C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES
C. U. SHAH INSTITUTE OF LIFE SCIENCES
DEPARTMENT OF ALLIED HEALTH SCIENCES

COURSE: PGDMLT
SEMESTER: I
SUBJECT NAME: HUMAN ANATOMY& PHYSIOLOGY- THEORY
SUBJECT CODE: 3SC01HAP1

Teaching & Evaluation Scheme: -

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
					Sessional Exam		University Exam		Internal		University	Total Marks
Th	Tu	Pr	Total									
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	-	-	4	4	30	1.5	70	3	-	-	-	100

Objectives: -The objective of this course is that the students can learn about basics of human anatomy & physiology.

Prerequisites: -Basic knowledge of Biological Sciences.

Course outline: -

Sr. No.	Course Contents
	ANATOMY
1	**Introduction to the subject -** Anatomical position, common planes & Anatomical terms. Different branchesof Anatomy. **Histology–** Typicalanimalcell(Structure&Function) ,Primarytissues(Classification&function) **SkeletalSystem-**Axialandappendicularbones-Joints&movements **Skin,Fascia andMuscles&Tendons** **CirculatorySystem–** Heart,BloodVessels,Lymphatic&R.E. System-Spleen,Thymus& Tonsils

2	**Respiratory System-** Nose,Pharynx,Larynx,Trachea,BronchiLungs and Pleura **Digestive System-** Alimentary canal(different parts)-Liver, Gallbladder, Pancreases, Peritoneum **UrogenitalSystem-** DifferentpartsofurinarysystemDifferentpartsofMale&Female genital-System(Internal&ExternalGenitalia) **Central&Peripheralnervoussystem-** Brain&SpinalCord-Cranial&SpinalNervous.- AutonomicNervous System.
3	**SpecialSenses &GeneralSensibilities-** Eye&Vision-Ears,Hearing&Equilibrium,-Taste &Olfactory sensations, GeneralSensibilitiesliketouch,pain,temperature. **RegionalAnatomy(OnlyDemonstration)–** Extremities,Head&Neck,Thorax, Abd& Pelvis. **SurfaceAnatomy-** ImportantBloodVessels,ImportantNerve,ImportantMuscles forInjection.
	PHYSIOLOGY
4	**Blood-** Composition-functions, Blood volume, Haemopoiesis, Hemostasis, Plasma proteins and ESR, Blood Groups, Immunity, Anaemias.
5	**Digestive system -** Secretions and movements, liver and liver function tests. **Muscle and Nerve Physiology-** Bioelectrical potentials, Muscle-types and functions, Nerves-Types and functions, synapse. **Respiratory system -** Tracheobronchial tree, Mechanics of respiration, Transport of respiratory gases, Lung volumes and capacities.Hypoxia, cyanosis, Dysbarism, Artificial respiration.
6	**Cardiovascular system -** Heart rate, Electrocardiogram, Cardiac cycle, Phonocardiogram, Blood pressure, Coronary circulation. **Excretory system -** Glomerular filtration rate, Function of tubules, Renal function tests, Body temperature. **Central Nervous system -** Sensory Physiology, Motor functions, Autonomic Nervous system, Memory, Speech, Learning.
7	**Special Senses -** Eye, Ear, Taste and smell **Endocrinology -** All endocrine glands, their secretions and functions with applied aspects. **Reproductive system-** Chromosomal sex, Genetic sex, Puberty, Male reproductive system, Female reproductive system, Family planning.

Learning Outcomes: -The students are expected to gain the knowledge about human anatomy and physiology.

Books Recommended: -

- Essentials of Physiology for Dental Students by Sembulingum
- Handbook of Christen Medical Association, India (CMAI) Medical LaboratoryTechnology- Robert H. Carman. 2nd Edn. CMAI, New Delhi.
- Text book of Medical Laboratory Technology, P.B. Godkar 2nd Edn. 2003 Bhalani
- Publication.
- Human Physiology (Vol. I, IV) C.C. Chatterjee 1992. 11th Edn. Medical AlliedAgencies, Calcutta.
- Human Anatomy (3- Vol) B.D. Chaurasia. 1995 .3rd Edn. CBS. New Delhi.
- Cunningham's Manual of Practical Anatomy (3- Vol) Cunningham 1986 15th ELBSOxford University.
- Laboratory Setup & Procedures , G. Guru, 1st Edn. 1989 NCERT, New Delhi
- Biosafety Manual for laboratories, WHO, Geneva, 2nd Edn. 1993 . WHO Publication,Geneva.

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COURSE: PGDMLT
SEMESTER: I
SUBJECT NAME: HUMAN ANATOMY& PHYSIOLOGY-PRACTICAL
SUBJECT CODE: 3SC01HPP1

Teaching & Evaluation Scheme: -

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
					Sessional Exam		University Exam		Internal		University	Total Marks
Th	Tu	Pr	Total									
					Marks	Hrs	Marks	Hrs	Pr	TW		
-	-	8	8	4	-	-	-	-	30	-	70	100

Objectives: -The objective of this course is that the students can learn about basics of human anatomy & physiology.

Prerequisites: -Basic knowledge of Biological Sciences.

