FUNDAMENTALS OF HUMAN ANATOMY & PHYSIOLOGY (THEORY)
Course Code: ANA/PHY.101T
Credit Hours: 3
Semester: I

SECTION I: HUMAN ANATOMY

UNIT-I : Structure & function of human body (2 Lectures)

- Definitions, Subdivisions of Anatomy, Terms of location and position, Fundamental Planes, organization of human body. Cell (structure & function). Tissues (Epithelium, Connective, Muscular, Nervous)

UNIT- II : Locomotion and support (2 Lectures)

- *Skeletal system:* Types of bones, Bones and their parts, Divisions of skeleton
- *Joints:* classification, types of movements with examples.

UNIT- III : Nervous system (2 Lectures)

- *Central nervous system*: Spinal Cord (anatomy, functions), reflex- arc, meninges.
- *Brain:* Hind Brain, Midbrain, Forebrain.

UNIT-IV : Sensory System (2 Lectures)

- Anatomical introduction to skin & Sense organs: Eye, Ear ,Nose

UNIT-V : Circulatory system (2 Lectures)

- *Heart:* size, location, coverings, chambers, blood supply, the blood vessels. General plan of circulation, pulmonary circulation. Names of arteries and veins and their positions.

UNIT- VI : Respiratory system (2 Lectures)

- Organs of Respiratory System. Brief knowledge of parts and position
- *Conducting portion:* Nose, nasal cavity, Para nasal air sinuses, Larynx, trachea, bronchial tree.
- *Respiratory portion:* Pleura and lungs.

UNIT- VII: Digestive system (2 Lectures)

- Components of Digestive system, Anatomy of organs of digestive system, mouth, tongue, teeth,
- salivary glands, liver, biliary apparatus, pancreas.

UNIT- VIII: Excretory system (2 Lectures)

- *Kidneys:* location, gross structure, excretory ducts, ureters, Urinary bladder, Urethra.

UNIT- IX: Reproductive system (2 Lectures)

- *Male Reproductive System:* Testis, Duct system.
- *Female Reproductive System:* Ovaries, Duct system

UNIT- X : Endocrine system (2 Lectures)

- *Endocrine glands:* Positions, Hormones secreted and their functions- Pituitary, Thyroid parathyroid, Adrenal glands, Gonads & Islets of pancreas

SECTION II: HUMAN PHYSIOLOGY

Unit I – Cell **(1 Lecture)**

Cell membrane& cytoplasmic organelles- Functions

Unit II – Blood **(4 Lecture)**

Composition and function of blood

Blood Cells- Types, structure and functions

Blood group- ABO Blood group & Rh factor, Blood groups and uses of blood grouping. Rh incompatibility

Blood Clotting: Definition, Mechanism of haemostasis, Physiology of clotting mechanism.

Anemia- Definition, Types and Clinical features of anemia.

Unit III – Cardiovascular System **(3 Lecture)**

Functions of heart and blood vessels

Heart rate :- Definition and factors affecting it

Cardiac cycle: Definition and events in the cardiac cycle, Heart sounds

Unit IV - Respiratory System **(2 Lecture)**

Functions of Respiratory organs

Mechanism of Respiration: Inspiration & expiration, Muscles of Inspiration & Muscles of expiration, Accessory muscles of Respiration

Lung Volumes and Capacities: Vital Capacity, Tidal Volume, Residual Volume

Unit V – Gastrointestinal system **(3 Lecture)**

Functions of various parts of GIT

Digestion & absorption of carbohydrates, fats, protein in various parts of GIT

Functions of Saliva, Gastric Juice, Bile, Pancreatic Juice

Functions of Liver , Gall Bladder and Pancreas

Movements of Small Intestine and large Intestine

Unit VI - Excretory System **(4 Lecture)**

Functions of kidney, ureters, urinary bladder and urethra

Nephron & Function of various parts

Mechanism of Urine Formation

Unit VII – CNS **(4 Lecture)**

Introduction: Organization and function of the nervous system

Central Nervous System: General Description- Cerebral hemisphere (cerebrum); Basal ganglia, Thalamus; Hypothalamus, Brain stem: Medulla; Pons, Mid Brain; Reticular formation, Cerebellum, Spinal Cord: Structure and function; Ascending (sensory) tracts; Descending (motor) tracts, Cerebrospinal fluid (CSF)

Peripheral nervous System: Somatic nervous system: Spinal nerves; Reflexes: Mono and Polysynaptic reflex; Cranial nerves

Autonomic nervous system (ANS): Sympathetic, parasympathetic

Unit VIII - Muscular System **(4 Lecture)**

Structure & Functions of skeletal muscle, smooth muscle & Cardiac muscle

Skeletal Muscle: -Action Potential, Excitation contraction coupling, Muscle tone, Neuro- Muscular Junction

Unit IX – Endocrine System **(5 Lecture)**

Hormones: GH, Thyroid Hormones, Parathyroid Hormones, Insulin, Glucocorticoids, Mineralocorticoids, ADH, oxytocin, Testosterone – their source & actions

FUNDAMENTALS OF HUMAN ANATOMY & PHYSIOLOGY (PRACTICAL)
Course Code: ANA/PHY.101P
Credit Hours: 1.5

- Identification and description of all anatomical structures.
- Demonstration through slides, models, charts etc.
- Measurement of pulse, blood pressure
- Identification/counting of blood cells by study of peripheral blood smear
- Determination of blood groups, bleeding/clotting times. Estimation of Hb

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

CONCEPTUAL MICROBIOLOGY & PATHOLOGY (THEORY)
Course Code: MIC/PAT.102T
Credit Hours: 3
Semester: I

SECTION I : MICROBIOLOGY

UNIT- I: Origin and Evolution of Microbiology (3 Lectures)

- Introduction, History & scope of Microbiology
- General characteristics of Microorganisms: Bacteria, viruses, fungi.

UNIT - II: Study of Common Lab Instruments (3 Lectures)

- Microscope: Types , principles & uses
- Autoclave, Hot air oven, Incubator, Laminar air flow, Colony counter : Principles & uses

UNIT III: Morphology of Bacteria & Viruses (3 Lectures)

- *Bacterial anatomy:* Cell wall, Cell membrane, Capsule, Flagella, Nucleoid, Bacterial Spore.
- Structure of viruses, Concepts of replication & cultivation
- Study of bacteria: Preparation of Stains, various Staining techniques (Simple staining, Gram staining, Acid-fast staining, Negative staining & Albert staining).

UNIT- IV: **Growth & Nutrition of bacteria: (3 Lectures)**

- Culture media and Culture methods
- *Bacterial Growth:* Growth Curve, Generation Time, Environmental factors affecting growth.
- Bacterial nutrition: Nutritional groups, Common Nutritional requirements

UNIT- V: Control of Microbial Growth (3 Lectures)

- Sterilization and disinfection

UNIT-VI: Immunity & Infection (3 Lectures)

- *Immunity:* Types of immunity, Antigens & Antibodies, Prophylactic Immunization
- *Infection:* Types, Various routes & modes of transmission, Nosocomial Infections

UNIT-VII: Biomedical Waste & Management (2 Lectures)

- Waste categories, Waste treatment & disposal

SECTION II : PATHOLOGY

UNIT-I: Introduction (1 Lectures)

- Definition, important terminology, different branches

UNIT-II: Cell Injury and Cellular Adaptations (4 Lectures)

- *Cell Injury:* types of cell injury, etiology of cell injury, morphology of cell injury, cellular swelling.
- *Cell Death:* types- Autolysis, Necrosis, Apoptosis & Gangrene.
- *Cellular Adaptations*: Atrophy, Hypertrophy, Hyperplasia & Dysplasia.

UNIT-III: Inflammation (3 Lectures)

- Acute inflammation - vascular event, cellular event, inflammatory cells.
- Chronic Inflammation - general features

UNIT-IV: Hemodynamic Disorders (3 Lectures)

- Edema, hyperemia, congestion, hemorrhage, thrombosis, ischemia & infarction.

UNIT-V: Neoplasia (2 Lectures)

- Definition,difference between benign tumor and malignant tumor.

UNIT-VI: Healing (2 Lectures)

- Definition, different phases of healing, factors influencing wound healing.

CONCEPTUAL MICROBIOLOGY & PATHOLOGY (PRACTICAL)
Course Code: MIC/PAT.102P
Credit Hours: 1.5

Microbiology

- Handling and maintenance of instruments required for routine lab work.
- *Various staining Techniques:* Gram stain, Acid-fast stain, Negative stain, Albert Stain.
- Various culture techniques
- Demonstration of Sterilization methods
- Preparation of commonly used culture media: Nutrient agar, Blood/chocolate agar, MacConkey agar, Sabouraud dextrose agar.

