- Plan & conduct research.
- Organize & equip physiology laboratories
- Organize the laboratories for various practical exercises, substitute & fabricate some of the simpler equipment for teaching purposes and
- Handle & order for stores, draw up lists of equipment's required for physiology laboratories.

3. Eligibility for admission

A Candidate who have passed B.Sc. with at least one subject of biological sciences like Zoology, Botany, Chemistry, Biochemistry, Biophysics, Microbiology, Biotechnology or BPT, B Pharm, B.Sc. MLT, B.Sc. Physician Assistant, B.Sc. Nursing or any other professional graduates in Allied Health Science with a minimum of 60% marks and MBBS, BDS, BHMS, BAMS and BUMS graduates with a minimum of 55% marks in the qualifying examination from a recognized University.

4. Mode of Selection

Candidates will be selected strictly on the basis of merit as decided by the Govt. of Kerala/Kerala University of Health Sciences.

5. Number of seats as per university norms.

6. Duration of the Course:

Three academic years. 2 parts-Preliminary part of one year & Final part of 2 years.

B. Course Content & regulations

Staff Pattern

Sl. No	Description	No's	Specification
1	Professor	1	M.Sc. Medical Physiology /M.Sc. Medical Anatomy/ M.Sc. Medical Biochemistry with 10 years' experience or Ph.D. with 5 years' experience
2	Associate Professor	1	M.Sc. Medical Physiology /M.Sc. Medical Anatomy/ M.Sc. Medical Biochemistry with 7years experience or Ph.D. with 3 years' experience
3	Assistant Professor	2	M.Sc. Medical Physiology / M.Sc. Medical Anatomy/ M.Sc. Medical Biochemistry with 5 years' experience/Ph.D.
4	Lecturer	3	M.Sc. Medical Physiology / M.Sc. Medical Anatomy/ M.Sc. Medical Biochemistry
Non - Teaching Staff			
1	Lab Technician	1	
2	Lab Assistant	1	
3	Office Assistant	2	
4	Peon/ Sweeper	2	

Maximum number of students a faculty could guide at a time is limited to five.

1. Foundation course - First year will be foundation course. i.e. Anatomy, Physiology and Biochemistry

2. Subject specializations

Second and Third year - Medical Physiology. Course content should include basics of Research methodology & Biostatistics. Candidates have to work on a particular allotted topic for dissertation, submission of which shall be as per University regulations. Candidates will also maintain a journal by the teacher in which all the practical done by him/her is recorded. They will also be given training in teaching methodology

3. Attendances

To appear for the University examination, there should be a minimum of 80% attendance.

4. Internal Assessment

Internal assessment marks is calculated on the basis of assessment of the candidate's performance in the Session examinations, laboratory works, Practical records, Projects, Seminars and structured discussions. In the case of failed candidates, the internal assessment marks have to be freshly calculated before each attempt of the University examination.

5. University examinations

University examination will be conducted at the end of first year for the Foundation course (Anatomy, Biochemistry and Physiology) & at the end of third year for the subject specialization. Candidates should clear the Foundation course for eligibility for the final examination.

6. Criteria of Passing

Minimum pass marks will be Minimum marks for pass in each paper will be **50% (50% external and 50% internal)** and practicum will be **(50% external and 50% internal)**.

7. Appearance for the Examination

A candidate shall apply for all papers of a year when he/she appears for the examination of that year for the first time. If candidate is failing one or more subject (s), he/she will be appearing for respective subjects (s) only (Theory/Practical Subject). Candidates who fail in the Foundation course are allowed to continue to second year; but will have to pass the Foundation course before appearing for the final University examination in the third year. Supplementary examination will be held as scheduled by the university.

8. Classification of Successful Candidates

Minimum for a pass in each paper shall be as per the concerned university regulations.

Grading:

50% Pass Class

51 < 60% Second Class

61 < 75% First Class

76% and above Distinction

9. Award of degree

A candidate who passes entire subjects of the course will be eligible for the award of degree

10. Practical's

There is no practical examination for Second year M.Sc. (Medical) Physiology Students.

11. Dissertation

In the 2nd year, student will work on a selected topic of dissertation prepared under supervision and guidance of recognized faculty and will submit the same at the end of the year. 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. The candidates shall submit four copies of dissertation in the prescribed format given by the college before the commencement of the theory examination of that year. Candidates who fail to submit their dissertation on or before the stipulated date shall not be permitted to appear for the final year examination. This shall be assessed as accepted or as rejected with no marks carried there of as per the panel of examiners (2 external & 1 internal at least). In the event of discrepancy between internal & external examiners the dissertation will be referred to a third examiner and his/her verdict on same will be taken as final.

12. Registration

A candidate on admission to the M.Sc. course shall apply to the University for Registration

- By making a formal application in the prescribed format.
- Original mark lists of the qualifying examination.
- Transfer certificate from the previous institution.
- Allotment letter from the competent authority who conducted the admission process
- Equivalency and migration certificate where ever needed.
- Original SSLC/Equivalent Certificate.
- The fees prescribed for the registration.

13. Migration and transfer

Migration and transfer will not be permitted during the course of study.

14. Summary of hours of Instruction

First year: Foundation Course

Subjects	Total (40 weeks)	
	Theory Hrs.	Practical Hrs.
Physiology	160	320
Biochemistry	160	80
Anatomy	140	420
Total	460	820

Second & Third Year – Medical Physiology

Years	Theory including Seminar, Symposium Hrs.	Practical's including Lab Postings Seminars, Journal clubs tutorials etc.	Total Hrs.
Second Year	240	1200	1440
Third Year	240	1200	1440

MARK DISTRIBUTION OF FIRST & FINAL YEAR UNIVERSITY EXAM

Year	Subject	Theory		Theory Internal		Theory Viva		Practical		Practical Internal	
		Max. Marks	Pass Mark	Max. Marks	Pass Mark	Max. Marks	Pass Mark	Max. Marks	Pass Mark	Max. Marks	Pass Mark
First Year	Foundation Course										
	Anatomy	70	35	20	10	10	**	40	20	10	05
	Physiology	70	35	20	10	10	**	40	20	10	05

	Biochemistry	70	35	20	10	10	**	40	20	10	05	
Third Year		Theory		Theory Viva		Practical internal		Practical	Distribution of Marks	Max. Marks	Pass Mark	
				Max	Min		Max	Min				
	Paper 1	100	50	50	25	Med. Physiology Practicals	50	25	Long Haematology	25	70	35
	Paper 2	100	50						Short Haematology	10		
	Paper 3	100	50						OSPE	10		
									Clinical Physiology	25		
Paper 4	100	50	Log bok, Seminar, Journal club, Integrated teaching	130	65	Micro Teaching	** *	50	25			
						Record(Disse rtation)	** *	50	25			

The duration of theory examination is three hours for each paper.