Sr. No.	LIST OF PRACTICALS
	ANATOMY PRACTICALS
1	Intro To Anatomy
2	General Histology
3	Bones
4	Muscle, Skin
5	Joints
6	Upper Limb
7	Lower Limb
8	Circulatory System
9	Respiratory System
10	Urogenital System & Head & Neck
	PHYSIOLOGY PRACTICALS
1	Blood Smear Preparation And Identification Of Cells
2	Differential W.B.C. Count
3	Total W.B.C. Count
4	Estimation of Hemoglobin
5	Total R.B.C. Count
6	Blood Group
7	B.T.- C.T.

8	E.C.G.
9	Arterial Pulse And Blood Pressure Measurement
10	Artificial Respiration

Learning Outcomes: -The students are expected to gain the knowledge about human anatomy and physiology.

Books Recommended: -

- General Anatomy by B.D.Chaurasia
- Practical of Physiology by Dr. A.K.Jain
- Essentials of Physiology for Dental Students by Sembulingum
- Handbook of Christen Medical Association, India (CMAI) Medical LaboratoryTechnology- Robert H. Carman. 2nd Edn. CMAI, New Delhi.
- Text book of Medical Laboratory Technology, P.B. Godkar 2nd Edn. 2003 Bhalani
- Publication.
- Human Physiology (Vol. I, IV) C.C. Chatterjee 1992. 11th Edn. Medical AlliedAgencies, Calcutta.
- Human Anatomy (3- Vol) B.D. Chaurasia. 1995 .3rd Edn. CBS. New Delhi.
- Cunningham's Manual of Practical Anatomy (3- Vol) Cunningham 1986 15th ELBSOxford University.
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DEPARTMENT OF ALLIED HEALTH SCIENCES

COURSE: PGDMLT
SEMESTER: I
SUBJECT NAME: CLINICAL BIOCHEMISTRY-THEORY
SUBJECT CODE: 3SC01CLB1

Teaching & Evaluation Scheme: -

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
					Sessional Exam		University Exam		Internal		University	Total Marks
Th	Tu	Pr	Total									
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	-	-	4	4	30	1.5	70	3	-	-	-	100

Objectives: -The objective of this course is that the students can learn about basics of Clinical Biochemistry.

Prerequisites: -Basic knowledge of Biological Sciences.

Course outline: -

Sr. No.	Course Contents
1	**Cell Biology & Biological membranes** Cell composition, sub-cellular organelles & their functions. Plasma membranes-composition, structural organization and Transport systems& their mechanisms
2	**Diet & Nutrition** Proximate principles of food and their physiological functions, caloric requirement, qualitative and quantitative requirement, balanced diet, biological values of proteins(BVP), Specific dynamic action (SDA), BMR, PEM
3	**Vitamins & Minerals** Definition, classification of vitamins. Dietary sources, RDA, biochemical functions, efficiency manifestations, hypervitaminosis. Principal elements & trace elements.
4	**Enzymes** General characteristics of enzyme, nomenclature, classification and structure of enzymes. Factors affecting enzyme activity, Enzyme inhibitions, mechanisms of action, Regulatory mechanisms. Diagnostic & therapeutic significance of enzymes.
5	**Biological oxidation** Definition, energy metabolism, Enzyme systems involved in biological oxidation, electron transport chain and oxidative phosphorylation.
6	**Chemistry & Metabolism of carbohydrates** Definition, classification of carbohydrates. Structure & Biological importance. Digestion and absorption of dietary carbohydrates. Major metabolic pathways: glycolysis, TCA-Cycle, Glycogenesis, Glycogenolysis. Gluconeogenesis, HMP-Shunt, Uronic acid pathways and associated inborn errors. Homeostasis of glucose. Diabetes mellitus

7	**Chemistry & metabolism of Lipids** Definition, classification of lipids. Properties, Structure & Biological importance of saturated & unsaturated fatty acids, triacylglycerol, phospholipids, lipoproteins & derived lipids. digestion and absorption of dietary lipids in GIT. An overview of steps & physiological significance, Regulation of fatty acid synthesis, Oxidation of fatty acids, Ketogenesis, Ketolysis, Cholesterol metabolism &.Lipoproteins metabolism.
8	**Chemistry & metabolism of proteins** Definition, classification, Structure & functions of proteins, plasma proteins, Immunoglobulin. Structure, types & functions of Hb, Hemoglobinopathies: Thalassemia, sickle cell anaemia. digestion and absorption of dietary proteins in GIT, Basic concept of disposal of nitrogen-transamination, deamination, urea cycle. Metabolism of amino acids & Associated inborn errors of metabolism & Formation and biological significance of specialized products.
9	**Acid base balance /imbalance** Blood buffers.Disturbances in acid base balance/imbalance-Types,Causes& Compensatory Mechanisms
10	**Hormones** Endocrine glands, structure, functions & mechanisms of hormone actions, Endocrine disorders.
11	**Biochemical Techniques** Principle, components,types & applications of the technique. centrifugation, colorimetery, electrophoresis, Chromatography, ELISA & RIA, Radioisotopes
12	**Metabolism of Heme&Porphyrines** Heme synthesis & degradation, regulation. