FIRST PROFESSIONAL BDS
SYLLABUS & COURSES

Anatomy

Physiology

Biochemistry

Oral Biology

Pakistan Studies

Islamic Studies

Behavioral sciences

Bio-statistics

Computer literacy

Introduction to dentistry

ANATOMY

The program of instruction is meant to provide a detailed anatomical study of the head and neck region to illustrate function and their interrelationship to the problems of dental therapy. Special emphasis is placed on the maxillofacial region, as well as those parts of the nervous system, thorax and abdomen, which are clinically important.

GENERAL ANATOMY

Bones

Structural classification
Regional classification
Functional classification
Anatomy of bones with reference to blood supply

Cartilage

Structural classification
Regional classification
Functional classification

Joints

Structural classification
Regional classification
Functional classification
Character and classification of synovial joints
Movements of synovial joints
Anatomy of joints with reference to dislocation sprain and inflammation

Muscle

- Parts of a muscle
- Classification
- Blood supply and nerve supply of muscle
- Neuromuscular junction
- Applied anatomy of muscle with reference to spasm.
- Paralysis atrophy and regeneration.

Cardiovascular system

- Introduction to C.V.S
- Arterial and venous circulation
- Capillary circulation
- Anastamoses
- Introduction to lymphatic system
- Lymph node

Nervous system

- Introduction to CNS
- Different parts of CNS with their brief functions
- Preripheral nervous system (cranial and spinal nerves) introduction
- Autonomic nervous system

GROSS ANATOMY

The gross structure of the regions of the human body, head and neck, thorax, abdomen and extremities are studied in the laboratory by dissection and demonstration. Special emphasis and study are placed on the Maxillofacial regions. Lectures stress morphological concepts, functional correlations and practical application to clinical problems. Lectures on radiographic anatomy of the head and neck and the development of the human body are also integrated with the teaching gross anatomy.

Head & Neck Region

Introduction
Osteology of cranio-facial complex, joints, musculature, nerve supply, blood supply, venous drainage and lymphatics

Neuro-anatomy

Introduction
General outline of the brain and spinal cord
Nuclei and central pathways of the cranial nerves

Thorax

Introduction
Parts of mediastinum
General disposition of organs and structures

Abdomen

Introduction
Parts of abdomen
General disposition of organs and structures

Practical Work

Dissection on dead bodies to identify the structures in the area of subject, to make sketchbook, surface marking of structure with different landmarks, identification of structure of study models, handling of light microscope and to know the methods of staining and slide preparation.

Study of osteology together with demonstrations on the main point of dissected out head and neck, thorax and abdomen. This includes demonstrations on models and dissected parts.

Recommended Books

Color atlas of anatomy by Mc Minn.
Clinically oriented development anatomy by K. L. Moore
Atlas of human anatomy by Franz Frozhe
Anatomy for dental students by D. R. Johnson & K. L. Moore
Clinical neuroanatomy by R. Snell
High Yeild neuroanatomy by James D Fix
Last's anatomy by R.M.H. McMinn
Cunningham's Manual of Practical Anatomy.
Gray's Text Book of Anatomy
Text Book of Anatomy by Hamilton

EMBRYOLOGY

Gametogenesis
Fertilization
Preimplantation period
Embryonic period with special emphasis on gastrulation
Fetal period
Teratogenesis and developmental anomalies
Postnatal growth and developments of cranio facial complex.

Recommended Books

Langman's medical embryology by T.W.Sadler

Snell's embryology by R.Snell.