Pathology

- Components & setting of the Compound microscope.
- Focusing of object.
- Use of low & high power objectives of microscope.
- Use of oil immersion lens.
- Care and Maintenance of the microscope.
- Different types microscopy

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

CONCEPTUAL BIOCHEMISTRY (THEORY)
Course Code: BIO.103T
Credit Hours: 2
Semester: I

UNIT -I: Introduction to Biochemistry (2 Lectures)

- Important definitions (Diffusion, Osmosis, Surface Tension, Adsorption , Absorption) & scope of biochemistry

UNIT -II: Carbohydrate (3 Lectures)

- Classification with structures
- Importance of Carbohydrates

UNIT -III: Lipids (3 Lectures)

- Classification
- Importance of Lipids

UNIT -IV: Proteins (4 Lectures)

- Amino Acid: Classification and general Properties
- Importance of Proteins
- Classification of Protein (in brief)

UNIT -V: Nucleotides (4 Lectures)

- Nucleoside & Nucleotide
- General structures of Purine and pyrimidine
- Brief discussion of DNA & RNA
- Structure of DNA

UNIT -VI: Electrolytes (3 Lectures)

- Source, function & deficiency symptoms of Sodium, Potassium, Calcium, phosphorus, Iron, Zinc & Chloride in human body.

UNIT - VII: Analytical Chemistry (5 Lectures)

Concepts of : Percent, Morality, Molality, Normality

- *SI Units:* Deci, Centi, Milli, Micro, Nano, Pico, Kilo, Mega, Giga & Angstrom
- **Normal Values & Interpretations:**
  - *Electrolytes:* Sodium, Potassium, Calcium, Iron, Chloride
  - *Renal Function Test*: Urea, Creatinine, Uric Acid, Glucose
  - *Urine Analysis:* Composition, Colour, Volume, pH, Specific Gravity, Turbidity
  - *Liver Function Test :* SGOT, SGPT, Bilirubin, Albumin, Globulin & Alkaline Phosphatase
  - *Carbohydrates:* Fasting , Random, GTT
  - *Lipid Profile :* Cholesterol, Triglycerides, HDL,LDL, VLDL

UNIT -VIII: Acids & Bases (2 Lectures)

- Definition, Classification of acids and bases.
- Physical and chemical properties with examples.
- Arrhenius concept of acids and bases.
- Classification of acids and bases.
- pH, Buffer Solutions

CONCEPTUAL BIOCHEMISTRY (PRACTICAL)
Course Code: BIO.103P
Credit Hours: 1.5

- Preparation of common lab reagents.
- General description of equipment's used in Biochemistry Lab.
- *Working & Uses of:* Spectrophotometer, Water bath, Centrifuges, Analytical Balances, pH meter, Colorimeter.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

HUMAN VALUES & PROFESSIONAL ETHICS
Course Code: PMS.104T
Credit Hours: 2
Semester : I

UNIT-I: Need, Basic Guidelines, Content and Process for Value Education (10 Lectures)

- Understanding the need, basic guidelines, content and process for Value Education
- Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT-II: Understanding Harmony in the Human Being - Harmony in Myself! (10 Lectures)

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Swasthya - Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT-III: Understanding Harmony in the Family and Society (10 Lectures)

- Understanding harmony in the Family- the basic unit of human interaction
- Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

FUNDAMENTAL OF MEDICAL LABORATORY TECHNOLOGY (THEORY)
Course Code: PMS.105T
Credit Hours: 3
Semester: I

UNIT-I : Introduction to Medical laboratory technology (5 Lectures)

- Role of medical laboratory technician
- Code of conduct of medical laboratory personnel.
- Medical Laboratory Ethics
- Medico legal aspects of Lab technology

Unit -II : Laboratory (8 Lectures)

- Laboratory Setup
- Organization of clinical laboratory – Primary, Secondary and Tertiary laboratory
- Laboratory Divisions
- Clinical Laboratory records: observing/reporting & documentation
- *Modern Laboratory set up:* Introduction to advanced techniques & future trends in laboratory science.
- Quality control in clinical laboratories, basic outline

Unit -III : Safety , First aid , Hazards and Accidents in Medical laboratory (6 Lectures)

- Common Laboratory hazards
- First aid in the clinical laboratory
- Safety measures
- Storage and handling of dangerous chemicals

UNIT-IV: Lab Instrumentation and Apparatus (18 Lectures)

Glass wares :

- Introduction to glassware - Types of glass and their Significance
- Beaker, Flasks, Measuring Cylinder, Test tube, Pipettes, Burettes, Funnels, Reagent Bottle, Dispensers, Tripod stand, Wire gauze
- Care and Cleaning of glassware, different cleaning solutions

Laboratory instruments:

- Microscopes-Principles, parts, use, care and maintenance of Light microscope, Dark field microscope, Phase contrast microscope, Fluorescent microscope, Electron microscope
- Principles, parts, use, care and maintenance of – Centrifuge, Water bath, Autoclave, Hot air oven, Laminar air flow, Incubator

FUNDAMENTAL OF MEDICAL LABORATORY TECHNOLOGY (PRACTICAL)
Course Code: PMS.105P
Credit Hours: 1.5

- Common glassware in clinical laboratory.
- Cleaning, care and maintenance of glassware.
- Laboratory instruments:

- Microscopes-Principles, parts, use, care and maintenance of Light microscope, Electron microscope, Fluorescent microscope, Dark ground microscope, Phase contrast microscope etc
- Working, Principles & uses of: Centrifuge, Water bath, Autoclave, Hot air oven, Water distillation apparatus.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

ENGLISH FOR PROFESSIONALS
Course Code: PMS.106T
Credit Hours: 2
Semester: I

UNIT-I: Grammar **(10 Lectures)**

- Narration.
- Voice change (Use of passive voice particularly in scientific and official writing).
- Use of articles and preposition.
- The language of Doctor and Patient.
- General description and Medical description.
- Medical terminology – roots.
- Prefixes and suffixes.
- Medical abbreviations.
- Punctuation
- Common errors in English.

UNIT-II: Writing Skills **(10 Lectures)**

- Precis writing.
- Report writing (with special stress on scientific/technical reports, preparing field/observation report).
- Letter writing/application writing (Social, business letter, applying for a job, for higher studies, Preparing curriculum vitae, subscribing to a journal, letters to the Editor).
- Essay writing

UNIT-III: Spoken English **(10 Lectures)**

- Advertisements/Posters
- Telegrams & short post cards
- Note & notice
- Front Desk management, Fixing appointments, getting information – Managing medical representatives, able to answer FAQs, lab reports writing, telephoning in a hospital: the object is to practice influent conversation.

SCHEME OF EXAMINATION

Type of Questions	Total No. of Questions	No. of Questions to be attempted	Marks (Each Question)	Subtotal
SEC -A (Grammar)	25	20	1	20
SEC -B (Essay writing)	3	1	10	10
SEC-C(Precis writing)	1	1	5	10
SEC-D(Letter writing)	2	1	5	10
			TOTAL MARKS	**50**

COMMUNICATION AND SOFT SKILLS
Course Code: PMS.107T
Credit Hours: 2
Semester: I

UNIT-I: Introduction to Communication **(5 Lectures)**

- Purpose of Communication
- Process of Communication
- Importance of Communication in Business
- Barriers to Communication
- Measures to Overcome the Barriers to Communication.

UNIT-II: Types of Communication **(5 Lectures)**

- Verbal Communication: Importance of verbal communication and Advantages of verbal communication
- Non Verbal Communication: Importance of written communication and Significance of Non-verbal Communication

UNIT-III: Communication Network **(5 Lectures)**

- Scope and Types of Communication Network
- Formal and Informal Communication Network
- Upward Communication
- Downward Communication
- Horizontal Communication
- Diagonal Communication.

