Human Anatomy

Course Code: OTT 101

Course Contents:

Introduction

Human body as a whole: Definition of anatomy and its divisions, Terms of location, positions and planes, Cell and its organelles, Epithelium-definition, classification, describe with examples, function, Glands- classification, describe serous & mucous glands with examples, Basic tissues – classification with examples.

2. Locomotion and Support

Cartilage – types with example & histology, ***Bone*** – Classification, names of bone cells, parts of long bone, microscopy of compact bone, names of bones, vertebral column, inter vertebral disc, fontanelles of
fetal skull, ***Joints*** – Classification of joints with examples, synovial joint (in detail for radiology), ***Muscular system***- Classification of muscular tissue & histology, Names of muscles of the body.

3. Cardiovascular System

Heart-size, location, chambers, exterior & interior, Blood supply of heart, Systemic & 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 venacava, portal vein, portosystemic anastomosis, Great saphenous vein, Dural venous sinuses, Lymphatic systemcisternachyli& thoracic duct, Histology of lymphatic tissues, Names of regional lymphatics, axillary and inguinal lymph nodes in brief.

4. Gastro-intestinal System

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.

5. Respiratory System

Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments, Histology of trachea, lung and pleura, Names of paranasal air sinuses.

6. Peritoneum: Description in brief

7. Urinary System

Kidney, ureter, urinary bladder, male and female urethra, Histology of kidney, ureter and urinary bladder.

8. Reproductive System

Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology), Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology), Mammary gland-gross.

9. Endocrine Glands

Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal glad (gross & histology).

10. Nervous System

Neuron, Classification of NS, Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology), Meninges, Ventricles & cerebrospinal fluid, Names of basal nuclei,
Blood supply of brain, Cranial nerves, Sympathetic trunk & names of parasympathetic ganglia.

11. Sensory Organs

Skin: Skin-histology, Appendages of skin, ***Eye:*** Parts of eye & lachrymal apparatus, Extra-ocular muscles & nerve supply, ***Ear:*** parts of ear- external, middle and inner ear and contents

12. Embryology

Spermatogenesis & oogenesis, Ovulation, Fertilization, Fetal circulation, Placenta.

Reference Books:

1. William Davis, *Understanding Human Anatomy and Physiology*, McGraw Hill
2. Chaurasia, *A Text Book of Anatomy*
3. Ranganathan, T.S., *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. LippinCott. Philadelphia

Practical

Course Contents:

1. Histology of types of epithelium, Histology of serous, mucous & mixed salivary gland
2. Histology of the 3 types of cartilage, Demo of all bones showing parts, radiographs of normal bones & joints, Histology of compact bone (TS & LS), Demonstration of all muscles of the body, Histology of skeletal (TS & LS), smooth & cardiac muscle.
3. Demonstration of heart and vessels in the body, Histology of large artery, medium sized artery & vein, large vein, Microscopic appearance of large artery, medium sized artery & vein, large vein, pericardium, Histology of lymph node, spleen, tonsil & thymus, Normal chest radiograph showing heart shadows, Normal angiograms
4. Demonstration of parts of respiratory system, Normal radiographs of chest, Histology of lung and trachea
5. Demonstration of reflections
6. Demonstration of parts of urinary system, Histology of kidney, ureter, urinary bladder, Radiographs of abdomen-IVP, retrograde cystogram
7. Demonstration of section of male and female pelvis with organs in situ, Histology of testis, vasdeferens, epididymis, prostate, uterus, fallopian tubes, ovary, Radiographs of pelvis – hysteron salpingogram
8. Demonstration of the glands, Histology of pituitary, thyroid, parathyroid, suprarenal glands
9. Histology of peripheral nerve & optic nerve, Demonstration of all plexuses and nerves in the body, Demonstration of all part of brain, Histology of cerebrum, cerebellum and spinal cord
1 0. Histology of thin and thick skin, Demonstration and histology of eyeball, Histology of cornea & retina

Reference Books:

1. William Davis, *Understanding Human Anatomy and Physiology*, McGraw Hill
2. Chaursia's, *Practical of Human Anatomy*

Human Physiology

Course Code: BOTT102
Course Contents:

