



ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು
Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore

4th T Block, Jayanagar, Bangalore – 560 041

AUTH/105SYN/AHS/83/2013-14

08/04/2014

NOTIFICATION

Sub: Revised Common Curriculum for I Year of Allied Health Science Courses viz. B.Sc. Operation Theatre Technology, B.Sc. Respiratory Care Technology, B.Sc. Radio Therapy Technology, B.Sc. Imaging Technology, B.Sc. Cardiac Care Technology, B.Sc. Perfusion Technology, B.Sc. Neuro Sc.Technology, B.Sc. Renal Dialysis Technology and B.Sc. Anaesthesia Technology

- Ref:1) RGUHS Notification No. UA/AUTH/ 1 YEAR A.H.S./126/2007-08 dated 29.06.2007
2) Recommendations of Academic Council in its meeting held on 12.11.2013
3) Minutes of 105th meeting of Syndicate held on 18/01/2014.

In exercise of the powers conferred by Section 35(2) of RGUHS Act 1994, the Syndicate in its 105th meeting held on 18/01/2013 is pleased to notify the Revised Common Curriculum for following I Year Allied Health Science Courses as shown in the annexure appended herewith.

1. B.Sc. Operation Theatre Technology
2. B.Sc. Respiratory Care Technology
3. B.Sc. Radio Therapy Technology
4. B.Sc. Imaging Technology
5. B.Sc. Cardiac Care Technology
6. B.Sc. Perfusion Technology
7. B.Sc. Neuro Sc.Technology
8. B.Sc. Renal Dialysis Technology
9. B.Sc. Anaesthesia Technology

The Ordinance shall come into force from the academic year 2013-14.

By Order,

(Dr.D.Prem Kumar)
REGISTRAR

To:
The Principals of colleges affiliated to RGUHS
conducting Allied Health Science Courses

Copy to:

1. The Principal Secretary to Governor, Governor's Secretariat, Raj Bhavan, Bangalore – 560 001.
2. Principal Secretary to Government, Health & Family Welfare Department, (Medical Education), Vikasa Soudha, Bangalore –560 001.
3. The Director, Department of Medical Education, Anand Rao Circle, Bangalore – 560 009.
4. PA to Vice-Chancellor / Registrar / Registrar (Eva.) / Finance Officer.
5. Director, Curriculum Development Cell.
6. The Home Page of RGUHS Website – <http://www.rguhs.ac.in/>
7. Guard File / Office Copy.

SYLLABUS FOR ALLIED HEALTH SCIENCE COURSES

I year - B.Sc. Allied Health Sciences

ANATOMY

Theory: 70hrs

Practicals: 20hrs

I. INTRODUCTION: HUMAN BODY AS A WHOLE

THEORY:

Definition of anatomy and its divisions

Terms of location, positions and planes

Cell and its organelles

Epithelium – definition, classification, describe with examples, functions

Glands – classification, describe serous and mucous glands with examples

Basic tissues – classification with examples

PRACTICALS:

Histology of types of epithelium

Histology of serous, mucous and mixed salivary gland

II. LOCOMOTION AND SUPPORT

THEORY:

Cartilage – types with examples and histology

Bone – classification, names of bone cells, parts of long bone, microscopy of

Compact bone, names of all bones, vertebral column, intervertebral disc,

Fontanelles of fetal skull

Joints – classification of joints with examples, synovial joint (in detail for radiology)

Muscular system – classification of muscular tissue and histology

Names of muscles of the body

PRACTICALS:

Histology of 3 types of cartilages

Demo of all bones showing parts, radiographs of normal bones and joints

Histology of compact bone (TS and LS)

Demonstration of all muscles of the body

Histology of skeletal, smooth and cardiac muscle (TS and LS)

III. CARDIOVASCULAR SYSTEM

THEORY:

Heart – size, location, chambers, exterior and interior
Blood supply of heart
Systemic and pulmonary circulation
Branches of aorta, common carotid artery, subclavian artery,
Axillary artery, brachial artery, superficial palmar arch, femoral artery,
Internal iliac artery
Peripheral pulse
Inferior vena cava, portal vein, portosystemic anastomosis
Great saphenous vein
Dural venous sinuses
Lymphatic system – cisterna chyli and thoracic duct
Histology of lymphatic tissues
Names of regional lymphatics, axillary and inguinal lymph nodes in brief
PRACTICALS:
Demonstration of heart and vessels in the body
Histology of large artery, medium sized artery and vein, large vein
Microscopic appearance of large artery, medium sized artery and vein,
Large vein pericardium
Histology of lymph node, spleen, tonsil and thymus
Normal chest radiograph showing heart shadows
Normal angiograms