HISTOLOGY

General Histology

- Cell
- Epithelial tissue
- Connective tissue
- Muscle tissue
- Nervous tissue

Special Histology

- Digestive tract
- Respiratory tract
- Nervous system
- Exocrine glands
- Endocrine glands

Recommended Books

Colour Textbook of Histology (2nd Ed.) 2001. Gartner & Hiatt. Published by Saunders. ISBN 0721688063

Basic Histology (9th Ed) 1998 Junqueira, Carneiro Contopoulos. Published by Appleton & Lange. ISBN 0838503764

Essential Histology (1993 Ed. Rev.) Published by Lippincott. ISBN 0397510624

Wheater Functional Histology Text & Colour Atlas (4th Ed) 2000. Wheater, Burkitt, Young & Heath. Published by Churchill Livingstone. ISBN 0443056129

Atlas of Functional Histology 1999 Kerr. Published by Mosby ISBN 0723430721

Human Histology (2nd Ed.) 1996 Stevens & Lowe. Published by Mosby. ISBN 0723424853

Practical Work

Microscopic examination and identification of various histological sections

PHYSIOLOGY

The functional organization of human body as whole & homeostasis with special reference to the application of physiology in dentistry and comprising the following:-

Cell Physiology

Organization of the cell; Physical characteristics – membranous structures, organelles, nucleus; Functional system of the cell – endocytosis, pinocytosis, phagocytosis, synthetic functions, exocytosis, energy production, cell movements & locomotion. Common abnormalities of cell function and their clinical relevance.

Nerve- Muscle Physiology

Transport of Ions & molecules – diffusion, active transport; Membrane potentials and action potentials; Conduction of nerve impulse. Physiologic anatomy of skeletal and smooth muscle and mechanisms of muscle contraction. Neuromuscular transmission. Common diseases like myasthenia gravis etc

Cardiovascular System

Structure and physiology of cardiac muscle
Specialized excitatory & conductive system of heart
Cardiac Cycle
Heart Sounds
Regulation of heart pump
ECG basics, recording and interpretation; correlation of cardiac cycle with ECG and heart sounds.
Cardiac arrhythmias
Circulation; the concept of pressure, flow & resistance
Functions of arterial & venous systems
Microcirculation and lymphatic system
Control & regulation of blood flow
Regulation of peripheral vascular resistance
Arterial pulse
Arterial pressure regulation (short-term/ long-term) – hypertension types and consequences
Regulation of venous return
Cardiac output regulation and measurement.
Coronary circulation
Changes in exercise
Ischemic heart disease; cardiac failure; circulatory shock etc heart murmurs and echocardiography

Respiration:

Basic organization of respiratory system
Mechanics of pulmonary ventilation
Pulmonary volumes & capacities and their clinical relevance
Dead space (anatomical and physiological)
Principles of gas exchange and transport in blood
Nervous and chemical regulation of respiration;
Breathing patterns
Respiratory changes in exercise, high altitude, deep sea diving
Hypoxia – causes, types and effects
Dyspnea – causes, types and effects
Apnea, including obstructive sleep apnea
Tachypnea
Cyanosis – causes, types and effects
Respiratory insufficiency
Artificial respiration and oxygen therapy

Blood Physiology

Red blood cells, production, functions, regulation
Formation of hemoglobin, iron metabolism,
Anemia & polycythemia
Production & functions of leukocytes
Blood groups transfusion, transfusion reactions, tissue & organ transplantation
Hemostasis & blood coagulation
Platelets, production, regulation and functions
Thrombocytopenias
The clotting cascade
Hemophilia, Von Willebrand disease; Christmas disease
Bleeding time and clotting screen

Gastro-intestinal System

General structure & organization
Principles of GIT movements
Mastication, deglutition,
Peristalsis mechanism and control
Vomiting mechanism and control
Defecation mechanism and control
Movements and functions of stomach, small intestine and large intestine
Secretory functions (saliva, gastric juice, pancreatic juice, intestinal juice & bile)
GIT hormones
Digestion & absorption & assimilation
Functions of liver & bilirubin formation & excretion; Jaundice.
Liver function tests

Renal Physiology

Structure and functions of kidneys
Glomerular filtration, factors affecting and measurement
Renal blood flow
Urine formation, micturation;
Renal regulation of blood volume & extra cellular fluid volume
Regulation of acid-base balance

Endocrine System:
General organization & importance of endocrine system
Chemistry, synthesis, storage, functions, control and abnormalities of pituitary, thyroid, parathyroid pancreatic, and adrenal hormones
Hormonal assays and interpretation