UNIT-IV: Letter and Resume Writing **(5 Lectures)**

- Types of Letter – Formal/Informal
- Importance and function of Letter Writing
- Business Letters / Elements of Structure
- Resume and Covering Letter
- Guidelines for making a Result – Oriented Resume/ Helpful Hints

UNIT-IV: Interview preparation **(5 Lectures)**

- Types of Interview
- Preparing for an Interview
- Attending an Interview
- Employers Expectation
- General Etiquette

UNIT-IV: Group Discussion and Presentation **(5 Lectures)**

- Process of Group Discussion
- Guidelines
- Helpful Expressions
- Evaluation

UNIT-VI: Presentation Skills **(5 Lectures)**

- Importance of Presentation skills
- Organizing Contents/ Structural Elements of a Presentation Concerning Data
- Visual Aids and Voice & Picture Integration
- Guidelines to make Presentation Interesting
- Body Language

(Note: Every student shall be given 15 minutes of presentation time)

SCHEME OF EXAMINATION

Type of Questions	Total No. of Questions	No. of Questions to be attempted	Marks (Each Question)	Subtotal
SEC -A (Fill ups)	10	10	1	10
SEC -B (Short Essay)	6	5	4	20
SEC-C (Long Essay)	3	2	5	10
SEC-D (Letter writing)	2	1	10	10
			TOTAL MARKS	**50**

ENVIRONMENTAL STUDIES
Course Code: PMS.108T
Credit Hours: 2
Semester: II

UNIT-I : Natural Resources (10 Lectures)

- *Renewable and non-renewable resources :*Natural resources and associated problems.
- *Forest resources :* Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- *Water resources :* Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- *Mineral resources :* Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- *Food resources :* World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- *Energy resources:* Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
- *Land resources:* Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

UNIT-II : Ecosystems (4 Lectures)

- Concept of ecosystems, Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- *Introduction, types, characteristic features, structure and function of the following ecosystem:* Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III: Biodiversity and its Conservation (3 Lectures)

- Introduction – Definition: genetic, species and ecosystem diversity.
- *Threats to biodiversity:* habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- *Conservation of biodiversity:* In-situ and Ex-situ conservation of biodiversity.

UNIT-IV: Environmental Pollution (7 Lectures)

- *Definition, Cause, effects and control measures of :* Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution
- Role of an individual in prevention of pollution.
- *Disaster management:* floods, earthquake, cyclone and landslides.

UNIT-V : Social Issues and the Environment (4 Lectures)

- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust
- *ACTS:* Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act

UNIT-VI : Human Population and the Environment **(2 Lectures)**

- Population explosion – Family Welfare Programme.
- Human Rights & Value Education.
- Women and Child Welfare.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

GENERAL MICROBIOLOGY (THEORY)
Course Code: MIC.109T
Credit Hours: 3
Semester: II

UNIT-I: Morphology of Bacteria (10 Lectures)

- Morphological types of bacteria, Study of all cell components in detail. Study of morphology using various staining techniques, motility & tests for motility.

UNIT- II : **Growth, nutrition & metabolism of bacteria: (15 Lectures)**

- *Bacterial growth:* Bacterial Cell Division, Bacterial Growth Curve, Generation Time, Bacterial Count, Bacterial Kinetics: Batch & Continuous Culture
- *Quantitative Measurement of Bacterial Growth:* direct microscopic count, electronic enumeration of cell numbers, plate count method, membrane – filter count, turbidometric methods.
- Environmental factors affecting Growth.
- *Bacterial nutrition:* Nutritional Requirements**,** Nutritional Types of Bacteria
- *Bacteriological Media:* Classification, choice of Media and Conditions of Incubation

UNIT-III: Pure Culture and Cultural Characteristics (10 Lectures)

- Natural Microbial Population (Mixed Culture)
- *Selective Methods :* physical/chemical/biological methods of selection
- *Pure Culture:* Method of isolating pure culture, Maintenance & Preservation of Pure Culture
- *Cultural Characteristics:* colony characteristics, characteristics of broth cultures

UNIT-IV: Bacterial Genetics (15 Lectures)

- Basic Principles, types of mutations, how mutations occur
- Bacterial Recombination-Bacterial Conjugation, Extrachromosomal Genetic Elements(Plasmids)
- Transduction-Generalized & Specialized
- Bacterial Transformation
- The Regulation and Expression of Gene Activity: The *Lac* Operon

GENERAL MICROBIOLOGY (PRACTICAL)
Course Code: MIC.109P
Credit Hours: 1.5

- Conducted as per theory syllabus

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

GENERAL BIOCHEMISTRY (THEORY)
Course Code: BIO.110T
Credit Hours: 3
Semester: II

UNIT-I: Introduction to Laboratory Apparatus (8 Lectures)

- *Pipettes:* different types (graduated, volumetric, Pasteur, automatic etc). Calibration of glass pipettes.
- Burettes, beakers, petri dishes, depression plates.
- *Flasks:* different types (volumetric, round bottomed, Erle Meyer conical etc).
- *Funnels:* different types (conical, Buchner etc).
- *Bottles:* reagent bottles – graduated and common, wash bottles – different type specimen bottles

UNIT-II: Measuring Cylinders, Porcelain Dish (10 Lectures)

- *Tubes:* test tubes, centrifuge tubes, test tube draining rack.
- Tripod stand, wire gauze, Bunsen burner.
- Cuvettes: significance of cuvettes in colorimeter, cuvettes for visible and UV range. Cuvette holder racks: bottle, test tube, pipette, desiccators.
- *Dispensers:* reagent and sample.
- Maintenance of lab glass ware and apparatus.
- Glass and plastic ware in laboratory.
- *Use of glass:* significance of boro silicate glass, care and cleaning of glass ware, different cleaning solutions of glass.
- Care and cleaning of plastic ware, different cleaning solution.

UNIT-III: Instruments (12 Lectures)

- Use, care and maintenance of: water bath, oven & incubators, water distillation plant, water deionizers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pH meter and electrodes.
- *Centrifuges:* definition, principles, Svedberg unit, centrifugal force, centrifugal field, RPM. Different types of centrifuges.
- *Colorimeter, spectrophotometer, pH meter:* principles, parts, types, guidelines to be followed and precautions to be taken while using.

UNIT-IV: Conventional and SI Units (10 Lectures)

- Molecular weight, equivalent weight of elements and compounds, normality, molarity.
- Preparation of molar solutions (mole/litre solution) eg: 1 M NaCl, 0.15 M NaCl, 1 M NaOH, 0.1 M HCl, 0.1 M H2S04 etc.
- Preparation of normal solutions. eg, 1N Na2CO3, O.1N Oxalic acid, 0.1 N HCl, 0.1N H_2S04, 0.66 N H_2S04 etc., percent solutions.
- Preparation of different solutions: v/v w/v (solids, liquids and acids).

UNIT-V: Dilutions (10 Lectures)

- *Diluting solutions:* e.g. preparation of 0.1 N NaCl from 1 N NaCl & from 2N NaCl etc, preparing working standard from stock standard, body fluid dilutions, reagent dilution techniques,

calculating the dilution of a solution, body fluid reagent etc, saturated and supersaturated solutions.

- Technique for preparation of standard solutions eg: glucose, urea, etc,

UNIT-VI: Acids and Bases (10 Lectures)

- Definition, physical and chemical properties with examples. Arrehenius concept of acids and bases.
- Classification of acids and bases.
- Concepts of acid base reaction, hydrogen ion concentration, ionisation of water, buffer, pH value of a solution.
- Preparation of buffer solutions using pH meter.
- *Salts:* definition, classification, water of crystallization, definition and different types, deliquescent and hygroscopic salts.

GENERAL BIOCHEMISTRY (PRACTICAL)
Course Code: BIO.110P
Credit Hours: 1.5

- Conducted as per theory syllabus

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

BASIC CELLULAR PATHOLOGY (THEORY)
Course Code: PAT.111T
Credit Hours: 3
Semester: II

UNIT- I Introduction to Cellular Pathology (4 Lectures)

Definition, Health and Disease, Terminology in Pathology, Evolution of Pathology, Subdivisions of Pathology.

UNIT-II: Techniques for the study of Pathology (5 Lectures)

Autopsy Pathology, Surgical Pathology, Special Stains, Enzyme Histotechnology, Basic Microscopy, Immunofluorescence, Immunohistochemistry, Cytogenetics, Molecular Pathology, Flow cytometry, Other methods for Cell Proliferation analysis, Computers in Pathology Laboratory

UNIT –III: Cell injury and Cell Adaptations (8 Lectures)

- The normal Cell, Etiology of cell Injury, Pathogenesis of Cell Injury, Morphology of Cell Injury, ischemia & hypoxic injury, chemical injury, reversible injury.
- Necrosis & Gangrene
- *Cellular adaptation :* atrophy, hypertrophy, metaplasia, hyperplasia, dysplasia
- Intracellular accumulations, accumulation of pigments.