Practical examination: One day each.

Eligibility of examiners and project guide

Eligibility for Internal Examiner

M. Sc Medical Physiology with three years of experience.

Eligibility for External Examiner

M. Sc Medical Physiology with five years of experience/ Ph.D with 3 years experience/ M.D with three years experience.

Eligibility for project guide

M. Sc Medical Physiology with five years of experience/ Ph.D with 3 years experience/ M.D with three years experience

FOUNDATION COURSE IN ANATOMY PAPER I

Time allotted Theory 140 hrs.
Practical 420 hrs.

General anatomy (8 hrs.)

Includes introduction to anatomy (1 hr.), Skeleton system with classification, types of bone, features of long bone, ossification, blood supply (2 hrs.), Joints – classification with examples, structure of typical synovial joints (1 hr.), Myology – classification with examples, types of skeletal muscles, tendon, aponeurosis (2 hrs.), Nervous system – subdivisions, types of cells in CNS, neuron - structure, types, ganglia and nuclei, plexuses. (2 hr.)

Regional anatomy.

Upper Limb (20 hrs.)-All parts and regions of upper limb –General lay out of; bones with regard to their structure and parts and muscular attachments (6 hrs.) --- All joints and details of capsules, ligaments, movements (6 hrs.) –Brachial Plexus of upper limb and its branches with details of root value, origin, formation, course, relations and distribution (4 hrs.) –Arteries and their branches (3hrs.) -- Necessary and applicable applied anatomy (1 hr.)

Lower Limb (20 hrs.)- All parts and regions of lower limb – general lay out of ; thigh, leg, ankle and foot with details of muscles, arteries veins and other vasculature, lymphatic's and nerves – All Bones in detail with regard to their structure and parts and muscular attachments (6hrs)– All joints and details of capsules, ligaments, movements(6hrs)–Lumbar plexus and its branches with details of root value, origin, formation, course, relations and distribution (4hrs)–arteries and their branches(3hrs)– Necessary and applicable applied anatomy(1hr).

Abdomen (20 hrs.) -Abdominal quadrants -- abdominal viscera with details of peritoneal coverings, relations, blood supply, lymphatics, innervation (5 hrs.)– Abdominal blood vessels and lymphatics – sympathetic and parasympathetic pathways of concerned areas (4 hrs.)–

Retroperitoneal area(1hr) – nerve plexuses of the region(1hr) – Thoraco-abdominal diaphragm(2hrs) -- Lumbar vertebrae (2hrs)-- all pelvic viscera with details of position, relations, blood supply, lymphatics, innervation and functions(3hrs) – termination of abdominal aorta and its subsequent branches(1hr)-- Necessary and applicable applied anatomy. (1hr).

Thorax (18 hrs.) - Thorax, its extent and dimensions– thoracic wall (1 hr.)– thoracic inlet and outlet (1hr.)– thoracic viscera with details of relations, blood supply, innervation and functions (3 hrs.)– pleura and pericardium(2 hrs.). – mediastinum, its divisions and structures (3 hrs.)– heart and great vessels(3 hrs.), thoracic vertebrae, sternum and ribs (2hrs.)-- relations and systemic outlay of various parts and structure (2 hrs.)-- necessary and applicable applied anatomy(1 hr.).

Head & Neck (17hrs.)- General lay out of triangles of neck (1 hr.), pharynx and larynx (2 hrs.), oral cavity and tongue (1 hr.), tonsils(1 hr.), oesophagus, (1 hr.) trachea (1hr.), all blood vessels of head and neck (1hr.), details of nerves of the region, sympathetic and para sympathetic components(1hr.), cranial nerves(2 hrs.), skull, cranial cavities and cervical vertebrae (3hrs.) – relations and systemic outlay of various parts and structure(1 hr.) -- necessary and applicable applied anatomy(1 hr.).

Brain & Spinal cord Meninges (17 hrs.)-- Parts of brain -- external features -- internal features (3 hrs.)--various ascending and descending tracts (3 hrs.) -- neural connexions – specialized areas of brain and their functions(2 hrs.) – ventricles of brain (2 hrs.)– cranial nerves and their connexions (2 hrs.)– blood supply(2 hrs.) – relations and systemic outlay of various parts and structure necessary and applicable applied anatomy(1hr.)

General embryology (10hrs)-includes introduction & mitosis and meiosis(1hr.), gametogenesis(1hr.), fertilization(1hr.), implantation(1hr.), bilaminar germ disc(1hr.), notochord formation(1hr.), trilaminar germ disc(1hr.), embryonic folds(1hr.), fetal membranes(1hr.), placenta(1hr.).

Histology (10hrs)– microscopy, basic tissues, blood vessels, tongue, esophagus, stomach, small intestine, large intestine, pancreas, liver, trachea, lung, kidney, ureter, urinary bladder, testis, ovary, uterus, fallopian tube, thyroid gland, and skin.

Genetics (8 hrs.) – Introduction, chromosomes, inheritance, karyotyping, chromosomal abnormalities, inborn errors of metabolism and genetic counselling.

PRACTICAL SYLLABUS

Demonstration of dissected specimens – Region wise Thorax, Abdomen and pelvis, Head and Neck and Brain including osteology and radiology.

Histology – Study of histology slides - system wise.

Distribution of theory and practical hours:

4 hours theory/week.

2 hours practical's/week for gross anatomy.

2 hours practical's for histology.

RECOMMENDED TEXT BOOKS

I Gross Anatomy

1. Clinical Anatomy for Medical Student By R.S. Snell 7th Edition 2003
2. Lippincott Williams & Wilkins
3. Grants Atlas of Anatomy By A. Agur, M. Lec 11th Edition 2004

II. Histology

1. Histology: A text & atlas By M.H. Ross 4th Edition 2002 G.I. Kaye, W. Pawlina Lippincott Williams & Wilkins
2. DiFiore's- Atlas of Histology with By V. Eroschenko Functional correlations International Edition 10th Edition 2004

III Developmental Anatomy

1. Langman's- Medical Embryology T. Sadler with Simbryo Version 1CD-ROM Lippincott, Williams and Wilkins 9th Edition 2003

IV Neuroanatomy

1. Clinical Neuroanatomy by Richard S. Snell for Medical Students Lippincott, William and Wilkins 5th Edition 2001

FOUNDATION COURSE IN BIOCHEMISTRY (INCLUDING MEDICAL PHYSICS AND MOLECULAR BIOLOGY) PAPER II

DETAILED SYLLABUS

Details of the course

Total number of hours	: 240
Lectures	: 160
Practical's	: 80

DETAILS OF LECTURES

1. Introduction: structure and functions of cell, cellular organelle and bio membranes 1hr

2. Bimolecular 14HRS

A. Proteins: Amino acids – classification based on structure 1hr

Ionic properties of amino acids, isoelectric pH, buffering action of Amino acids and proteins.