Unit 1
1. **Cell**
Definition, Structure and function of Cytoplasmic Organelles, Reproduction Meosis, Mitosis

Unit 2
Physiology of blood & cvs
- Composition of blood
- Function of RBC & WBC
- Blood Groups
- Blood circulation general Principles
- Cardiac Cycle ,Cardiac Output
- ECG

Unit 3
Respiratory system
- Mechanism of Respiration
- Lung capacity
- Lung Volumes

Unit 4
Digestive system
- Introduction to Digestive System
- The salivary glands
- Blood supply and secreation
- Intestines
- Function of liver

Unit 5
Endocrinal system
- General principles of endocrinology
- Thyroid

- Parathyroid

Unit 6
Skin
- Structure and function of skin
- Appendages of skin

Unit 7
Urogenital system
- Physiology of kidney and urine formation
- Constituent of normal urine etc
- Kidney function test
- Physiology of male and female reproductive system

Unit 8
Central Nervous system
- Reflex Arc
- Physiology of central nervous system
- Sympathetic and parasympathetic nervous system
- Function of cerebrum,cerebellum,basal ganglia,thalamus
- Hypothalamus ,CSF
- Blood brain barrier

Practical

- TLC
- DLC
- RBC
- Blood pressure
- Reflexes –Superficial & deep
- Test for function of cerebrum
- Test for function of cerebellum

Medical Biochemistry

Course Code: BOTT103
Course Contents:

Unit 1
Introduction to bio chemistry

- Cell .prokaryotic & eukaryotic Cell ,cell organelles

Unit 2

- Carbohydrates
- – functions&classification–Monosaccharides,oligosaccharides, PolySaccharides

Unit 3

- Lipids
- Functions and classifications\
- Classification of fatty acids
- Phospholipids, glycoproteins

Unit 4

- Proteins –Amino acids classifications, structure of protein, properties of protein
- Classification of protein –Antigen antibody, bleeding 7 clotting

Unit 5

- Vitamins &Minerals
- Fat soluble vitamins (A,D,E,K) Water soluble vitamins B-complex vitamins

Unit 6

- Nucleic acid
- Structure of DNA –Watson and cric model of DNA
- Structure of RNA ,Types of RNA

Unit 7

- Enzymes Definition-Nomenclature-Classification
- Factors affecting enzyme activity-
- Active Site, Coenzyme, Enzyme inhibitor
- Mechanism of enzyme action

Practical

Unit 1

Introduction to Laboratory Apparatus

- Pipettes- different types (Graduated, volumetric, Pasteur, Automatic etc.), Calibration of glass pipettes,
- Burettes, Beakers, Petri dishes, depression plates. Flasks - different types) Volumetric, round bottomed, Erlenmeyer conical etc.). Funnels – different types (Conical, Buchner etc.) Bottles:
- Reagent bottles – graduated and common, Wash bottles – different types, Specimen bottles etc.
- Measuring cylinders, Porcelain dish,
- 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 holders Racks – Bottle, Test tube, Pipette, Desiccators, Stop watch, rimers, scissors, Dispensers – reagent and sample.
- Any other apparatus which is important and may have been missed should also be covered

Unit 3

Maintenance of Lab Glassware and Apparatus

- Glass and plastic ware in Laboratory, use of glass: significance of boro silicate glassware and cleaning of glassware,
- Different cleaning solutions of glassware and cleaning of plastic ware,
- Different cleaning solutions.

Unit 4

Instruments (Theory and demonstration)

- Water bath: Use, care and maintenance,
- Oven & Incubators: Use, care and maintenance.
- Water Distillation plant
- water deionizers. Use, care and maintenance,
- Refrigerators, cold box, deep freezers – use, care and maintenance. Reflux condenser: Use, care and maintenance. Centrifuges (Theory and demonstration) *Diagrams to be drawn*
- Definition, Principle, Svedberg unit, centrifugal force, centrifugal field rpm, ref. Conversion of G to rpm and vice versa.
- Different types of centrifuges, Use care and maintenance of a centrifuge.
- Laboratory balances [Theory & Practical) Diagrams to be drawn. Manual balances: Single pan, double pan, trip balance, Direct read out electrical balances. Use care and maintenance. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids. Hygroscopic compounds etc.
- Colorimeter and spectrophotometer (Theory and Practical) *Diagrams to be drawn*. Principle, Parts diagram. Use, care and maintenance of pH meter and electrodes, Guidelines to be followed and precautions to be taken while using pH meter