UNIT-IV: Inflammation and Healing (8 Lectures)

- Phagocytosis. Chemical mediators of inflammation. Definition and causes of chronic inflammation. Granulomatous inflammation, system manifestations of inflammation. Healing.
- Categories of infectious agents, host barriers to infection, how disease is caused, inflammatory response to infectious agents

UNIT –V: Neoplasis (8 Lectures)

- Nomenclature and classification characteristics of Tumors, Epidemiology and predisposition to neoplasia,
- *Carcinogenesis:* Etiology and pathogenesis of cancer, Clinical aspects of neoplasia

UNIT-VI : Immunopathology including Amyloidosis (8 Lectures)

Components of Immune System, HLA System, Diseases of immune system, Transplant Rejection,
Amyloidosis: Systemic and Localized.

UNIT –VII: Hemodynamic Disorders (9 Lectures)

- *Internal Environment:* Normal water and Electrolyte balance, Acid Base Balance
- *Disturbances of Body Fluids and Electrolytes:* Edema, Over hydration, dehydration.
- *Hemodynamic Disturbances:* hyperemia or congestion, thrombosis, embolism. Infarction shock, Ischemia ,
- Hemorrhage. Various type of Anemia, leucopenia, leucocytosis, bleeding disorders coagulation mechanism, maintenance of blood volume. Abnormalities of pH of blood.

BASIC CELLULAR PATHOLOGY (PRACTICAL)
Course Code: PAT.111P
Credit Hours: 1.5

- Conducted as per theory syllabus
- Demonstration through slides

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

BASIC HAEMATOLOGY (THEORY)
Course Code: PAT.112T
Credit Hours: 3
Semester: II

UNIT –I: Blood & its Components (15 Lectures)

- Blood and its constituents
- Origin, Development, maturation and fate of blood cells.
- Collection of blood –capillary and venous blood collection
- *Anticoagulants:* various anticoagulants and their uses, advantages and disadvantages.
- Different types of haemocytometers, their ruling and uses.
- *Erythrocytes*: morphology of RBC in health and disease, functions of RBC, RBC counting, diluting fluids used, erythrocyte indices
- *Leucocytes* : Structure, function morphology, leucocyte count, absolute eosinophil count,
- *Platelets:* Structure and function, counting of platelets, diluting fluids.

UNIT-II: Hematological Disorders (15 Lectures)

- *Anemia:* Classification - Morphological & etiological.
- *Iron Deficiency Anemia:* Distribution of body Iron, , causes of iron deficiency, lab findings.
- *Megaloblastic Anemia :* Causes, Lab findings.
- *Hemolytic Anemia* : Definition, causes, classification & lab findings.
- *Bone Marrow :* Cell composition of normal adult Bone marrow, Aspiration, Indication, Preparation & Staining,Special Stain for Bone Marrow -Periodic Acid Schiff, Sudan Black, Myeloperoxidase.
- *Leukemia :* Classification, Blood Picture, Differentiation of Blast Cells.

UNIT-III: Basic Hematological Techniques (20 Lectures)

- Characteristics of good technician
- Preparation of specimen collection material.
- Lab. request form.
- Basic steps for drawing a blood specimen by venipuncture. Complications of venipuncture.
- Patient after care
- Specimen rejection criteria for blood specimen
- Hemolysis of blood
- Blood collection by skin puncture (Capillary Blood), Arterial puncture.
- *Anticoagulant*- EDTA, Citrate, Oxalate, Heparin, sodium fluoride.
- Separation of serum/Separation of plasma
- Changes in blood on keeping
- Maintenance of specimen identification
- Transport of the specimen.
- Effect of storage on Blood Cell Morphology
- Universal precautions

BASIC HAEMATOLOGY (PRACTICAL)
Course Code: PAT.112P
Credit Hours: 1.5

- Basic requirements for hematology laboratory.
- Glassware for Hematology.
- Equipments for Hematology.
- Anticoagulant vial preparation.
- Complete Blood Counts.
- Determination of Hemoglobin.
- TRBC Count by Hemocytometers.
- TLC by Hemocytometer.
- Differential Leukocyte count.
- Determination of Platelet Count.
- Determination of ESR by Wintrobes.
- Determination of ESR by Westergeren's method.
- Determination of PCV by Wintrobes.
- Erythrocyte Indices- MCV, MCH, MCHC.
- Reticulocyte Count.
- Absolute Eosinophil Count.
- Morphology of Red Blood Cells.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

BIOSTATISTICS & COMPUTER APPLICATIONS
Course Code: PMS.201T
Credit Hours: 2
Semester: III

SECTION-I: BIOSTATISTICS (15 Lectures)

- Introduction to data and statistics
- Presentation of data:
  - Bar diagram
  - Histogram
  - Frequency polygon
  - Frequency curve, Cumulative frequency curve.
- Measure of central tendency:
  - Mean
  - Median
  - mode (individual, discrete and continuous data).
- Measure of variability:
  - Range
  - Standard deviation
  - Variance and coefficient of variation

SECTION-II: COMPUTER APPLICATIONS (15 Lectures)

- Computer: General Introduction, History of computer development and respective generation: Need to use computers, Applications in Laboratory and in general.
- Input and Output Device
- Memory
- Personal Computer
- Data Representation and Number System
- Software
- Data Communication
- Internet, Cyber etiquette
- Microsoft Office: PowerPoint Presentations, Microsoft word, excel sheet

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SYSTEMIC BACTERIOLOGY (THEORY)
Course Code: MIC.202T
Credit Hours: 4
Semester: III

Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria; **(36 Lectures)**

- Staphylococci (*Staph.aureus*)
- Streptococci (*Strep.pyogenes*)
- Pneumococci (*P.pneumoniae*)
- Neisseria (*N.gonorrhoeae* & *N.meningitidis*)
- Corynebacterium (*C.diphtheriae*)
- Mycobacteria (*M.tuberculosis* & *M.leprae*)
- Clostridia (*Cl.perfringens,Cl.tetani* & *Cl.botulinum*)
- Bacillus (*B.anthracis*)
- Shigella (*Sh.dysenteriae*)
- Salmonella (*S.typhi* & *S.paratyphi*)
- *Esch.coli*
- Klebsiella (*K.pneumoniae*)
- Proteus
- *Vibrio Cholerae*
- Pseudomonas (*P.aurogenosa*)
- Spirochetes
- Chlamydiae & Rickettsiae

- Principles of collection, transportation & preservation of different bacteriological specimen **(3 Lectures)**
- Antibiotic sensitivity tests **(8 Lectures)**
- Different transport media & their significance in maintenance of *status quo* **(4 Lectures)**
- Cultural methods for aerobic & anaerobic bacteria **(4 Lectures)**
- Principles of common serological tests used in diagnosis of bacterial infections **(5 Lectures)**

SYSTEMIC BACTERIOLOGY (PRACTICAL)
Course Code: MIC.202P
Credit Hours: 2

- Conducted as per theory syllabus

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	**Marks**
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

CLINICAL PATHOLOGY (THEORY)
Course Code: PAT.203T
Credit Hours: 4
Semester: III

UNIT-I: Urine **(10 Lectures)**

Collection of urine and its preservation, 24 hour urine collection for protein. Physical examination of urine- examination of urine for colors, cloudiness, specific gravity, reaction and pH. Chemical examination of urine. Microscopic examination of urine- Urine sediment preparation, types of sediments and its examination.

UNIT-II: Faeces **(6 Lectures)**

Collection and preservation, examination of motion for color, mucus, consistency, ova, ameba, cysts, parasites, pus cells, RBC and crystals. Detection of occult blood in stool, concentration techniques.

UNIT-III: Sputum **(6 Lectures)**

Method of collection for various purposes including AFB fugal, malignant cells and others. Microscopic examination of sputum, sputum for AFB.

UNIT-IV: Semen **(10 Lectures)**

method of collection examination of semen for time for liquefaction, volume, colour, reaction pH, motility of spam, sperm count and other findings staining and morphological study of spermatozoa, semen fructose determination, Antisperm antibodies

UNIT-V: CSF **(10 Lectures)**

General introduction method of CSF collection, Transport of CSF, examination of CSF, colour, turbidity and fibrin clot (Cob web), total and differential leukocyte count. CSF examination by Gram's staining and acid fast staining, biochemical tests, clinical significance of CSF analysis in various meningitis and encephalitis and interpretations.

UNIT-VI: Other body fluids **(10 Lectures)**

Methods of collection, transport and macroscopic and microscopic examination of ascetic fluid, pleural fluid, pericardial fluid and synovial fluid.