IV. GASTRO-INTESTINAL SYSTEM

THEORY:

Parts of GIT, oral cavity (lip, tongue – with histology, tonsil, dentition, pharynx,
Salivary glands, Waldeyer's ring)
Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas,
Radiographs of abdomen

V. RESPIRATORY SYSTEM

Parts of RS – nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments
Histology of trachea, lungs and pleura
Names of paranasal air sinuses
PRACTICALS:
Demonstration of parts of respiratory system
Normal radiographs of chest
Histology of lung and trachea

VI. PERITONEUM

THEORY:

Description in brief

PRACTICAL:

Demonstrations of reflections

VII. URINARY SYSTEM

Kidney, ureter, urinary bladder, male and female urethra

Histology of kidney, ureter and urinary bladder

PRACTICAL:

Demonstration of parts of urinary system

Histology of kidney, ureter, urinary bladder

Radiographs of abdomen – IVP, retrograde cystogram

VIII. REPRODUCTIVE SYSTEM

THEORY:

Parts of male reproductive system, testis, vas deferens, epididymis,

Prostate (gross and histology)

Parts of female reproductive system, uterus, fallopian tubes,

Ovaries (gross and histology)

Mammary gland – gross

PRACTICAL:

Demonstration of section of male and female pelvis with organs in situ

Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes,

Ovaries

Radiographs of pelvis – Hysterosalpingogram

IX. ENDOCRINE GLANDS

THEORY:

Names of all endocrine glands, in detail on pituitary gland, thyroid gland,

Parathyroid gland, suprarenal gland (gross and histology)

PRACTICAL:

Demonstration of the glands

Histology of pituitary, thyroid, parathyroid, suprarenal glands

X. NERVOUS SYSTEM

THEORY:

Neuron

Classification of NS

Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord

With spinal nerve (gross and histology)

Meninges, ventricles and cerebrospinal fluid

Names of basal nuclei

Blood supply of the brain

Cranial nerves

Sympathetic trunk and names of parasympathetic ganglia

PRACTICAL:

Histology of peripheral nerve and optic nerve
Demonstration of all plexuses and nerves in the body
Demonstration of all parts of brain
Histology of cerebrum, cerebellum, spinal cord

XI. SENSORY ORGANS

THEORY:

Skin – histology, appendages of skin
Eye – parts of eye and lacrimal apparatus
Extra-ocular muscles and nerve supply
Ear – parts of ear- external, middle and inner ear and contents

PRACTICAL:

Histology of thin and thick skin
Demonstration and histology of eyeball
Histology of cornea and retina

XII. EMBRYOLOGY

THEORY:

Spermatogenesis and oogenesis
Ovulation, fertilization
Fetal circulation
Placenta

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20
Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practical need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Anatomy shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10

GRAND TOTAL			80
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Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder's & C P Prism Publishers, Bangalore
5. ESTER. M. Grishcimer- Physiology & Anatomy with Practical Considerations, J. P. Lippin Cott. Philadelphia
6. Bhatnagar- Essentials of Human Embryology- Revised Edition. Orient Blackswan Pvt. Ltd.

PHYSIOLOGY

Theory 70 hours

Practical 20hours

Introduction

Composition and function of blood

Red blood cells – Erythropoiesis, stages of differentiation function, count physiological Variation.

Haemoglobin –structure, function, concentration physiological variation, Methods of Estimation of Hb

White blood cells – Production, function, life span, count, differential count

Platelets – Origin, normal count, morphology functions.

Plasma Proteins – Production, concentration, types, albumin, globulin, Fibrinogen, Prothrombin functions.

Haemostasis & Blood coagulation

Haemostasis – Definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting factors.

Blood Bank

Blood groups – ABO system, Rh system

Blood grouping & typing

Crossmatching

Rh system – Rh factor, Rh incompatibility.

Blood transfusion – Indication, universal donor and recipient concept.