Structural organization of proteins – primary, secondary, tertiary and quaternary, forces involved in maintaining-Examples-Insulin, Collagen, proteins.

Denaturation, coagulation, isoelectric precipitation of proteins using salt solutions, classification of proteins (color reactions to be covered with practicals).

Electrophoresis and chromatography-brief mention on separation techniques (details of techniques and application in practical demonstration)

B. Carbohydrates: Classification-monosaccharide's: glucose, fructose, galactose and mannose. Reactions: reducing property, oxidation, reduction, isomers, anomers and epimers. Derivatives like amino sugars and deoxy sugars, Glycosidic bond
Disaccharides, lactose, sucrose, maltose, polysaccharides: Starch 2hrs

C. Lipids: definitions, classification with examples, saturated and unsaturated fatty acids, triacylglycerol. Phospholipids 2hrs
Structure and function of biomembrane 2hrs

3. Enzymes: 10HRS

Nature of enzymes, coenzymes and cofactors, classification	1hr
Mechanism of action, specificity of enzymes, active site	1hr
Enzyme kinetics, factors affecting enzyme activity, Km value and significance (derivation not required)	2hrs
Enzyme inhibition – competitive, allosteric, feedback	
Therapeutic agents like antimentabilites as example	2hrs
Enzymes regulation in biological systems-allosteric regulation	
Covalent modification, zymogen activation induction and Repression (mention only)	1hr
Isoenzymes and their significance with suitable examples	1hr
Clinical enzymology-diagnostic importance of enzymes (LDH, CPK, AST, ALT, ACP.GGT, GPD, 5'Ntase, cholinesterase, Amylase, Lipase)	2hrs

4. Digestion and absorption of nutrients – carbohydrates

Lipids and proteins:	3hrs
Disorders of digestion and absorption	1hr
Glucose transporters	1hr
Malnutrition's –PEM	1hr

5. A. Metabolism of Carbohydrates 14 HRS

i. EMP pathway: Reactions, regulation in brief, energetics, Rapaport Leubering cycle, fate of pyruvate in aerobic and Anaerobic conditions, PDH reaction	3hrs
ii. Gluconeogenesis, key enzymes, regulation and significance Cori's cycle	1hr
iii. Glycogen synthesis and degradation, regulation (brief), inborn Errors associated	2hrs
iv. HMP shunt pathway, NADPH generation, Transketolase Reaction, Tissues where operating, G6PD deficiency m, Metabolic importance (Non oxidative phase need not be	

Elaborated)	2hrs
v. Metabolism of galactose, fructose, polyol and uronic acid Pathways-inborn errors associated	2hrs
vi. Blood glucose regulation-action of insulin, glucagons cortisol Growth hormone	1hr
vii. Diabetes mellitus-Aetiology, biochemical abnormalities, Symptoms and complications	1hr
viii. Glycosurias -differential diagnosis of reducing sugars	1hr
ix. GTT-procedure,criteria of normal & diabetic status, Interpretation of Graphs, glycated HB	1hr

B. Metabolism of lipids 13HRS

i. Beta oxidation of fatty acids, transport of fatty acids across mitochondrial Membrane regulation and energetics	1hr
ii. Synthesis of fatty acids, fatty acid synthase complex, regulation, elongation and desaturation	2hrs
iii. Formation and utilization of ketone bodies, ketoacidosis in diabetes and starvation	2hrs
iv. Metabolism of adipose tissue, hormone sensitive lipase, action of hormones (insulin, glucagons, epinephrine and cortisol), liver adipose tissue axis, fatty liver, lipotropic factors	2hrs
v. Cholestrol-structure synthesis (crucial intermediates only), regulation, metabolic fate, bile acids and steroids hormones-formation from cholesterol	2hrs
vi. Transport plasma lipids, lipoproteins, metabolism, apoproteins , functions, lipids profile and Dyslipidemias-diet PUFA and dietary fibre Drugs	2hrs
vii. Eicosanoids-prostaglandins, thromboxanes and leukotrienes, structure and formation (major Steps only), actions	1hr
viii. Phospheolipids and sphingolipids – inborn errors	1hr

C. Metabolism of Amino acids 13HRS

i. Body amino acid pool, dynamic state of body proteins interorgan transport of amino acids, Nitrogen balance, glucogenic and ketogenic amino acids	1hr
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- ii. Transamination (reaction only) decarboxylation, oxidative deamination, transdeamination, Formation of ammonia 1hr
- iii. Metabolism of glycine, compounds synthesized, creatine and creatinine, hyperglycinemias, Glutathione 2hrs
- iv. Metabolism of sulphur containing amino acids, methionine and cysteine, transsulphuration, transmethylation reactions, formation of taurine, PAPS, excretion of sulphur, homocystinuria, cystinuria and cystinosis 2hrs
- v. Phenyl alanine and tyrosine-metabolism, PKU and alkaptonuria synthesis of thyroid Hormones, synthesis and catabolism of catecholamines, albinism, tyrosinemia 2hrs
- vi. Tryptophan-formation of NAD (important steps only), serotonin and 5 HIAA, xanthurenic Acid, melatonin, formation of indican, Hartnup's disease, branched chain amino acids – MSUD (Pathway not required) 2hrs
- vii. Glutamic acid, glutamine, GABA, aspartic acid, asparagines, serine, (metabolic role and compounds synthesized using these amino acids only) 2hrs

D. TCA Cycle 6HRS

- i. Reaction, regulation and energetics 1hr
- ii. Interrelation of CHO, lipid and amino acid metabolism 1hr
- iii. Anaplerotic reactions, role of TCA cycle and metabolic adaptations during fed state and Starvation 2hrs
- iv. Electron transport chain- components and sites of ATP synthase, inhibitors and uncouplers, ATP phosphorylation (briefly) 2hrs

6. Haemoglobin 5HRS

- Synthesis and degradation 2hrs
- Haemoglobinopathies and thalassemias, porphyrias (Brief mention only as examples in each case) 3hrs

7. Vitamins 8HRS

Classification, chemical nature (detailed structure not required), coenzyme forms, biochemical role, sources, requirements, deficiency and toxicity of the following vitamins

- i. Vitamins A, D, K and E-free radicals 4hrs

- ii. Thiamine, riboflavin, niacin, biotin, pyridoxine, panthothenic acid 1hr
- iii. Folic acid and one carbon groups and B12 2hrs
- iv. Ascorbic acid 1hr

8. Minerals 6HRS

Sources, requirements, absorption, biochemical role, deficiency, and Toxicity of the following minerals.