UNIT-VII: Pregnancy tests **(8 Lectures)**

Different methods of testing and chronic gonadotropin assay with urine

CLINICAL PATHOLOGY (PRACTICAL)
Course Code: PAT.203P
Credit Hours: 2

- Urine-collection, processing, physical, chemical and microscopic examination.
- Collection, preservation and examination of stool
- Sputum collection and microscopy. Examination of sputum for AFB.
- Analysis and examination of semen-physical examination, sperm motility, morphological study of sperms, fructose determination in semen.
- Analysis of CSF, microscopic and chemical examination of CSF.
- Macroscopic and microscopic examination of Ascetic fluid, Pleural fluid, pericardial fluid and synovial fluid.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	**Marks**
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

CLINICAL BIOCHEMISTRY-I (THEORY)
Course Code: BIO.204T
Credit Hours: 4
Semester: III

UNIT-I: Clinical Instrumentation (12 Lectures)

- Photometry: Definition, laws of photometry, absorbance, transmittance, absorption maxima, instruments, parts of photometer, types of photometry–colorimetry, spectrophotometry, flame photometry, fluorometry, choice of appropriate filter, measurements of solution, calculation of formula, applications.
- Immunodiffusion Techniques, Radioimmunoassay & ELISA -Principles & Applications.
- Electrophoresis –Principle, Types & Applications.
- Polymerase Chain Reaction -Principle & Applications
- Autoanalysers -Principle & Applications

UNIT-II: Water & Mineral Metabolism (6 Lectures)

Distribution of fluids in the body, ECF & ICF, water metabolism, dehydration, mineral metabolism, macronutrients (principal mineral elements) & trace elements.

UNIT-III: Liver Functions & their Assessment (15 Lectures)

Based on:

- Carbohydrate metabolism (Galactose & glucose estimation);GTT
- Protein metabolism (Proteins,albumins,globulins,AG ratio-estimations)
- Lipid metabolism(Cholesterol profile)-estimation
- Measurements of serum enzyme levels (DT,PT,ALP,GGT,NT etc.)-estimations
- Bile pigment metabolism,
- Jaundice, its types and their biochemical findings.

UNIT-IV: Renal Function Tests (12 Lectures)

Various Tests, GFR & Clearance

UNIT-V: Vitamins (5 Lectures)

Fat & water soluble vitamins, sources, requirement, deficiency disorders & biochemical functions.

UNIT-VII: Different methods of Glucose Estimation- (5 Lectures)

Principle advantage and disadvantage of different methods(new methods for glucose monitoring)

UNIT-VIII: Different methods of Cholesterol Estimation- (5 Lectures)

Principle, advantage and disadvantage of different methods.

CLINICAL BIOCHEMISTRY-I (PRACTICAL)
Course Code: BIO.204P
Credit Hours: 2

Detections by Colorimeter / Spectrophotometer:

- Blood urea estimation
- Serum creatinine estimation
- Serum uric acid estimation
- Serum total protein estimation
- Serum albumin estimation
- Serum globulin estimation
- Serum glucose estimation
- Total cholesterol estimation
- HDL cholesterol (direct) estimation.
- LDL cholesterol (direct) estimation
- Triglyceride estimation
- Serum Bilirubin total estimation
- Serum Bilirubin direct estimation
- Serum amylase estimation
- Serum GOT (AST) estimation
- Serum GPT (ALT) estimation
- Alkaline Phosphatase estimation
- Serum sodium estimation
- Serum potassium estimation

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

CLINICAL HAEMATOLOGY (THEORY)
Course Code: PAT.205T
Credit Hours: 4
Semester: III

UNIT- I: Introduction **(5 Lectures)**

- Quality Assurance
- Blood collection procedures
- Anticoagulants used in Hematology: General applications
- Anaemia: types causes

UNIT –II: Haemopoiesis **(8 Lectures)**

- Main Cell Lines
- Erythropoiesis
- Leucopoesis
- Functions of WBCs
- Functions of Platelets

UNIT –III: Complete Blood Count (CBC) **(12 Lectures)**

- Haemoglobin estimation
- Haemocytometry (Counting of Cells in Blood)
- Packed cell volume (PCV)
- Manual Cell Counts
- Use of Counting Chamber (Haemacytometer) for cell counting
- Red Cell Count (Manual Method)
- Red Blood Cell Indices
- WBC counts-Total and differential.
- Total Eosinophil count (TEC)
- Platelet count (Manual Method)
- Erythrocyte sedimentation rate

UNIT- IV: Examination of Peripheral Blood Smear **(8 Lectures)**

- Preparation of Blood Smear
- Staining of Blood Smear
- Microscopic Examination of the Blood Film
- The Differential Count of Leucocytes
    - Interpretation of the variations/Abnormalities in Leucocytes
    - Morphological Variations/Abnormalities in Erythrocytes

UNIT - V : Miscellaneous Investigations in Haematology **(12 Lectures)**

- Osmotic fragility
- Investigation of G-6 PD deficiency
- Examination of Bone Marrow Test for Sickle Cells
- Estimation on of Hb-F (Foetal – Haemoglobin) by Akali Denaturation Method
- Plasma haemoglobin and Haptoglobin, demonstration of hacmosiderin in urine

- Autohaemolysis Test
- Spectroscopic Examination of Blood for the detection of abnormal Hb pigments
- Reticulocyte Count
- Staining of Heinz Bodies
- Staining of Siderocytes (Demonstration of Pappenheimer Bodies)
- Peroxidase Staining
- PAS Reaction
- Neutrophil (Leucocyte) Alkaline Phosphatase

UNIT – VI: Haemostasis and Fibrinolysis (15 Lectures)

- Haemostasis
- Mechanism of Haemostasis
- Functions of Platelets in Haemostasis and Coagulation
- Coagulation
- Coagulation factors
- Pathways for the Coagulation Process
- Fibrinolysis
- Disorders of Blood coagulation
- Tests for Coagulation Function
- Clotting Time (Lee- White Method)
- Clot Retraction
- Test to measure the Extrinsic System:
- One –Stage Prothrombin Time(PT)
- Test for Prothrombin Consumption Index(PCI)
- Test for Intrinsic System
- Assays of Coagulation Factors

CLINICAL HAEMATOLOGY (PRACTICAL)
Course Code: PAT.205P
Credit Hours: 2

- Hb Estimation-Sahli's method & Cyanmethhaemoglobin method
- RBC Count
- Reticulocyte Count
- Preparation of blood smears and staining with Leishman stain
- WBC Count
- WBC –Differential Count
- Platelet Count
- Absolute Eosinophil Count
- ESR- Westergrens & Wintrobe's method,
- PCV.
- Sickling test-Demonstration
- Bone Marrow Smear preparation & staining procedure- Demonstration
- Demonstration of Malarial Parasite.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

VIROLOGY & MYCOLOGY (THEORY)
Course Code: MIC.206T
Credit Hours: 3
Semester: IV

SECTION-I: VIROLOGY

UNIT –I: Introduction **(5 Lectures)**

- Morphology of Virus
- Chemical Constituents of Viruses
- Classification of Medically Important Viruses
- Replication of Viruses
- Pathogenesis of Viral Infections

UNIT –II: Methods of Cultivation of Viruses **(5 Lectures)**

- Animal Inoculation
- Inoculation of Embryonated Eggs
- Inoculation of Organ, Tissues Fragments or Cell Monolayers

UNIT –III: Diagnosis of Viral Disease **(10 Lectures)**

- Collection of Specimen for Virology
- Transport & Storage of Specimen for virology
- Diagnostic Methods
  - Direct Methods for Detection of Viruses
  - Isolation and Identification if Viral Agents
  - Serodiagnosis of Viral Infection

UNIT –IV: Viral Diseases **(15 Lectures)**

- *DNA Viruses:* Pox viruses, Herpes Viruses, Adenoviruses, Papovaviruses, Parvoviruses
- *RNA Viruses:* PicornaViruses, Orthomyxoviruses, Paramyxoviruses, Orbiviruses Rhabdoviruses
- *Hepatitus Viruses*
- *Retroviruses*: HIV

SECTION-II: MYCOLOGY **(15 Lectures)**

- Morphology and Structure of fungi
- Classification of fungi
- Nutrition and cultivation of fungus
- Cutaneous & Subcutaneous and Systemic Mycosis (in brief)
- Lab diagnosis of fungal Infections
- Opportunistic fungal infections

VIROLOGY & MYCOLOGY (PRACTICAL)
Course Code: MIC.206P
Credit Hours: 1.5

Virology:

- Techniques in tissue culture.
- Demonstration of Cytopathogenic effect (CPE)
- Haemagglutionation test.
- Haemagglutination inhibition test.
- Viral Serology/PCR

Mycology

- Lactophenol – cotton blue staining
- KOH Preparation
- Preparation of SDA
- Morphology of common fungi, yeasts isolated from various fungal infections
- Culture demonstration of contaminants- Aspergillus, Penicillium, Mucor, Rhizopus

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	**Marks**
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