Selection criteria of a blood donor. Transfusion reactions

Anticoagulants – Classification, examples and uses

Anaemias : Classification – morphological and etiological. Effects of anemia on body

Blood indices – Colour index, MCH, MCV, MCHC

Erythrocyte sedimentation Rate (ESR) and Packed cell volume

Normal values, Definition. Determination

Blood Volume -Normal value, determination of blood volume and regulation of blood volume Body fluid

– pH, normal value, regulation and variation

Lymph – lymphoid tissue formation, circulation, composition and function of lymph

Cardiovascular system

Heart – Physiological Anatomy, Nerve supply

Properties of Cardiac muscle

Cardiac cycle-systole, diastole.

Intraventricular pressure curves.

Cardiac Output – only definition

Heart sounds- Normal heart sounds Areas of auscultation.

Blood Pressure – Definition, normal value, clinical measurement of blood pressure. Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension. Pulse – Jugular, radial pulse, Triple response

Heart sounds – Normal heart sounds, cause characteristics and signification. Heart rate

Electrocardiogram (ECG) –significance.

Digestive System - Physiological anatomy of Gastro intestinal tract

Functions of digestive system.

Salivary glands - Structure and functions.

Deglutination –stages and regulation

Stomach – structure and functions.

Gastric secretion – Composition function regulation of gastric juice secretion.

Pancreas – structure, function, composition, regulation of pancreatic juice

Liver – functions of liver.

Bile secretion, composition, function, regulation of bile secretion. Bilirubin metabolism, types of bilirubin, Vandernberg reaction, Jaundice- types, significance.

Gall bladder – functions.

Intestine – small intestine and large intestine.

Small intestine –Functions- Digestion, absorption, movements.

Large intestine – Functions, Digestion and absorption of Carbohydrates, Proteins, Fats, Lipids. Defecation

Respiratory system

Functions of Respiratory system, Physiological Anatomy of Respiratory system, Respiratory tract, Respiratory Muscles, Respiratory organ-lungs, Alveoli, Respiratory membrane, stages of respiration.

Mechanism of normal and rigorous respiration. Forces opposing and favouring expansion of the lungs.

Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall.

Transportation of Respiratory gases: Transportation of Oxygen: Direction, pressure gradient, Forms of transportation, Oxygenation of Hb. Quantity of Oxygen transported.

Lung volumes and capacities - Regulation of respiration what? Why? How? Mechanisms of Regulation, nervous and chemical regulation. Respiratory centre. Hearing Brier, Reflexes.

Applied Physiology and Respiration : Hypoxia, Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnoea.

Endocrine System –

Definition, Classification of Endocrine glands & their Hormones Properties of Hormones.

Thyroid gland hormone – Physiological, Anatomy, Hormone secreted, Physiological function, regulation of secretion. Disorders – hypo and hyper secretion of hormone

Adrenal gland, Adrenal cortex physiologic anatomy of adrenal gland, Adrenal cortex, cortical hormones – functions and regulation Adrenal medulla – Hormones, regulation and secretion. Functions of Adrenaline and nor adrenaline

Pituitary hormones – Anterior and posterior pituitary hormones, secretion, function.

Pancreas – Hormones of pancreas. Insulin – secretion, regulation, function and action. Diabetes mellitus – Regulation of blood glucose level.

Parathyroid gland – function, action, regulation of secretion of parathyroid hormone.

Calcitonin – function and action

Special senses

Vision – structure of eye. Function of different parts.

Structure of retina.

Hearing structure and function of ear mechanism of hearing

Taste – Taste buds functions.

Smell physiology, Receptors.

Nervous system

Functions of Nervous system, Neuron structure, classification and properties. Neuroglia, nerve fiber, classification, conduction of impulses continuous and saltatory. Velocity of impulse transmission and factors affecting. Synapse – structure, types, properties.

Receptors – Definition, classification, properties. Reflex action – unconditioned properties of reflex action. Babinski's sign. Spinal cord nerve tracts. Ascending tracts, Descending tracts

Pyramidal tracts – Extrapyrmidal tracts. Functions of Medulla, pons, Hypothalamic, disorders. Cerebral cortex lobes and functions, Sensory cortex, Motor cortex, Cerebellum, functions of Cerebellum. Basal ganglion-functions. EEG.

Cerebro Spinal Fluid(CSF) : formation, circulation, properties, composition and functions lumbar puncture.

Autonomic Nervous System: Sympathetic and parasympathetic distribution and functions and comparison of functions.

Excretory System

Excretory organs

Kidneys: Functions of kidneys structural and functional unit nephron, vasarecta, cortical and juxtamedullary nephrons – Comparision, Juxta Glomerular Apparatus –Structure and function. Renal circulation peculiarities.