Unit 5

Conventional and SI Units

- Preparation of normal solutions e.g., In Na2CO3, O In Oxalic acid, 0.1N HCl, 0.1N H2S04, 0.66 N
- H2S04 etc. Percent solutions. Preparation of different solutions – v/v w/v (solids, liquids and acids).
- Conversion of a percent solution into a molar solution.

Unit 6

- **Dilutions**
- ***Diluting solutions:*** e.g. Preparation of 0.1N NaCl from 1N NaCl from 2N HCl 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.
- **Standard solutions:** Technique for preparation of standard solutions e.g. Glucose, urea, etc.,Significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, Preparation of standard solutions of deliquescent compounds (CaCl2, potassium carbonate, sodium hydroxide etc.,) Preparation of standards using conventional and SI units.
- ***Acids, bases, salts and indicators: Acids and Bases*** – Definition, physical and chemical properties with examples. Arrhenius concept of acids and bases, Lowery – Bronsted theory of acids and bases
- classification of acids and bases. Difference between bases and alkali, acidity and basicity, monoprotonic and polyprotonic 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.

- ***Acid-base indicators:*** (Theory and Practical) Definition, concept, mechanism of dissociation of an indicator, colour change of an indicator in acidic and basic conditions, use if standard buffer solution and indicators for pH determinations, preparation and its application, list of commonly used indicators, and their pH range, suitable pH indicators used in different titrations, universal indicators.
- ***Quality control:*** Accuracy, Precision, Specificity, Sensitivity. Limits of error allowable in laboratory, Percentage error, Normal values and Interpretations, pH Regulation, Disturbance in acid Base Balance, Metabolic acidosis & alkalosis, Respiratory acidosis & alkalosis, Respiratory alkalosis, Basic Principles and estimation of Blood Gases and pH, Basic principles and estimation of Electrolytes, Nutritional importance of lipids, carbohydrates, proteins and Vitamins.

General Pathology

Course Code: BOTT104
Course Contents:

Histopathology

- Histopathology ,Clinical Pathology, Haematology and Blood Banking
- Introduction to Histo Pathology
- Receiving of Specimen in the laboratory
- Grossing Techniques
- Mounting Techniques – various Mountants
- Maintenance of records and filing of the slides.
- Use & care of Microscope
- Various Fixatives, Mode of action, Preparation and Indication.
- Bio-Medical waste management
- Section Cutting
- Tissue processing for routine paraffin sections
- Decalcification of Tissues.
- Staining of tissues - H& E Staining
- Bio-Medical waste management Clinical Pathology – Theory
- Introduction to Clinical Pathology
- Collection, Transport, Preservation, and Processing of various clinical specimens
- Urine Examination – Collection and Preservation of urine.Physical, chemical, Microscopic Examination

- Examination of body fluids.
- Examination of cerebro spinal fluid (CSF)
- Sputum Examination.
- Examination of feces
- Haematology – Theory
- Introduction to Haematology
- Normal constituents of Blood, their structure and function.
- Collection of Blood samples
- Various Anticoagulants used in Haematology
- Various instruments and glassware used in Haematology, Preparation and use of glassware
- Laboratory safety guidelinesSI units and conventional units in Hospital Laboratory
- Hb,PCV
- ESR
- Normal Haemostasis
- Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time.

Blood Bank

- Introduction
- Blood grouping and Rh Types
- Cross matching

REFERENCE BOOKS

Pathology –

1. Culling Histopathology techniques
2. Bancroft Histopathology techniques
3. Koss – cytology
4. Winifred greg – Diagnostic cytopathology
5. Orell – Cyto Pathology
6. Todd & Sanford Clinical Diagnosis by laboratory method
7. Dacie& Lewis – Practical Haematology
8. RamanicSood, Laboratory Technology (Methods and interpretation) 4th Ed. J.P. Bros, New Delhi –1996)
9. Satish Gupta Short text book of Medical Laboratory for technician J.P. Bros, New Delhi – 1998
10. Sachdev K.N. Clinical Pathology and Bacteriology 8th Ed, J.P. Bros, New Delhi-1991.
11. Krishna - Text book of Pathology, Orient Longman PVT Ltd. Bacteriology 8th Ed, J.P.Bros, New Delhi-1991.