- i. Calcium and phosphorus-role of PTH.1, 25 DHCC and CT 2hrs
- ii. Iron, copper magnesium and anemia's 2hrs
- iii. Sodium potassium and chloride 1hr
- iv. Trace elements- Zn, FI, Se, Mn 1hr

9. Maintenance of homeostasis 6HRS

- i. Acid base regulation-acid and bases, pH, buffers Henderson-Hasselbach's equation (derivation not required), buffer capacity 1hr
- ii. Acids bases in the body, plasma buffers, respiratory and renal Regulation of pH 2hrs
- iii. Acidosis and alkalosis, major causes and compensatory mechanism Anion gap, assessment of acid base status 2hrs
- iv. Fluid and electrolyte balance –distribution of body water and disorders (Hormonal regulation covered in physiology) 1hr

10. Nucleic acid 23HRS

- A. i. Structure of purines, pyrimidines, nucleosides, nucleotides 2hrs
- ii. Purine: nucleotide synthesis and catabolism (synthetic pathway need not be considered in detail with names of intermediates. Only the sources of different atoms and sequence of addition) Salvage pathway and regulation, hyperuricemia and gout, Lesch Nyhan Syndrome 2hrs
- iii. Pyrimidine: nucleotide synthesis, regulation, orotic aciduria, formation of deoxy nucleotides thymidylate synthesis reaction, folic antagonist and nucleotide analogues as chemotherapeutic agents 1hr
- iv. Nucleic acids: structure of DNA, different types of DNA, mitochondrial DNA, base pairing rule, differences between types of RNA 2hrs

- B. DNA replication, DNA polymerase, DNA repair 1hr
- C. Transcription, RNA polymerase, post-transcriptional modifications, splicing inhibitors, reverse transcriptase ribozyme 2hrs
- D. Genetic code, RNA, ribosomes 1hr
- E. Translation, steps, post – translational modification, inhibitors 2hrs
- F. Regulation of gene expression, induction, repression and derepression 2hrs
- G. Recombinant DNA technology, restriction endonucleases, southern, northern and western blotting, RFLP, DNA, finger printing, polymerase chain reaction, anti-sense therapy, application of molecular biology in clinical situations, gene therapy 5hrs

H. Biochemical basis of inherited disorders: Mutations, Pathogenesis of inborn in general types of mutations with examples in each, mode of inheritance

11. Immunoglobulins

Structure and functions, hyper and hypogammaglobulinemias, immunoassays. AIDS monoclonal antibodies. 2hrs

12. Biochemistry of Cancer-cell cycle 5HRS

Mutagens, carcinogens, role in carcinogenesis, virus in carcinogenesis, tumor Markers and oncogenes 2hrs

Biochemical basis of environmental health and environmental toxicology, Biotransformation of xenobiotics in general and absorption, transport, effects and biotransformation. 3hrs

13. Conventional Laboratory Investigations

- i. Liver function Tests including formation of bilirubin, hyperbilirubinemias and differential diagnosis of jaundice (S.bilirubin, serum enzymes, A/G ration, BSP test, urine tests) 2hrs
- ii. Gastric function tests (pentagastrin test, total and free acidity of a gastric juice, AHT and Hollander's test) and pancreatic function tests including tests for malabsorption. 2hrs
- iii. Renal function tests –clearance tests of tubular function, NPN urine analysis 2hrs
- iv. Specialized Laboratory investigations – RIA, EIA, principles of colorimetry, Blot techniques, RFLP, PCR-Details 1hr
- v. Radioactivity – diagnostic, research and therapeutic applications and radiation hazards. 1hr

DETAILS OF PRACTICALS

Practicals 1 to 15 (48hrs)

Practicals 16 to 21 (32hrs)

1. Reactions of carbohydrates: Glucose, Fructose, lactose, sucrose
2. Reactions of proteins (colour reactions and precipitation)
3. Reactions of urea and uric acid
(hypobromite and specific urease test for urea and Benedict's test and Schiff's test for uric acid).
4. Identification of biochemically important compounds in given solution
5. Normal urine-organic and inorganic constituents
6. Abnormal Urine: report on abnormal urine
7. Demonstration of chromatography and diagnostic importance
8. Introduction to clinical chemistry, collection of samples, anticoagulants and preservatives, principles of colorimetry.
9. Estimation of glucose
10. Estimation of urea in serum calculation of clearance from given values of UV
11. Estimation of creatinine serum
12. Estimation of serum cholesterol – estimation of LDL cholesterol from given values of HDL and TAG, lipid profile, data interpretation.
13. Estimation of total protein and albumin-A/G ration
14. Estimation of serum alkaline phosphatase
15. Spotters – demonstration-simple instruments, graphs, tests, etc.
16. Laboratory data interpretation-liver disease, renal diseases, acid base disturbances, diabetes mellitus, lipid disorders.
17. Problem solving exercises – short history of different conditions may be given and students will be asked to suggest investigations to arrive at a diagnosis and student will be
18. Demonstration to techniques in molecular biology
19. Clinical lab posting
20. Revision.

FOUNDATION COURSE

Paper III Physiology: Theory

First year- 160 hrs

SCHEDULE OF LECTURES

I. HAEMATOLOGY

18 Hrs.

Fluid compartments, Composition & functions of blood, Plasma proteins

Erythrocyte - Morphology, Count, Function, Erythrocyte Sedimentation rate, Osmotic fragility. Hemoglobin, Erythropoiesis, Anemia, Polycythemia, Fate of RBC, Jaundice.

Leucocytes - Morphology, Types, normal count and variations. Properties & Functions, Leucopoiesis.

Thrombocytes- Morphology, Count, Function, Variations. Thrombopoiesis Hemostasis. Coagulation and its disorders.

Blood groups and its importance, Blood transfusion.

Blood volume, Tissue fluid and Lymph.

II CARDIOVASCULAR SYSTEM

20 Hrs

Organization of CVS, Properties of Cardiac Muscle, Origin and spread of cardiac impulse

Cardiac Cycle – Electrical and mechanical events, ECG.

Cardiac output, Measurement, regulation

Blood pressure, measurement & variation, determinants, regulation, shock.

Regional circulation- coronary, Pulmonary, Cerebral, Cutaneous.

III RESPIRATORY SYSTEM

18 Hrs

Introduction. Functional anatomy, Mechanics of ventilation, Pressure changes, volume changes, Surfactant, Compliance, Airway resistance.

Alveolar ventilation, Dead space, Ventilation perfusion ratio

Diffusion of gases, O₂ transport, CO₂ transport.

Regulation of respiration – Voluntary, Neural, Chemical. Abnormalities of respiration Hypoxia, Cyanosis, Dyspnea, Asphyxia. High altitude, Dysbarism.

IV DIGESTIVE SYSTEM

13 hrs

Functional anatomy of GI tract, salivary secretion & its regulation.

Gastric secretion and its regulation, Peptic ulcer, pancreatic secretion, Bile & its regulation, Intestinal juice.