Nervous System:
Organization of the nervous system
Synaptic transmission
Basic concepts of sensory, motor and integrative functions of nervous system including various pathways
Cerebral blood flow and cerebrospinal fluid system
Physiology of pain with emphasis on endogenous pain control mechanisms
Organization and functions of spinal cord
Organization and functions of sensory cortex
Organization and functions of motor cortex; pyramidal and extra pyramidal pathways; presentation and interpretation of common upper and lower motor neuron lesions
Organization and functions of cerebellum & basal ganglia in overall motor control - Parkinsonism
Thalamus- organization, nuclei and functions
Functions of hypothalamus
Temperature regulation
States of brain activity – sleep, brain waves, epilepsy & psychoses.
Organization and functions of autonomic nervous system
Special senses-elementary knowledge of structure and physiology of the special sense organs.

Laboratory Assignments

Hematology
- Study of the microscope
- RBCs Count
- Hematocrit
- Determination of Hemoglobin (Hb%)
- Packed cell volume (PVC)
- Total leukocyte count (TLC)
- Differential leukocyte count (DLC)
- Erythrocyte sedimentation rate (ESR)
- Bleeding time (BT)
- Prothrombin time
- Thrombin time
- Blood grouping

Respiratory system
- Measurement of pulmonary volumes and capacities (Spirometry)
- Stethography

Nervous system
- Examination of superficial reflexes
- Examination of deep reflexes
- Examination of sensory, motor system
- Clinical examination of cranial nerves

Cardiovascular system

Frog's heart

- Recoding of normal cardiogram and affect if temperature
- Effect of drugs on cardiac contractility
- Effect on ions on cardiac contractility
- Properties of cardiac muscle in frog's heart (demonstration)

Cardiopulmonary resuscitation
Cold pressor test
Triple response
Examination of arterial pulse
ECG recoding/interpretation
Measurement of arterial blood pressure
Effect of exercise & posture on BP
Examination of apex beat
Heart sounds – auscultation of normal sounds/murmurs
Recording of body temperature

Introduction to biostatistics e.g. data collect and analysis

Recommended Books

Textbook of Medical Physiology (10th Ed) Sept.2000 Guyton. Published by Saunders. ISBN 072168677X.

Review of Medical Physiology (20th Ed.) 2001 Ganong. Published by Appleton & Lange. ISBN 0838582826

Physiology (2nd Revised Ed) 1998 Linda S Costanzo. Published by W B Sanders, ISBN 0721666116

Lecture Notes on Human Physiology (4th Ed.) Bray JJ, Cragg, PA, MacKnight ADC, Mills R G & Taylor D W. Published by Blackwell, ISBN 0865427755.

Human Physiology (8th Ed.) 1998. Vander, Sherman & Luciano. Published by McGraw Hill. ISBN 0071182543

Principles of Physiology (3rd Ed.)2000 Berne RM & Levy MW. Published by Mosby (HBJ). ISBN 0-323-00813-5

Physiology (4th Ed.) 1998. Berne R M & Levy M W. Published by Mosby (HBJ). ISBN 0815109520.

BIOCHEMISTRY

Introduction of Biochemistry
Introduction to cell (biochemical aspects)
Composition of cell
Methods to study cell biochemistry

Biochemistry of Intracellular and Extra cellular Communication
Structure, assembly and function of cell membrane
Biochemistry of cell membrane, chemical composition
Importance of Lipid and proteins in membranes, chemistry of signals and receptors
Biochemistry of membrane transport mechanisms

Biochemistry of Body Fluids
Introduction of water & weak acids, Bases
Concept of pH and pH scale.
Dissociation constant & titration curve of week acids, the concept of pK values.
Henderson-Hesselbalch Equation
Buffers, their mechanism of action
Regulation of pH of body fluids; the concepts of metabolic acidosis/ alkalosis and respiratory acidosis / alkalosis
Routes of transport across cell membrane including simple & facilitated diffusion, osmosis; osmotic pressure, surface tension, viscosity & their importance related to regulation of body fluids.

Amino Acids
Amino acids, classification, properties, functions & significance
Acid/ base properties of amino acids.
Separation techniques

Peptides
Introduction and biomedical significance
Peptide structure and separation techniques
Synthesis of peptides by automated techniques

Proteins

Structure and classification of proteins
Globular and fibrous proteins
Plasma proteins & their clinical significance
Heme proteins: myoglobin and hemoglobin
Structure, function and types of hemoglobin
Oxygen binding capacity of hemoglobin, and its regulation
Degradation of heme, formation of bile pigments, its types transport and excretion
Hemoglobinopathies (Hb-S, Thalassemia etc) and their biochemical basis

Enzymes
Introduction, nomenclature, properties of enzymes
Enzyme kinetics; mechanism of action; factors affecting enzymes activity, Michaelis-Menten Equation
Lineweaverburk equation and their application in enzyme kinetics
Enzyme inhibitors and their classification and biomedical importance
Application of enzyme in clinical diagnosis and therapeutic use.

Carbohydrates
Definition, classification, biochemical function and significance
Structure and functions of monosaccharides, disaccharides and polysaccharides, their important examples and biochemical role.

Lipids
Classification of lipids; classification, functions, biochemical significance
Phospholipids, glycolipids, sphingolipids and their biochemical significance.
Fatty acids, chemistry, classification and biochemical function
Eicosanoids, their classification and functions in health and disease
Cholesterol: chemistry, functions and clinical significance

Bioenergetics and Metabolism of Carbohydrates and Lipids
Introduction to bioenergetics, biologic oxidation
Oxidative phosphorylation and mitochondrial transport systems
The citric acid cycle: the catabolism of acetyl-CoA
Glycolysis and the oxidation of pyruvate
Metabolism of glycogen
Gluconeogenesis and the pentose phosphate pathway
Regulation of carbohydrate metabolism
Oxidation and biosynthesis of fatty acids
Metabolism of unsaturated fatty acids and eicosanoids
Metabolism of acylglycerols and sphingolipids
Lipids transport and storage
Cholesterol synthesis, transport and excretion
Regulation of lipid metabolism

Metabolism of Proteins and Amino Acids
Biosynthesis of amino acids
Catabolism of amino acids- the urea cycle
Porphyrins & bile pigments

Vitamins
Introduction, classification
Chemistry, Biochemical functions, daily allowances and source of water soluble and fat-soluble vitamins.
Hypovitaminosis and hypervitaminosis

Mineral & Trace Elements:
Classification, biochemical role and regulation of macro minerals (Na, K Ca, Cl, PO4) and micro minerals (Fe, Zn, Mg, Se,I,Cu, Cr, Cd, Mn)

Nucleotide and Nucleic Acid
Chemistry and structure of nucleotides and their biochemical role
Synthetic and degradation of purines and pyrimidines
DNA structure and synthesis
RNA structure and synthesis
Recombinant DNA technology
Protein synthesis and genetic code
Regulation of gene expression and molecular basis of genetic disease -

Biochemistry of Digestive Tract
Basic concepts of digestion and absorption
Composition, functions, daily secretion, stimulants and depressants of:
Saliva
Gastric juice & HCL
Pancreatic juice
Intestinal juice
Bile Juice
Digestion and absorption of carbohydrates, proteins, and lipids.
Biochemical disorders of GIT, e.g. achlorhydria, peptic ulcer, lactose intolerance, cholelithiasis and related disorders.

Integration of Metabolism
Metabolic effects of Insulin and glucagon
Glucose homeostasis
Basic concepts of metabolism in fed-state, starvation and diabetes mellitus
An overview of nutrition, nutrient and energy requirements

Laboratory Assignments
Introduction to use laboratory facilities / equipments
Basic techniques and fundamental information's
Preparations of solution-Normal solution and Normal saline
Experiments on carbohydrates qualitative analysis
Experiments on proteins – qualitative analysis
Experiments on fats - qualitative analysis
Chemical analysis of Urine-Normal and abnormal specimens.

Recommended Books
Lippincots illustrated Reviews, Biochemistry
Basic and applied dental Biochemistry by Williams & Elliott
Harper's Biochemistry
Text Book of Biochemistry by West & Todd.
Berg, Tymoczko & Stryer, 5th edition (2002). *Biochemistry*
W H Freeman.Dow, Lindsay & Morrison (1995) *Biochemistry*
Mosby.Cole and Eastoe. 2nd Edition (1988). *Biochemistry and Oral Biology*.