HISTOPATHOLOGY & CYTOLOGY TECHNIQUES (THEORY)
Course Code: PAT.207T
Credit Hours: 4
Semester: IV

UNIT-I: General outline of Procedures in the Examination of Tissues (10 Lectures)

- Reception
- Fresh Specimen
- Fixed Tissues
- Paraffin Sections
- Cutting and Staining
- Report and Filing

UNIT-II: **Fixation and Decalcification (10 Lectures)**

- Fixation
- Simple Fixatives
- Compound Fixatives
- Micro Anatomical Fixatives
- Fixation of Smears
- Fixation of Gross Specimen
- Secondary Fixation
- Decalcification

UNIT- III: Processing (10 Lectures)

- Dehydration
- Clearing
- Impregation and embedding
- Embedding
- Gelatin Embedding
- Plastic Embedding
- Trimming of Blocks

UNIT –IV: Section Cutting (10 Lectures)

- *Microtome's:* Microtome -Types, Uses, Parts, different types of microtome knives, care & maintenance.
- Sharpening of Microtome Knives
- Stropping
- Routine Paraffin Section Cutting
- Floating out Bath
- Difficulties encountered in Paraffin
- Section Cutting
- Frozen Sections
- Fixing Tissue for Cyrostat
- Examination

UNIT-V: Staining Methods **(10 Lectures)**

- Hematoxylin & Eosin stain- Method of preparation
- Staining Reaction of Carbohydrates: PAS
- Metachromatic Staining Methods
- Staining of Lipids & Cholesterol
- Staining of Pigments

UNIT-VI: Museum Techniques **(10 Lectures)**

- The mounting of pathological specimens - Introduction, Preparation of specimen, Fixation of specimen- Kaiserling solution-1 & Kaiserling solution-2
- Precaution taken for the Fixation of Specimens
- Storage of Specimens
- Mounting of Museum Specimens
- Routine Mounting of Specimens
- Filling and Scaling

HISTOPATHOLOGY & CYTOLOGY TECHNIQUES (PRACTICAL)
Course Code: PAT.207P
Credit Hours: 2

- Tissue processing
- Staining techniques – H & E
- Special stains used in histopathology
- Cell Block Preparation

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

IMMUNOLOGY & SEROLOGY (THEORY)
Course Code: MIC.208T
Credit Hours: 3
Semester: IV

UNIT-I: Introduction (4 Lectures)

- Immunity - Definition and classification
- General Principles of Innate & Acquired Immunity.
- Immune Response **-** Humoral immunity & cell mediated immunity.

UNIT-II: Structure and functions of Immune System (6 Lectures)

- Parts of Immune system
- T/B cells, other cells & their functions

UNIT-III: Antigens & Antibodies (6 Lectures)

- Antigen - Definition, classes, properties.
- Antibodies/Immunoglobulin's - Definition, Properties, Sub types of Immunoglobulin's

UNIT-IV: Antigen/Ab Reaction/Serological Refractions (10 Lectures)

- Features of antigen/antibody Reaction-
- Precipitation
- Agglutination
- Complement fixation test
- Neutralization
- Opsonization
- Immune adherence

UNIT-V: Hyper sensitivity Reactions (10 Lectures)

- General Principles of different types of hypersensitivity reactions
- Auto immune disorders

UNIT-VI: Vaccination/Immunization (4 Lectures)

- Types of vaccines
- Schedule & Vaccines

UNIT-VII: Serological diagnosis of microbial diseases (10 Lectures)

- TORCH profile: Widal , VDRL, RPR, Antistreptolysin'O test, CRP,Rheumatoid factor test, Rose waler test, Latex agglutination test, Fluorescent antibody test, Antinuclear antibody test.

IMMUNOLOGY & SEROLOGY (PRACTICAL)
Course Code: MIC.208P
Credit Hours: 1.5

- WIDAL Test
- VDRL Test
- RA Test
- CRP Test
- Pregnancy Test & HIV Test

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	**Marks**
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

CLINICAL BIOCHEMISTRY-II (THEORY)
Course Code: BIO.209T
Credit Hours: 4
Semester: IV

UNIT –I : Liver: Metabolism (10 Lectures)

- Role of the liver in metabolism
- Formation of bilirubin and mode of excretion.
- Fractionation of Proteins: separation of proteins on electrophoresis.
- The Plasma(serum) Proteins
- Estimation of Serum/ Plasma Bilirubin
- Clinical enzymology: AST,ALT,,Amylase,,ALP,GGT

UNIT –II: Gastric Analysis (10 Lectures)

- Composition of gastric juice,
- Concepts of free and bound acid,
- Fractional Test Meal
- Faecal fat
- Occult Blood in Faeces

UNIT – III: Urine Analysis (10 Lectures)

- Renal Function test: Urea, Creatinine, Uric acid
- Urine Analysis: Physical & Chemical
- Routine Test for Urine Analysis: Proteins, Reducing substances, Ketone Bodies, Bilirubin and urobilinogen
- Microscopic examination of urine: Urinary calculi

UNIT – IV: Electrolytes and Blood Gases (10 Lectures)

- Measurement of Sodium & Potassium
- Serum/Plasma Chloride
- Calcium & Phosphorus

UNIT – V : Lipid and Lipoproteins (10 Lectures)

- Estimation of total Serum/plasma cholesterol
- Estimation of total Serum/plasma HDL cholesterol
- Estimation of total Serum/plasma LDL cholesterol
- Estimation of Serum triglycerides

UNIT – VI : CSF and Other Body fluids (10 Lectures)

- Routine Lab Test for CSF :Synovial fluid, Pleural fluid, Peritoneal fluid

CLINICAL BIOCHEMISTRY-II (PRACTICAL)
Course Code: BIO.209P
Credit Hours: 2

- Liver function tests.
- Estimation of Total Protein, Albumin & A/G ratio,
- Estimation of Bilirubin – total and conjugated.
- *Gastric analysis:* Determination of free and total acid, gastric stimulation, Specimen collection.
- *Lipids determination:* Estimation of cholesterol.
- *Inorganic ions:* Determination of calcium in serum and serum phosphates,
- Determination of Iron, copper, chloride, sodium, and potassium.
- Determination of Alkaline Phosphates, Acid phosphates, SGOT, SGPT,
- Analysis of Calculi

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

COMMUNITY HEALTH
Course Code: PMS.210T
Credit Hours: 2
Semester: IV

- General concepts of health and diseases with reference to natural history of disease with pre-pathogenic and pathogenic phase. The role of socio-economic and cultural environment in health and diseases-Epidemiology and scope. **(3 Lectures)**
- Public health administration-An overall view of the health Administration set up at centre and state level. **(3 Lectures)**
- The National Health Programmes- National Health programmes including tuberculosis, malaria, MCH and HIV/AIDS. **(3 Lectures)**
- Health problems in vulnerable groups-Pregnant and lactating women and infants and school going children-occupational groups, geriatrics. **(3 Lectures)**
- Occupational Health- Definition, scope-Occupational diseases, prevention of occupational diseases and hazards. **(3 Lectures)**
- Social security and other measures for the protection of occupational hazards, accidents and disease. Details of compensation acts. **(3 Lectures)**
- Family planning objectives of National family planning methods. A general idea of advantages and disadvantages of the method. **(3 Lectures)**
- Mental Health- community aspects of mental health; role of physiotherapists, therapists in mental health problems such as mental retardation etc. **(3 Lectures)**
- Communicable disease-An overall view of the communicable disease. Classification according to the principal mode of transmission. Role of insects and their vectors. **(3 Lectures)**
- International health agencies. **(3 Lectures)**

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

NUTRITION
Course Code: PMS.211T
Credit Hours: 2
Semester: IV

- Introduction to science of nutrition
- Food pattern and its relation to health **(2 Lectures)**
- Factors influencing food habits, selection and food stuffs **(3 Lectures)**
- Food selection, storage & preservation **(3 Lectures)**
- Classification of nutrients – macronutrients and micronutrients **(3 Lectures)**
- Proteins – types, sources requirements and deficiencies of proteins **(3 Lectures)**
- Carbohydrates sources, requirements & efficiency **(3 Lectures)**
- Fats – types, sources, requirements, deficiency and excess of fats **(3 Lectures)**
- Water – sources of drinking water, requirements, preservation of water **(2 Lectures)**
- Minerals – types, sources, requirements deficiencies of minerals **(3 Lectures)**
- Vitamins – types, sources, requirements deficiencies of vitamins **(3 Lectures)**
- Planning diets including renal diets **(2 Lectures)**

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

OCCUPATIONAL SAFETY & HEALTH
Course Code: PMS.212T
Credit Hours: 2
Semester: IV

UNIT - I : Safety and Health Management (4 Lectures)

i. Occupational Health Hazards, Promoting Safety, Safety and Health training, Stress and Safety.

ii. Ergonomics - Introduction, Definition, Objectives, Advantages.