Mastication, Deglutition, Movements of stomach, vomiting, Movements of intestine, Defecation. GI Hormones, Digestion & Absorption of carbohydrates, Proteins, Fat & vitamins.

V. KIDNEY, and SKIN

11 Hrs

Functional anatomy of kidney, functions of kidney, renal blood flow and its peculiarities.

Glomerular filtration rate, Definition, Measurement and factors affecting Tubular functions – Reabsorption, Secretion, Acidification, concentration and abnormalities.

Micturition – Bladder innervation, Micturition reflex and its abnormalities.

Skin - Structure, Functions, regulation of body temperature.

VI MUSCLE and NERVE

12 Hrs

Neurons and glial cells - Structure, Types, electrical property, function, degeneration and regeneration.

Muscle- Structure & Functions of skeletal muscle & smooth muscle

Neuromuscular transmission – Functional anatomy, Transmission & Clinical importance.

VII CENTRAL NERVOUS SYSTEM

32 Hrs

Organization of Nervous system. Synapse, Properties & Functions

Reflexes, Reflex action, Property, Function.

Sensory system – Receptor, Ascending sensory pathways, Thalamus, sensory cortex

Motor System – Spinal control of Motor activity, Motor areas in Cerebral Cortex, Pyramidal & extrapyramidal tracts, Basal ganglia & Cerebellum.

Reticular formation, Higher functions of Cortex.

Autonomous nervous system

Cerebro spinal fluid

VIII SPECIAL SENSES

10 Hrs

Olfaction and gustation

Audition

Vision

IX ENDOCRINOLOGY**18 Hrs**

General endocrinology

Pituitary hormones & disorders.

Thyroid hormones & its disorders

Parathyroid hormone and calcium metabolism

Adrenal cortical hormones and clinical significance Adrenal medullary hormones.

Endocrine Pancreas

Local Hormones.

X REPRODUCTIVE SYSTEM**8 Hrs**

Male Reproductive System

Female reproductive system, Lactation, Pregnancy & Contraception

PHYSIOLOGY Practical's: 320 hrs**SCHEDULE OF PRACTICALS****Haematology**

RBC count, WBC count, Differential count

Hemoglobin estimation, ESR determination

Blood group determination, PCV, Bleeding time, clotting time. Platelet count, Eosinophil count, Reticulocyte count.

Demonstrations only

Measurement of blood pressure

Examination of sensory systems

Examination of motor system, reflexes

Examination of CVS & Respiratory system

Examination of cranial nerves

ECG

Frog muscle-nerve preparation; Muscle experiments, Heart experiments

Innovative Sessions**Tutorials, seminars, structured discussion, integrated teaching,**

Formative evaluation and revision

FOUNDATION COURSES

Scheme of Examination

University theory single paper (3 hrs)	- 70 marks
Internal assessment theory	- 20 marks
University Practical's	- Total 40 marks
OSPE (10 stations)	-10 marks
Haematology long	-20 marks
Haematology short	-5 marks
Amphibian short	-5 marks
Internal assessment practicals	- 10 marks
University viva	- 10 marks
Overall total.....	- 150 marks

(Model question paper attached below)

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Detailed syllabus for specialization

**M.SC – MEDICAL PHYSIOLOGY (2ND AND 3RD YEAR) –
THEORY & PRACTICAL SYLLABUS**

The course content is distributed as follows:

- Semester 3:** General Physiology, Electro physiology, Muscle & Nerve, Hematology, Gastrointestinal Physiology
- Semester 4:** CVS, Respiratory System, Renal Physiology, Skin & Temperature regulation, Dissertation.
- Semester 5:** Endocrine System, Reproductive System, Recent advances in Physiology. Dissertation

Semester 6: Nervous system, Special senses, Recent advances in Physiology.

There will be sessional examinations and University examination at the end of 3rd Year. There will be 4 theory papers, practical's, dissertation & viva for University Examination.

HUMAN PHYSIOLOGY – SYLLABUS

GENERAL PHYSIOLOGY –

Introduction to Physiology, morphology of cells-Structure of cell membrane with reference to ion channels, transport across cell membranes, Intercellular communication, Cell death and regeneration, Ageing and theories, Protein synthesis and its regulation, Homeostasis, Body fluid compartments: principles of measurement and normal values.

HAEMATOLOGY-

Composition, properties and functions and values and variations of blood.

Plasma proteins: Types, normal values, origin, functions, abnormal proteins & applied aspects.

Red blood cells: Morphology, functions. RBC Count - Normal value, variations, determination.

Hemoglobin: Structure, types, derivatives, normal value, functions & variations.

Life span of RBCs, destruction of RBCs, Jaundice, tissue macrophage system.

Erythropoiesis: Definition, sites, stages and regulation.

Anaemias: types and features.

Leucocytes: Morphology of different types of leucocytes, normal values, variations, Properties and functions.

Leucopoiesis: sites, stages, regulation & leukemia

Platelets: Morphology, normal values, variations, properties and functions, Thrombopoiesis.

Haemostasis: Definition, mechanism. Blood coagulation: Definition, mechanisms, clot

Retraction, fibrinolysis, bleeding disorders, tests for coagulation, Anticoagulants: mechanism of action and uses. Thrombosis and embolism.

Blood groups: ABO and Rh systems & Bombay blood group, blood typing, Blood transfusion: indications, precautions to be taken and complications of mismatched transfusion & recent advances.

Erythroblastosis foetalis – management, prevention, Medicolegal and clinical importance.

Lymph, tissue fluid, oedema.

NERVE & MUSCLE PHYSIOLOGY-

Types of neurons, Neuroglia.

Morphology of neurons, classification of nerve fibers, properties, bioelectric potentials- RMP & Action potential. Mechanisms of conduction in nerve fibers, factors affecting conduction.

Types of nerve injuries, Wallerian degeneration, regeneration of nerve fibers, factors affecting regeneration.

Classification of muscles & Morphology & properties of each type.

Mechanism of neuro-muscular transmission. Molecular mechanism of muscle contraction

Excitation contraction coupling. Electrical, chemical, mechanical & thermal changes during muscle contraction. Types of contraction. Length tension relationships.

DIGESTIVE SYSTEM-

Introduction – Functional Anatomy of G.I. Tract. Basic electric rhythm, enteric nervous system Salivary secretion. Types of salivary glands. Innervation, composition & functions of saliva, regulation & applied aspects.

Gastric secretion – Structure of gastric mucosa. Innervation. Origin, composition and functions of gastric juice. Mechanism of secretion of Hcl. Functions.

Regulation of gastric secretion. Methods of study. Phases of gastric secretion, factors influencing gastric secretion, Peptic ulcer & gastrectomy & gastric function tests.