Mechanism of Urine formation: Ultrafiltration criteria for filtration GFR, Plasma, fraction, EFP, factors effecting EFR. Determination of GFR selective reabsorption – sites of reabsorption, substance reabsorbed, mechanisms of reabsorption Glucose, urea.

H + Cl aminoacids etc. TMG, Tubular lead, Renal threshold % of reabsorption of different substances, selective e secretion.

Properties and composition of normal urine, urine output. Abnormal constituents in urine. Mechanism of urine concentration.

Counter – Current Mechanisms : Micturition, Innervation of Bladder, Cystourethrogram. Diuretics : Water, Diuretics, osmotic diuretics, Artificial kidney Renal function tests – plasma clearance Actions of ADH, Aldosterone and PTH on kidneys. Renal function tests.

Reproductive system

Function of Reproductive system, Puberty

Male reproductive system- Functions of testes, spermatogenesis site, stages, factors, influencing semen. Endocrine functions of testes

Androgens – Testosterone structure and functions.

Female reproductive system. Ovulation, menstrual cycle. Physiological changes during pregnancy, pregnancy test.

Lactation : Composition of milk factors controlling lactation.

Muscle nerve physiology

Classification of muscle, structure of skeletal muscle, Sarcomere contractile proteins, Neuromuscular junction. Transmission across, Neuromuscular junction. Excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue Rigour mortis.

Skin -structure and function

Body temperature measurement, Physiological variation, Regulation of body Temperature by physical chemical and nervous mechanisms .Role of Hypothalamus, Hypothermia and fever.

Practicals

Haemoglobinometry

White Blood Cell count

Red Blood Cell count

Determination of Blood Groups

Leishman's staining and Differential WBC count

Determination of packed cell Volume

Erythrocyte sedimentation rate [ESR]

Calculation of Blood indices

Determination of Clotting Time, Bleeding Time

Blood pressure Recording

Auscultation for Heart Sounds

Artificial Respiration
 Determination of vital capacity

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20
 Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Physiology shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

1. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism Publishers
2. Chatterjee (CC) Human Physiology Latest Ed. Vol. 1, Medical Allied Agency
3. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book
4. Ganong (William F) Review of Medical Physiology. Latest Ed. Appleton

BIOCHEMISTRY I

No. Theory classes: 70 hours
 No. Practical classes: 20 hours

I. Clinical Laboratory

- Responsibilities of health care personnel
- Laboratory hazards- Physical, Chemical and Biological. Laboratory safety measures- Safety regulations and first aid in laboratory

II. Laboratory apparatus : Different types, use, care and maintenance (Where appropriate, diagrams to be drawn in practical record)

- Glass ware in laboratory – Significance of borosilicate glass. Plastic ware in laboratory
Cleaning of glass ware and plastic ware
- Pipettes - Glass and Automated
- Burettes, Beakers, Petri dishes, Porcelain dish
- Flasks - different types (volumetric, round bottomed, Erlenmeyer, conical etc.,)
- Funnels – different types (Conical, Buchner etc.,)
- Bottles – Reagent, Wash bottles
- Measuring cylinders, reagent dispensers
- Tubes – Test tube, Centrifuge tube, Folin-Wu tube
- Cuvettes and its use in measurements , cuvettes for visible and UV range
- Racks – Bottle, Test tube, Pipette and draining racks
- Tripod stand, Wire gauze, Bunsen burner, Dessicator, Stop watch, timers

III. Instruments: Use, care and maintenance (Where appropriate, pictures/diagrams and schematic diagrams to be drawn in practical record)

- Water bath, Oven & Incubators, Distillation apparatus - water distillation plant and water deionisers, Reflux condenser, Cyclomixers , Magnetic stirrer, Shakers
- Refrigerators, Deep freezers, Cold box
- Centrifuges*: Principle, Svedberg unit, centrifugal force, centrifugal field, rpm, Conversion of G to rpm and vice versa) Components, working.
Different types of centrifuges
- Laboratory balances*: Physical and analytical. Mono & double pan, Electronic balances. Weighing different types of chemicals, liquids, hygroscopic compounds etc. Precautionary measures while handling (Diagram)
- Photometry - Colorimeter*- Principle, limitations of Beer-Lambert's law, components, working.
- pH meter*- Principle, components-pH measuring electrodes, Working, Precautions taken while handling. (Diagram of pH meter)

(*Diagrams mandatory)

IV. Units of measurement

- Metric system. Common laboratory measurements, Prefixes in metric system
- International system of units- SI units- definition, classification, Conversion of conventional and SI Units

V. Introduction to general Bio-molecules:

- Chemistry of carbohydrates: Classification (structures for monosaccharides*), Functions of carbohydrates
- Chemistry of amino acids*: Classification–based on structure and nutritional requirement, Occurrence. Functions of amino acids.
- Chemistry of lipids: Classification of lipids and fatty acids. Functions of lipids
- Chemistry of nucleotides*: Purine and Pyrimidine bases. Composition of nucleosides and nucleotides. Occurrence of bases.

*** Structures mandatory**

VI. Fundamental Chemistry

- Valency, Molecular weight & Equivalent weight of elements and compounds. Normality, Molarity, Molality.

VII. Solutions: Definition, use, classification where appropriate, preparation and storage

- Stock and working solutions.
- Molar and Normal solutions of compounds and acids. (NaCl, NaOH, HCl, H₂SO₄, H₃PO₄, CH₃COOH etc.,)
- Preparation of percent solutions – w/w, v/v w/v (solids, liquids and acids), Conversion of a percent solution into a molar solution
- Saturated and supersaturated solutions
- Standard solutions. Technique for preparation of standard solutions and Storage. E.g: glucose, albumin etc.
- Dilutions- Diluting Normal, Molar and percent solutions. Preparing working standard from stock standard.
Part dilutions: Specimen dilutions. Serial dilutions. Reagent dilution. Dilution factors

VIII. Acids, Bases, Salts and Indicators : Basic concepts. Determination of pH- Henderson

Hasselbalch's equation. Buffer solutions. pH determination of buffers.

Blood pH.

Fluid buffers.

IX. Biomedical waste management

ASSIGNMENT TOPICS:

- Radio active isotopes
- Arterial Blood gases

PRACTICAL DEMONSTRATION (Record book to be maintained)

- Laboratory apparatus - All glass ware and plastic ware (all appropriate diagrams in practical record)
- Water bath, Oven & Incubators, Water Distillation plant*, refrigerators, cold box, cool barns, reflux condensers.
- Preparation of solutions: 1N HCl, 1M NaOH. Standard solutions of glucose and albumin
- Centrifuges*- Technique of Centrifugation
- Analytical balance* - Weighing of chemicals to prepare standard and different types of solutions. Care while weighing acids, deliquescent and hygroscopic compounds.
- Colorimeter* - Absorbance readings of a colored solution and graphing
- pH meter* - Checking pH of urine and buffer

Diagrams to be drawn

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20

Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Biochemistry I shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

Text Book References

- Biochemistry – 3rd revised edition by U Sathyanarayana & U Chakrapani
- Textbook of Medical Biochemistry-6th Edition by MN Chatterjea & Rana Shinde
- Textbook of Medical Laboratory technology 2nd edition by Godkar and Godkar.
- Biochemistry-3rd edition by Pankaja Naik
- Medical Laboratory technology 6th edition by Ramnik Sood.
- Manipal Manual of Clinical Biochemistry for medical laboratory and M.Sc., students-3rd edition by Shivananda Nayak B
- Varley's Practical Clinical Biochemistry, 4th, 5th and 6th editions

PATHOLOGY I

Histopathology, Clinical Pathology, Hematology and Blood Banking

Theory-70 hours

Practicals-20 hours

I. Histopathology- Theory

- Introduction to Histopathology
- Receiving specimens in the laboratory
- Grossing techniques
- Mounting techniques- various mountants
- Maintenance of records and filing of slides
- Use and care of Microscope
- Various fixatives, mode of action, preparation and indications
- Biomedical waste management
- Section cutting
- Tissue processing for routine paraffin sections
- Decalcification of tissues
- Staining of tissues-H & E Staining

II. Clinical Pathology- Theory

- Introduction to clinical pathology
- Collection , transport, preservation and processing of various clinical specimens
- Urine examination- collection and preservation, Physical, chemical and microscopic examination for abnormal constituents
- Examination of Body fluids
- Examination of Cerebrospinal fluid (CSF)
- Sputum examination
- Examination of feces