Ergonomics Hazards - Musculoskeletal Disorders and Cumulative Trauma Disorders.

- Organizing for safety, Health and Environment.
- Organization: Structure, Function and responsibilities
- Safety Committee: Structure and function

UNIT - II : Radiation and Industrial Hazards (5 Lectures)

i. Types and effects of radiation on human body, Measurement and detection of radiation intensity. Effects of radiation on human body, Measurement – disposal of radioactive waste, Control of radiation

ii. Industrial noise -Sources, and its control, Effects of noise on the auditory system and health, Measurement of noise ,

iii. Different air pollutants in industries, Effect of different gases and particulate matter ,acid fumes , smoke, fog on human health

iv. Vibration - effects, measurement and control measures

v. Industrial Hygiene.

UNIT –III: Electrical Hazards (5 Lectures)

Safe limits of amperages, voltages, distance from lines, etc., Joints and connections, Overload and Short circuit protection, Earthing standards and earth fault protection , Protection against voltage fluctuations, Effects of shock on human body Hazards from Borrowed nutrals, Electrical equipment in hazardous atmosphere, Criteria in their selection, installation, maintenance and use, Control of hazards due to static electricity,

UNIT – IV : Fire and Other Hazards (3 Lectures)

i. General causes and classification of fire, Detection of fire, extinguishing methods, fire fighting installations with and without water.

ii. Machine guards and its types, automation. High pressure hazards, safety, emptying, inspecting, repairing, hydraulic and nondestructive testing, hazards and control in mines.

UNIT –V: Vibration and Noise (3 Lectures)

Activities related to vibrations, its impact on human health, abatement Sources, effects of noise on man, Measurement and evaluation of noise, Silencers, Practical aspects of control of noise

UNIT-VI: Theories & Principles of Accident Causation & Prevention (5 Lectures)

i. The effect of accident, unsafe act, unsafe condition, unpredictable performance, Human factors contributing to accidents - causes for unsafe acts,

ii. Safety and psychology -Theories of motivation and their application to safety. Consequences of accident, accident prevention programmers, Role of safety

Incident, accident, injury, dangerous occurrences, unsafe acts, unsafe conditions, hazards, error, oversight, mistakes, etc.

Accident Prevention : Theories / Models of accident occurrences, Principles of accident prevention, Accident and Financial implications.

UNIT-VII: First Aid (5 Lectures)

i. Body structure and Functions, Position of causality, the unconscious casualty, fracture and dislocation, Injuries in muscles and joints, Bleeding, Burns, Scalds and accidents caused by electricity, Respiratory problems, Rescue and Transport of Casualty. Cardiac massage, poisoning, wounds.

ii. Personal Protective Equipments: Need, selection, supply, use, care and maintenance, Personal protective devices for head, ear, face, eye, foot, knee and body protection, Respiratory personal protective devices.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

BASIC HISTOLOGICAL TECHNIQUES
Course Code: PAT.213T
Credit Hours: 2
Semester: IV

UNIT-I: Laboratory management **(5 Lectures)**

-Collection handling and storage of specimen
-Utilization and maintenance of general laboratory equipment including minor repairs
-Sterilization of apparatus and reagents
-Safety precautions including those of radioactive material

UNIT-II: Laboratory application of microscopy **(7 Lectures)**

-Principle application and maintenance of light microscope with knowledge of varius types of lenses (simple and compensated)
-Principle of dark-ground illumination
-Principle of phase contrast microscope
-Principle of polarizing microscope
-Principle of fluorescent microscope
Principle of electron- microscope

UNIT-III: Histology of normal tissue **(2 Lectures)**
-Recognition of normal human tissue in sections.

UNIT-IV: Fixation **(4 Lectures)**
-Methods of fixation for biopsies and gross specimens i.e. immersion injection etc.
-Secondary fixation and post mordanting.
-Post chromation.
-Effects of fixation on subsequent

UNIT-V: Processing of tissues **(6 Lectures)**
-Manual processing
-Automatic processing
-Different embedding media and their particular use i.e. paraffin wax celloidin gelatin, water soluble waxes, ralwax etc
-Dehydrating and clearing agents.
-Rapid celloidin processing different methods of decalcification and their effect on staining
-Double embedding.
-Vacuum impregnation.

UNIT-VI: Microtomy **(6 Lectures)**
Working principle and use of various types of microtomes
Use and maintenance of various types of microtomy knives including automatic knife shatpener and different types of adhesives
Preparation of thin section step section and serial section
Practical difficulties in section cutting and their remedy.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

HUMAN PARASITOLOGY & APPLIED MICROBIOLOGY (THEORY)
Course Code: MIC.301T
Credit Hours: 4
Semester: V

SECTION-I: HUMAN PARASITOLOGY

UNIT-I: Introduction **(5 Lectures)**

- Definition - parastism, host, Vectors etc.
- Classification of Parasites & hosts
- Host-parasite interactions
- Life cycles of parasites: general outline
- Consequences of parasitism

UNIT-II: Protozoa **(10 Lectures)**

- *Intestinal Amoebae: E. Histolytica , E. coli* - Life cycle, Morphology, Disease & Lab Diagnosis
- *Flagellates of intestine/genitalia: Giardia lamblia, Trichomonas vaginalis* : Life cycle, Morphology, Disease & Lab Diagnosis
- *Malarial Parasite:* Plasmodium spp. : Life cycle, Morphology, disease & lab diagnosis

UNIT-III: Nematodes : **(10 Lectures)**

- *Intestinal Nematodes :* Ascaris : Life cycle, Morphology, disease & lab diagnosis
- Brief discussion about *Enterobius vermicularis* (Thread worm) and *Ancylostoma duodenale* (Hook worm)
- *Tissue Nematodes : W. Bancrofti* - Life cycle, Morphology, Disease & Lab Diagnosis

UNIT-IV: Phylum Platyhelminths **(10 Lectures)**

- Cestodes - *T. solium, T. saginata & E. granulosus*. (in brief)
- Trematodes - *S. haematobium & F. hepatica* (in brief)

SECTION-II: APPLIED MICROBIOLOGY

- Normal Microbial flora of human body
- Urinary Tract infection
- Diarrheal Diseases
- Meningitis
- Fever of Unknown Origin
- Sexually Transmitted Diseases
- Prophylactic Immunization
- Antimicrobial Sensitivity Testing

HUMAN PARASITOLOGY & APPLIED MICROBIOLOGY (PRACTICAL)
Course Code: MIC.301P
Credit Hours: 2

- Collection of Faeces and Specimen for Blood Film
- Preparation of Blood Films and its staining
- Preservation of Faecal Specimens
- Microscopic examination (Wet Mount)
- Serological Diagnosis
- Culture Techniques

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

BLOOD BANK PROCEDURES & HAEMOGLOBINOPATHIES (THEORY)
Course Code: PAT.302T
Credit Hours: 4
Semester: V

UNIT-I: Blood Grouping (11 Lectures)

- Human Blood Group system
- ABO Subgroups
- Red Cell Antigen,Natural Antibodies
- Rh System,Rh Antigens & Rh Antibodies
- Hemolytic Disease of Newborn & Prevention
- Principal of Blood grouping, antigen-antibody reaction.
- Agglutination, Haemagglutination, Condition required for antigen antibody reaction.
- Blood grouping techniques, Cell grouping, Serum grouping.
- Methods for ABO grouping- Slide & Tube Method, Cell grouping, Serum grouping, Rh grouping by slide & tube method.
- Difficulties in ABO grouping, Rouleaux formation, how it interfere with Blood grouping.
- Auto agglutinins
- Antiserum used in ABO test procedures, Anti –A, Anti-B Anti- AB Antiserum.

UNIT-II: Blood Transfusion (5 Lectures)

- Principal & Practice of blood Transfusion.
- Blood Transfusion service at District level.
- Guide lines for the use of Blood, Appropriate use of Blood, Quality Assurance.
- Antilogous Blood Transfusion practices.

UNIT-III: Blood Donation (5 Lectures)

- Blood donor requirements, Criteria for selection & rejection, Medical history & personal details, Self-exclusion, Health checks before donating blood, Screening for TTI.

UNIT-IV: Blood Collection (5 Lectures)

- Blood collection packs.
- Anticoagulants.
- Taking & giving sets in Blood transfusion
- Adverse donor reaction.