Pancreatic secretion – Structure of pancreas. Innervation, composition and functions of . Pancreatic juice. Mechanisms of secretion, Regulation, Tests for . Pancreatic exocrine function & pancreatitis.

Liver and gall bladder – Structure and functions of liver. Composition and functions of Bile. Regulation of bile secretion. Functions of gall bladder.

Regulation of filling and emptying, Cholecystectomy, Gall stones. steatorrhoea & liver function tests.

Small intestine – Structure, Composition and functions of succus entericus & short bowel syndrome, sprue.

Large intestine- Structure, functions, constipation and diarrhoea.

Gastro-intestinal movements – Stages of deglutition, Mechanism, Disturbances, Gastric Motility. Types of movement, Regulation of gastric emptying.

Movements of small intestine – Types, Regulation, Functions.

Movements of colon, Defecation and vomiting.

Gastro –intestinal hormones and their actions. Digestion of carbohydrates, proteins and fats. Absorption of carbohydrates, Proteins, fats, vitamins, water and electrolytes.

CARDIOVASCULAR SYSTEM

Introduction, Systemic and pulmonary circulation.

Functional anatomy of heart and blood vessels.

Properties of cardiac muscle.

Conducting system of the heart, Origin and spread of cardiac impulses & abnormal pacemakers & conduction defects.

Cardiac cycle: phases, Electrical events- Electrocardiogram, mechanical events, heart sounds.

Innervation of the heart & Echo cardiography. Heart rate variations and its regulation & heart failure.

Cardiac output: Definition, variations, distribution, methods of determination (using Fick's Principle in detail), Regulation.

Arterial pulse & variations.

Haemodynamics.

Blood pressure and its regulation. Applied aspects- Hypertension, Hypotension.

Shock.

Cardiovascular changes during exercise, Compensation for gravitational effects.

Regional circulation: Cerebral, Coronary, splanchnic, cutaneous. Foetal circulation.

RESPIRATORY SYSTEM

Introduction, functional anatomy of respiratory tract & non respiratory functions,

Ventilation - mechanics-mechanism of breathing. Pressure changes, volume changes (lung volumes and capacities), pressure-volume interrelationship- compliance, work of breathing – Airway resistance & determination, importance.

Pulmonary & Alveolar ventilation – dead space, significance.

Pulmonary circulation & pulmonary edema, ventilation –perfusion ratio and its significance.

Diffusion of gases through respiratory membrane and factors affecting it.

Oxygen transport – Oxygen Dissociation Curve and factors affecting it- myoglobin.

Carbon dioxide transport: Carbon dioxide dissociation curve.

Regulation of respiration –organisation of respiratory centers, neural regulation, Herring Breur reflexes, chemical regulation. Periodic breathing. Voluntary hyperventilation, breath holding.

Hypoxia: types and effects & treatment, high altitude changes, acclimatization, decompression sickness,

respiratory adjustments during muscular exercise.

Other disorders - Dyspnoea, cyanosis, asphyxia. **COPD, Sudden infant death syndrome.**

Principles of Artificial respiration

Pulmonary function tests.

RENAL PHYSIOLOGY, SKIN AND TEMPERATURE REGULATION

Introduction - Functional anatomy of the kidney. Function in homeostasis

Renal circulation - peculiarities, renal blood flow and its determination.

GFR: definition, factors influencing, measurement, normal value & variations.

Tubular functions. Reabsorption, secretion and concentration mechanisms. Acidification of urine, Diuretics.

Micturition- Nerve supply to urinary bladder: Micturition reflex, its higher control

Non-excretory function of kidney.

Principles of Dialysis.

SKIN AND ITS FUNCTIONS. Temperature regulation.

ENDOCRINE SYSTEM

General endocrinology,

Pituitary gland- (Anterior and posterior)- hormones, actions, regulation of secretion and abnormalities.

Thyroid gland: Hormones, synthesis, transport, actions, regulation of secretion and abnormalities.

Hormones regulating Calcium metabolism and bone physiology, Parathormone, actions and regulation of secretion. Calcitriol- Synthesis, actions and regulation.

Calcitonin: source, actions and regulation.

Hypoparathyroidism – tetany, Hyperparathyroidism.

Rickets, osteomalacia, osteoporosis.

Adrenal cortex: Structure, classification of adrenal cortical hormones, biosynthesis. Actions, regulation of secretion and abnormalities of each.

Adrenal medulla: Hormones, actions, and pheochromocytoma.

Endocrine pancreas: hormones, actions and regulation of secretion. Diabetes mellitus.

Thymus gland, pineal.

Local hormones.

Physiology of Growth & development

REPRODUCTIVE SYSTEM

Introduction **sex determination & differentiation**

Male reproductive system. - Physiological Anatomy, Spermatogenesis & factors influencing it, Functions of accessory sex organs & **male fertility tests & Castration & prostate cancer.**

Female reproductive system- Menstrual cycle- Phases of ovarian and uterine cycle, Tests for ovulation, cervical cycle, hormonal control Pregnancy, tests for pregnancy and its medico level importance parturition and lactation, menopause – changes. First breath and its importance.

Contraceptive measures in male and female.

CENTRAL NERVOUS SYSTEM

Synapse, Types, synaptic transmission, properties.

Reflexes: classification and properties & abnormal reflexes.

Organisation of CNS: Cross section of spinal cord.

Sensory system: receptors, classification and properties.

Sensory pathways: Dorsal column tract, spinothalamic tracts – lateral and ventral.

Trigeminal pathway from face. Origin, course and termination and the sensations carried through each tract.

Pain sensation: Referred pain, mechanisms and examples.

Intrinsic analgesic system.

Thalamus: classifications of nuclei, connections and functions, thalamic syndrome.

Motor system: Pyramidal tract – (Corticospinal and corticobulbar tract). Origin, course and termination.

Extrapyramidal tract and function.

Upper motor neuron and lower motor neuron lesion.

Spinal cord lesions: complete section, hemisection-Effects

Tabis dorsalis, syringomyelia, subacute combined degeneration of spinal cord.

Cerebellum: functional classification, major connections, functions and effects of lesions.

Basal ganglia: components, major connections, functions and abnormalities

Reticular formation: functions.

Sleep & EEG & evoked potentials.

Vestibular apparatus: functions & disorders.

Posture and equilibrium maintenance- basic principles

Hypothalamus: major nuclei connections and functions.

Limbic system: major connections, functions & disorders.

Cerebral cortex, areas, functions.

Higher functions of the nervous system.

CSF: formation, composition, circulation, functions and applied aspects.

Autonomic nervous system.

SPECIAL SENSES

Vision: Structure of the eye. Physiology of vision. Visual pathway

Field of vision, effects of lesion at different sites. Light reflexes and accommodation reflex-pathway. Common errors of refraction.

Dark and light adaptation. Photochemical changes. Colour vision, colour blindness.