III. Hematology – Theory

- Introduction to hematology
- Normal constituents of Blood, their structure and functions
- Collection of Blood samples
- Various anticoagulants used in Hematology
- Various instruments and glass ware used in Hematology, preparation and usage of glass wares
- Laboratory safety guidelines
- SI units and conventional units in Hospital laboratory
- Quality control of laboratory findings
- Hemoglobin estimation, different methods and normal values
- Packed cell volume
- Erythrocyte sedimentation rate
- Normal Haemostasis
- Bleeding time. Clotting time, prothrombin time, Activated partial Thromboplastin time

IV. Blood Bank- Theory

- Introduction blood banking
- Blood group system

- Collection and processing of blood for transfusion
- Compatibility testing
- Blood transfusion reactions

Practicals

1. Urine analysis- Physical, Chemical, Microscopic
2. Blood grouping and Rh typing
3. Hb estimation , packed cell volume (PCV), Erythrocyte Sedimentation rate (ESR)
4. Bleeding time and Clotting time
5. Histopathology- section cutting and H & E Staining (for BSc MLT only)

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20
 Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Pathology I shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

1. Culling Histopathology techniques

2. Bancroft Histopathology techniques
3. Koss- Cytology
4. Winifred Diagnostic cytopathology
5. Orell Cytopathology
6. Todd and Sanford- clinical diagnosis by Laboratory Medicine
7. Dacie and Lewis- Practical Hematology
8. Ramnik SOOD. Lab technology, Methods and interpretation, 4 th edition JP Bros New Delhi, 1996
9. Sathish Guptha , Short text book of Medical laboratory techniques for technicians
10. Sachdev K N. Clinical Pathology and Bacteriology, 8 th edi JP Bros, New Delhi, 1996

Microbiology I

Theory: 70 Hours

Practicals: 20 Hours

1. Introduction (6 hrs)

History of Microbiology, classification of microorganisms, use of microscope in the study of bacteria, Morphology of bacterial cell

2. Growth and nutrition (6 hrs)

Nutrition, growth and multiplication of bacteria, culture media and culture methods

3. Sterilization and disinfection (8 hrs)

Principles and use of equipments of sterilization, chemicals used in disinfection

4. Biomedical waste management principle and practice

5. Immunology (5 hrs)

Immunity, vaccines

Immunization schedule

Definition of Antigen, antibody, list of antigen antibody reactions.

5. Infection

(5hrs)

Definition, types and mode of transmission

Hospital infections – causative agents, mode of transmission and prophylaxis

Antimicrobial susceptibility testing

6. Systematic bacteriology

(15 hrs)

Disease caused and lab diagnosis of medically important bacteria (Staphylococcus, Streptococcus, Gonococcus, Echerichia coli, Salmonella, Shigella, Vibrio, Mycobacteria, Treponema, Leptospira)

(No need of classification, antigenic structure, virulence mechanism)

7. Parasitology

(10hrs)

Introduction to Parasitology

List of medically important parasites and diseases (E.histolytica, Plasmodium, W.bancrofti, Ascaris, Ancylostoma)

Lab diagnosis of parasitic infections

8. Virology

(10hrs)

Introduction to virology

List of medically important viruses and diseases (AIDS, Hepatitis, Rabies, Polio, Arboviruses)

Lab diagnosis of viral infections

9. Mycology

(5hrs)

Introduction to Mycology

List of medically important fungi and diseases (Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis and Mucor mycosis)

Lab diagnosis of fungal infections

PRACTICALS

(20hrs)

Compound Microscope

Demonstration and sterilization of equipments

Demonstration of commonly used culture media and media with growth

Antibiotic susceptibility test

Demonstration of common serological tests –widal, VDRL,

Grams stain, Acid fast staining

Stool exam for Helminthic ova

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20

Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practical need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Microbiology I shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

Reference Books-

1. Ananthanarayana & Panikar Medical Microbiology- University Press
2. Robert Cruickshank- Medical Microbiology- The Practice of Medical Microbiology
3. Chatterjee- Parasitology- Interpretation to Clinical Medicine
4. Rippon- Medical Mycology
5. Emmons- Medical Mycology
6. Basic Laboratory methods in Parasitology, J P Bros, New Delhi
7. Basic Laboratory procedures in clinical bacteriology, J P Bros, New Delhi
8. Medical Parasitology- Ajit Damle
9. Introduction to medical microbiology- Ananthanarayana- Orient Longman Pvt. Ltd