UNIT-V: Testing Donor Blood (5 Lectures)

- Screening donor's blood for infectious agents - HIV, HCV, HBV, T. palladium, Plasmodium, HTLV.

UNIT-VI: Storage & Transport (8 Lectures)

- Storage of blood, Changes in blood after storage, Gas refrigerator, Transportation.

UNIT-VII: Maintenance of Blood Bank Records (5 Lectures)

- Blood donation record book, Recording results, Blood donor card, Blood bank temperature sheet, Blood bank stock sheet, Blood transfusion request form.

UNIT-VIII: Compatibility Testing (8 Lectures)

- Single tube compatibility techniques using AHG reagent, Emergency compatibility testing, Difficulties in cross matching, Labeling & Issuing cross- matched blood.

UNIT-IX: Blood Transfusion Reactions (8 Lectures)

- Investigation of a Transfusion reaction, Hemolytic transfusion reaction.

BLOOD BANK PROCEDURES & HAEMOGLOBINOPATHIES (PRACTICAL)
Course Code: PAT.302P
Credit Hours: 2

- Conducted as per theory syllabus

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1^{st} ,2^{nd} Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

FUNDAMENTALS OF MOLECULAR BIOLOGY (THEORY)
Course Code: CBR.303T
Credit Hours:3
Semester: V

UNIT I: Basic Principles in Molecular Diagnostics (6 Lectures)

Organizations of molecular diagnostic laboratory-Bio-membranes and the sub-cellular organization of eukaryotic cells.

UNIT-II: Nucleic acid organelle (6 Lectures)

DNA-the genetic code and the synthesis of macromolecules-structure of nucleic acids-synthesis of biopolymers-nucleic acid synthesis-the role of RNA in protein synthesis stepwise formation of proteins on ribosome.

UNIT-III: Molecular structure of genes and chromosomes (6 Lectures)

organization of cellular DNA into chromosomes-morphology and functional elements of eukaryotic chromosomes-chromosomal organization of genes and non-coding DNA.

UNIT-IV: (6 Lectures)

DNA replication-repair-recombination-mutation-Regulation of the eukaryotic cell cycle-gene control in development-Cellular energetic-Types of syndromes-Cystic fibrosis.

UNIT -V: (6 Lectures)

Molecular oncology including DNA assay for T and B-cell rearrangement-analysis for translocation, oncogenes analysis-translocation gene mutation in various cancer, in situ hybridization- Blood group, molecular histocompatibility testing, forensic identity testing by DNA analysis.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

FUNDAMENTALS OF MOLECULAR BIOLOGY (PRACTICAL)
Course Code: CBR.303P
Credit Hours: 1.5

- Precautions to prevent hemolysis
- Storage of blood specimens
- Bleeding time & clotting time estimation
- Prothrombin time estimation
- aPTT (activated partial thromboplastin time) estimation.
- Clot retraction time

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

DIAGNOSTIC MICROBIOLOGY (THEORY)
Course Code: MIC.304T
Credit Hours: 3
Semester: V

UNIT-I: Lab Diagnosis of Common Bacterial Infections (20 Lectures)

- Pyogenic infections
- Respiratory tract infections
- Meningitis
- Diphtheria
- Whooping Cough
- Gas gangrene
- Food poisoning
- Enteric fever
- Acute diarrheal diseases
- Cholera
- Urinary tract infection
- Tuberculosis
- Leprosy
- Plague
- Anthrax
- Typhus fever
- Syphilis, Gonorrhoea and other STD's

UNIT-II: Principles of Serological Techniques used in Virology (5 Lectures)

- ELISA
- RIA
- IF
- Immunoperoxidase test

UNIT-III: Lab Diagnosis of Fungal Infections (15 Lectures)

- Superficial dermatophyte fungal infections
- Candidiasis
- Cryptococcosis
- Pulmonary infections
- Mycetoma, other deep mycotic infections
- Eye and Ear fungi infections

UNIT-IV: Parasitology (10 Lectures)

- Identification of Adult worms- mosquitoes, flies, ticks and fleas
- Preparation of parasitic antigens, antigens and antisera

DIAGNOSTIC MICROBIOLOGY (PRACTICAL)
Course Code: MIC.304P
Credit Hours: 3

- Conducted as per theory syllabus

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

SCHEME OF EXAMINATION - PRACTICALS

	Particulars	Marks
INTERNAL	Log Book	10
	Clinical Posting(attendance)	20
	Internal (1st ,2nd Hourly & mid-term)	20
EXTERNAL	Viva-voce	50
	TOTAL MARKS	**100**

HEALTHCARE
Course Code: PMS.305T
Credit Hours: 2
Semester: V

UNIT-I: Introduction to Health (10 Lectures)

- Definition of health, determinants of health, health indicators of India, health team concept.
- National health policy
- National health programmes (Briefly objectives and scope)
- Population of India and family welfare programme in India

UNIT-II: Introduction to Nursing (15 Lectures)

- What is nursing? Nursing principles, inter-personnel relationships.
- *Bandaging:* basic turns, bandaging extremities, triangular bandages and their application.
- Nursing position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.
- *Lifting and transporting patients:* lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.
- Bed side management: giving and taking bed pan, urinal.
- Observation of stools, urine, sputum
- Use and care of catheters, enema giving.
- *Methods of giving nourishment:* feeding, tube feeding, drips, transfusion.
- Recording of body temperature, respiration and pulse.
- Simple aseptic techniques, sterilization and disinfection.
- *Surgical dressing:* observation of dressing procedures.

UNIT-III: First Aid (15 Lectures)

- Physical Exam and SAMPLE History
- Documentation and Legal Considerations
- Sudden Illness, Bleeding
- Caring for Shock, Burns, Injuries to muscles, bones, and joints, Splints, Bites and Stings
- Administering Epinephrine
- Assisting with bronchodilators (inhalers)
- Heat/Cold Related Emergencies
- In-line stabilization for head, neck and back injuries
- First Aid Kits, Fire & safety

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

DIETARY MANAGEMENT OF COMMON DISEASES
Course Code: PMS.306T
Credit Hours: 2
Semester: V

UNIT – I **(10 Lectures)**

- Diet Therapy: Routine hospital diet, Regular diet, Light diet, Soft Diet, Full liquid diet.
- Diet in fevers and infections – Typhoid, Malaria and Tuberculosis.
- Diet in gastro intestinal disorders: Diarrhoea, Constipation, Peptic ulcer

UNIT – II **(20 Lectures)**

- Diet in Diabetes mellitus – Classification, predisposing factors, Diagnosis, Dietary management.
- Diet in Cardiovascular diseases – Dietary management in atherosclerosis and hypertension.
- Diet in diseases of liver and gall bladder.
- Diet in Renal diseases
- Dietary Management in glomerulonephritis
- Dietary Management in Acute and chronic renal failure.

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**

BLOOD BANKING-SCOPE & SAFETY GUIDELINES
Course Code: PAT.307T
Credit Hours: 2
Semester: V

Blood Transfusion Scope, Safety and Regulatory Requirements

-Introduction to blood banking **(2 Lectures)**
-Part X B- Definitions, Requirements for the collection, processing and operation of blood banks **(3 Lectures)**
-Part XIIB of Schedule F- Requirements for the functioning and operation of blood banks/for preparing blood components (A, B, C, D, E, F) **(4 Lectures)**
-Good manufacturing practices and standard operating procedures (G) **(3 Lectures)**
-Criteria for blood donation (H) **(2 Lectures)**
-General equipment and instruments (I) **(2 Lectures)**
-Special reagents (J) **(3 Lectures)**
-Testing of whole blood (K) **(2 Lectures)**
-Records (L) **(2 Lectures)**
-Blood donation camps **(2 Lectures)**
-Blood components **(2 Lectures)**
-Plasmapheresis, plateletpheresis, leukopheresis **(2 Lectures)**
-Part XIIC- Requirements for manufacture of blood products **(3 Lectures)**
-Collection and storage of plasma for fractionation **(2 Lectures)**
-Viral inactivation **(2 Lectures)**
-Guidelines for approval of blood and or its components Storage Centers run by first referral unit, community health center, primary health center or any hospital **(3 Lectures)**
-Universal Safety Guidelines **(3 Lectures)**

SCHEME OF EXAMINATION - THEORY

Types of Questions	Total No. of Questions	No. of Questions to be attempted	Marks Assigned	Subtotal
SEC -A: MCQ'S	10	10	1	10
SEC -B: Very Short Answer Questions	7	5	2	10
SEC -C: Short Answer Questions	6	4	5	20
SEC -D: Long Answer Questions	2	1	10	10
			TOTAL MARKS	**50**