Hearing: Structure of the ear, Components and functions of the middle ear

Structure of organ of Corti. Physiology of hearing. Auditory pathway. Theories of hearing.

Deafness. Tests of hearing.

Smell: Structure of olfactory mucous membrane and olfactory pathway

Taste: Structure of taste bud, Basic taste modalities, Taste pathway.

BIOPHYSICS (To be taken along with the relevant systems)

Physical principles of transport across cell membranes and across capillary walls.

Biopotentials, Physical principles governing flow of blood in heart & blood vessels.

Physical principles governing flow of air in air passages.

PRACTICALS

Besides specially designed PG practicals, MSc students are to perform all undergraduate practicals and also teach these practicals to the undergraduates.

I. HAEMATOLOGY EXPERIMENTS

1. Use and care of microscope
2. Microscopic examination of blood
3. ESR, PCV and Haemoglobin estimation
4. RBC count
5. Calculation of blood indices
6. WBC count
7. Differential leukocyte count
8. Determination of blood group
9. Absolute eosinophil count
10. Reticulocyte count
11. Platelet count
12. Bleeding time, clotting time

II HUMAN EXPERIMENTS

1. Recording of arterial pulse.
2. Recording of blood pressure
3. Effects of posture and exercise on blood pressure
4. Perimetry
5. Spirometry
6. Electrocardiography (ECG)
7. Clinical examination of respiratory system

8. Examination of cardiovascular system
9. Examination of sensory system
10. Examination of motor system
11. Examination of cranial nerves
12. Examination of reflexes.

EXPERIMENTS III - AMPHIBIAN EXPERIMENTS

1. Use and care of common appliances used in experimental physiology
2. Muscle-nerve preparation
3. Simple muscle curve
4. Effect of two successive stimuli
5. Effect of variation of temperature on muscle contraction
6. Fatigue
7. Velocity of nerve impulse
8. Effect of load and after load
9. Genesis of tetanus and clonus
10. Recording of normal cardiogram of frog's heart
11. Effect of cold and warm saline on sinus venosus and ventricle of frog's heart.
12. Effect of Stannius ligatures.
13. Properties of cardiac muscle
14. Effect of refractory period on frog's heart
15. Effects of vagal stimulation on frog's heart
16. Perfusion of isolated frog's heart, study of the effects of ions and drugs.
17. Isolated mammalian heart perfusion – effects of drugs.
18. Intestinal movements.

Mammalian Experiments

1. Isolated Organ Bath/Perfusion studies.

To study inotropic & chronotropic functions in isolated rabbit heart.

2. Dog experiments (charts)

PRACTICAL DEMONSTRATION

1. Audiometry
2. Pulse recording using Physiograph
3. EMG
4. Pregnancy diagnosis test. (Immunological test)
5. Genesis of tetanus using Mosses Ergograph.
6. Blood Banking.
7. Bicycle Ergography.
8. Case history (for interpretation)/Spotters/Calculations/charts.
9. Clinical charts.ie. Clinical conditions for Discussion. Eg: Cushing's Syndrome,Cretinism, Myxoedema, Grave's disease, Adrenogenital Syndrome, Tetany, Gigantism etc.

Text Books:

1. GUYTON (Arthur C), Text of Medical Physiology 11th Edition, 2008, Prism Publishers, Bangalore.
2. GANONG (William F), Review of Medical Physiology, 23 rd Edition, and Lange.
3. CHAUDHURI (Sujith K), 5th Edition Concise Medical Physiology New Central Books, Calcutta.
4. TORTORA (Gerald J), Principles of anatomy and physiology 11th Edition John Waley & Sons, Ref. college publication.
5. A.K. Jain – Textbook of Medical Physiology, 4th Edition 2008. 6. BIJLANI (RL), Understanding medical physiology; text book for medical students, Jaypee Brothers, New Delhi
6. Text Book of Medical Physiology – A.P.Krishna, Suman Publications, Mangalore.
7. VANDER ct al. Human Physiology, 8th Edition, Mechanism of body function, Mc Graw Hill Publishers.

Reference books

1. MORAN Campbell E. J Clinical Physiology, ELBS UK Churchill 14th Edition
2. BERNE (Robert M) and LEVY (Mathew 6th Edition, Physiology Elsevier Publication 2008
3. VERNON B. MOUNT CASTLE, Vol. 1 & 2, Medical Physiology, 14th Edition, Mossby Publication.
4. PATERSON SMITH, Textbook of Physiology, 10th Edition, Smith Churchill Livingstone Publication.

Experimental Physiology

1. Ghai, A textbook of Practical Physiology, 5th Edition, Jaypee Brothers.
2. Hutchinson & Hunter, Clinical Methods 22nd Edition, Elsevier Publishers.
3. A.K. Jain – Manual of practical Physiology, 2nd Edition, Arya Publications- 2007.

Pattern of University exam for Final M. Sc Medical Physiology

4 Papers (100 marks per paper)

Paper I - General Physiology, Haematology, Cardiovascular system

Paper II - Physiology of Respiration, Renal Physiology, Skin & temperature regulation, Principles of Biophysics as applied to Physiology

Paper III - Nervous system, Special senses, Muscle & nerve Physiology

Paper IV– Gastro intestinal Physiology, Endocrine system, Reproductive system, Recent Advances in Physiology

Mark distribution- University Exam and Internal Assessment

University Marks			Max. / Min.
Theory	Paper1	General Physiology, Haematology, Cardiovascular system	100/50
	Paper2	Physiology of Respiration, Renal Physiology, Skin & temperature regulation, Principles of Biophysics as applied to Physiology	100/50
	Paper3	Nervous system, Special senses, Muscle & nerve Physiology	100/50
	Paper4	Gastro intestinal Physiology, Endocrine system, Reproductive system, Recent Advances in Physiology	100/50
Internal Assessment	Paper1	General Physiology, Haematology, Cardiovascular system	25
	Paper 2	Physiology of Respiration, Renal Physiology, Skin & temperature regulation, Principles of Biophysics as applied to Physiology	25
	Paper 3	Nervous system, Special senses, Muscle & nerve Physiology	25
	Paper 4	Gastro intestinal Physiology, Endocrine system, Reproductive system, Recent Advances in Physiology	25
	Practical		50/25

	Log book		50/25
	Seminars, Journal club & Integrated teaching		80/40
Total			680/340
Practical	Practical 1	Long Haematology- 25	70/35
		Short Haematology-10	
	Practical 2	OSPE-10	
	Practical 3	Clinical Physiology (System Examination, ECG, Spirometry, Physiograph, Perimetry) - 25	
Record			50/25
Viva			100/50
Dissertation			50/25
Microteaching			50/25
Grand Total			1000/500

EMBLEM

LOG BOOK

Submitted in partial fulfillment of the requirements for the award of the Master of Science in
Medical Physiology.