ORAL BIOLOGY

Oral Anatomy

The actions, attachments of the muscles of the mouth and related regions
Facial & jaw bones
Salivary glands
Temporomandibular joint
The nerve supply, blood supply and lymphatic drainage of the orofacial region
Eruption and resorption of teeth
Articulation of teeth and movement during mastication.
Age changes of the teeth and jaws, and their integument

Oral Embryology

Development of human embryo with special emphasis on the pharyngeal apparatus, & role neural crest cells
Development of skull, jaws, face, tongue, palate, & teeth. amelogenesis, dentinogenesis, etc.
Development of deciduous and permanent dentition
Development of occlusion
Common anomalies associated with development of the afore-mentioned

Oral Histology

The microscope and its accessories
Principles governing their use and methods of working with them
Histology, composition and functions of various dental tissues including;

- Enamel
- Dentin-pulp complex
- Cementum
- Periodontal ligament
- Alveolar process

Histology, and functions of oral mucosae, gingivae and the dento-gingival junction,
Microscopic structure of salivary glands
Microscopic structure of temporomandibular joint

Oral Physiology

Composition, functions, control and clinical relevance of saliva.
The phenomenon of taste, smell, mastication, swallowing, pain, proprioception & speech.
Physiology of bone growth & metabolism with special reference to jaw bones. Effects of hormones, diet etc & various disease processes of jaw bones

Tooth Morphology

Study of naked eye anatomy of the primary and permanent teeth
Timings and sequence of eruption & shedding of teeth
Study of the forms and dimensions of the teeth, their drawings and modeling.

Laboratory Assignment

Histological methods: The preparation of (i) hard tissues (ii) soft tissues (iii) combined hard and soft tissues. Decalcification, fixing and hardening, microtomes and methods of cutting sections; staining elective, general and special. Clearing and mounting sections, preserving, Microscopic examination of (i) normal human oral and dental tissues (ii) pathological human oral & dental tissues.

Recommended Books

Oral Histology Development, Structure & Function	Richard Ten Cate
Orban's Oral Histology & Embryology	
Essentials of Oral Histology And Embryology	Avery
Orofacial Embryology	Kamran Ali
An Atlas of Oral Anatomy	Berkovitz
Tooth Morphology	Fuller
Wheeler's Atlas of Tooth Form	
Essentials of Oral Physiology	Robert M Bradley
Oral Physiology	Levalle

PAKSITAN STUDIES AND ISLAMIYAT

As proposed by the Government of Punjab & University of Health Sciences

ISLAMIYAT

As proposed by the Government of Punjab & University of Health Sciences

BEHAVIORAL SCIENCES

Patient behavior and its managements in dentistry.
Response of anxious patient towards dental treatment. Effects of stress.
Attitudes to dental treatment.
Physiologic response to stress
Role of personality, psychiatric disorders and psychological problems in relation to dental problems.
Role of dentist in patient reassurance and allaying anxiety and fear
The subjects concerned are principally psychology and sociology besides a few other related topics.

BIO STATISTICS

Introduction of bio-statistics, probability and samples, tests of statistical significance, description of terms mean, modes, average, standard deviation, percentage, percentile, Chi-square and distribution free tests, definition of variable, types of variable and analyzing the association between variable, comparison of several groups and introduction of SPSS.

INFORMATION TECHNOLOGY IN HEALTH SCIENCES

Introduction and history of computers, types of computer generations
Introduction to different hardware and their usage
Introduction to software, handling and management of windows
Usage of Microsoft Word & Excel for documentation
Usage of Microsoft Power Point for slide preparations
Handling of software for dental record keeping, handling of internet and usage of E-mail and net links and literature search from the internet.

INTRODUCTION TO DENTISTRY

History of dentistry, role of basic sciences in dentistry, specialties of dentistry or branches of dentistry, Clinical and laboratory work in different sub-specialties, Importance of dentistry in modern era.