Practical

- Hb,PCV
- ESR
- Grossing Techniques
- Mounting Techniques
- Staining of tissues - H& E Staining
- Bleeding Time, Clotting Time
- Urine Examination
- Examination of cerebro spinal fluid (CSF)
- Sputum Examination.
- Examination of feces
- Blood grouping and Rh Types

General Microbiology

Course Code: BOTT105
Course Contents

Unit 1

Morphology

Classification of micro organisms, size, shape and structure of bacteria.

Use of microscope in the study of bacteria.

Growth and nutrition

Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic Bacteriology

Unit 2

Sterilisation and Disinfection

Principles and use of equipments of sterlization namely Hot Air oven,
Autoclave and serum Inspissrator.Pasteurization,Anti septic and disinfectants. Antimicrobial sensitivity test

Unit 3
Immunology
immunity Vaccines, Types of Vaccine and immunization schedule
Principles and interpretation of commonly done serological tests namely
Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HbsAg

Unnit4
Systematic Bacteriology
Morphology, cultivation, diseases caused, laboratory diagnosis including
Specimen collection of the following bacteria(the classification, antigenic
Structure & pathogenicity are not to be taught Staphyloccci,Streptococci
Pneumococci, Gonococci, Menigococci, diphtheriae,
Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Esch coli,
Klebsiella, Proteus,vibriocholerae, Pseudomonas & Spirochetes

Unit 5
Parasitology
Morphology, life cycle, laboratory diagnosis of following parasites
E. histolytica, Plasmodium, Tape worms, Intestinal nematodes

Unit 6
Mycology
Morphology, diseases caused and lab diagnosis of following fungi.
Candida, Cryptococcus, Dermatophytes ,opportunistic fungi.

Unit 7
Virology
General properties of viruses, diseases caused, lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

Unit 8
Hospital infection Causative agents, transmission methods, investigation, prevention and control Hospital infection.
Principles and practice Biomedical waste management

REFERENCE BOOKS
Microbiology

1. Anathanarayana&Panikar Medical Microbioloty
2. RobertyCruckshank – Medical Microbiology – The Practice of Medical Mircrobiology
3. Chatterjee – Parasitology – Interpretation to Clinical medicine.

4. Rippon – Medical Mycology

5. Emmons – Medical mycology
6. Basic laboratory methods in Parasitology, 1st Ed, J P Bros, New Delhi – 199
7. Basic laboratory procedures in clinical bacteriology, 1st Ed, J P Brothers, New Delhi

8. Medical Parasitology – AjitDamle

9. Introduction to Medical Microbiology –Ananthanarayana, Orient Longman PVT Ltd.

Practical

- Sterilization
- culture media
- Widal
- VDR
- ASLO
- CRP
- HIV,
- RF
- ELISA
- HbsAg
- HCV
- Hepatitis
- H And E Staining

Introduction to OT technique

Course Code: BOTT106

Course Contents

- Introduction to OT-variou areas/Zones/layout in OT
- Various equipment's in OT
- Ten golden rules in anesthesia
- General anesthesia Protocols
- Consent and medico legal aspects

- Blood transfusion
- Sterilization- sterilization of various laparoscopic equipments
- OT lights
- Scrubbing technique, gloving Technique
- Linen
- Preparation of dressing and swabs
- Suture material- types of needles
- Role and responsibility of Ot technician
- Biomedical waste management
- CSSD
- Care of patient in post operative ward
- Pre anesthesia checkup
- Preparation of electrical gadgets (laparoscope,cautery,work station)
- Various equipments in OT
- Preparation of patient for surgery
- Fluids used in OT
- General instruments used for surgery
- Hemostasis –
- Orthopedic instruments
- X-ray shooting basic views(PA & Lateral view)