By

Name

Roll no:

Certificate

This is to certify that the content of the log book is a bonafide work of

Reg. No: M.Sc.Medical Physiology student in the Department of Physiology, for
the academic period 20.... - 20....

Head of the Department

Candidate's Statement

I hereby declare that the work incorporated in the present log book is original and has not been submitted
to any other University or Institutions for the award of any degree.

Signature

Name

Biodata of the Candidate

1. Name of the candidate:

2. Register number:

3. Name of Institution/Hospital:

4. Name of University

5. Name of the course:

M Sc Medical Physiology

6. Duration of the course:

3yrs

Address

7. Department:

Physiology

Signature of HOD

FIRST YEAR

- Attended the foundation course
- Subjects included were: a) Medical Anatomy
 - b) Medical Biochemistry
 - c) Medical Physiology
- Appeared for all internal assessment exams both Theory and Practical's
- Appeared for First Year MSc Degree Course University Examination [Theory and Practical] Scheduled by the university

SECOND YEAR

- Attended daily lecture classes in Physiology with MBBS 20.... batch & also presented seminars, journal clubs, and group discussions & had individual topic discussions & evaluation sessions under the guidance of senior Faculty in Physiology.
1. Attended classes in Biostatistics & Research Methodology in the month of February 20....
 2. Search for & Selection of topic for dissertation

3. Practicals done: All Hematology, Biophysics and Amphibian experiments (as per curriculum)

4. Attended Departmental Teacher's training program in the form of

- Helping in conducting Practical demonstrations for MBBS and BDS students.
- Practical supervision & conducting group discussions – all hematology and Amphibian experiments for BBS, BDS and Para medical students.
- Helping in conducting research and practical's for PG students. (MD)

THIRD YEAR

Weekly Schedule

1. Daily lecture class attended: _____ hours per week
2. PG training programme: Discussions, Viva and Seminars
3. Practical demonstration and supervision: _____ hours per week
4. Practicals done: Hematology, Biophysics and Amphibian experiments.
5. Dissertation work: Study designing, Ethical clearance, Data collection, Sampling, Statistical analysis and Writing up of thesis.

Hematology

- PCV
- ESR
- RBC count
- WBC count
- Differential leukocyte count
- Clotting time • Bleeding time
- Blood grouping
- Microscopic examination of blood
- Blood indices

- Absolute eosinophil count

- Platelet count

- Reticulocyte count

Biophysics

- Perimetry

- ECG

- Physiograph

- Spirometry

Amphibian experiments

- All Nerve-muscle experiments (as per curriculum)

- All Frog heart experiments (as per curriculum)

Mammalian Experiments

Mammalian Experiments

1. Isolated Organ Bath/Perfusion studies.

To study ionotropic & chronotropic functions in isolated rabbit heart.

Clinical examinations

- Blood pressure recording
- General examination
- Examination of cardiovascular system
- Examination of respiratory system
- Examination of higher mental functions and sensory system
- Examination of motor system
- Examination of reflexes
- Examination of cranial nerves I – VI
- Examination of cranial nerves VII - XII

Seminars Twice a Week (Monday, Friday)

The seminars are on a topic belonging to a system scheduled by the faculties. The topic is presented in depth appropriate for postgraduates by one of the M.Sc. or PhD students and moderated by a faculty member.

The seminars represent only a small and somewhat arbitrary selection of topics. They are not intended to cover an entire system. Their aims are to:

- Topics belonging to a system scheduled for the semester.
- Topic presented in depth by appropriate for PGs & modulated by a faculty member.
- Cover recent advances.
- To give practice in oral presentation

Journal Clubs every month first week

The journal clubs are on an article belonging to a system scheduled by the faculties. The article is presented by an M.Sc./PhD student or senior demonstrator and moderated by a faculty member. The aims of journal clubs are to:

- Highlight recent advances
- Discuss classical papers
- Inculcate the faculty of critical appreciation of a research article
- Give students and senior demonstrators practice in the art of oral presentation
- Faculty presentation
- Medical education
- Research methodology
- An area of research in which the faculty member is involved

Dissertation

Topic:

Summary:

CME and Conferences

Details of CME, whether delegate /paper presentation

Preparation of Panel of Examiners:

From the Medical faculty coming under KUHS

Reference Books:

1. Textbook of Medical Physiology, Guyton and Hall.
2. Review of Medical Physiology, William. F. Ganong.
3. Human Physiology, Vander, Sherman, Luciano
4. Physiology, Robert. M. Berne, Mathew. N. Levy
5. Textbook of Human Physiology, Sarada Subramaniam.
6. Text book of Human Physiology Dr. Indu Khurana.
7. Understanding Medical Physiology, R.L. Bijilani
8. Text book of Physiology, Vol.1 and 2, Prof. A.K. Jain
9. Practical Physiology L. Prakasam reddy.
10. Physiological Basis of Medical Practice, John. B. West
11. Text book of practical physiology G K Pal

Planning of Sessional Exams

- Exams on theory, practical's, and oral to be conducted by the Dept. on topics scheduled by the Faculties.
- Maintain record of internal assessment
- Final semester examination to be conducted by the university.

Unifying of Evaluating System:

- Evaluation at the university level by examiners appointed by the university.

Model Question paper-Foundation Course :(Physiology)

Q I. Essay -10 Marks.

Q II. Essay -10 marks

Q III. 6marks x 5 = 30

Q IV. Short Notes 4Marks x 5 = 20

**FIRST YEAR M. Sc MEDICAL PHYSIOLOGY EXAMINATION
(FOUNDATION COURSE)
MODEL QUESTION PAPER**

Time: 3 hrs

Max marks – 70

PHYSIOLOGY

Instructions;-

Draw labeled diagrams wherever necessary

Do not write anything on the question paper other than your hall ticket no on top left

- I. Describe how oxygen is transported in the blood from lungs to tissues, with the help of an oxygen hemoglobin dissociation curve (ODC). Explain the factors which shift the ODC to the right.
(5+2+3=10 marks)

- II. Define stroke volume and cardiac output giving the normal values. Discuss how stroke volume is regulated?
(4+6=10 marks)

- III Explain the following:
 - A. Water reabsorption in the renal tubules
 - B. Regulation of aldosterone secretion
 - C. Changes taking place in the uterine endometrium during different phases of the menstrual cycle.
 - D. Composition and functions of pancreatic juice
 - E. Intrinsic mechanism of blood coagulation & name two anticoagulants used in the laboratories.(6 marks each = 30 marks)

- IV. Write short notes on:
 - A. Function of Cerebellum
 - B. Refractive errors of the eye and their correction
 - C. Acromegaly
 - D. Excitation contraction coupling
 - E. Reflex action(4 marks each = 20 marks)
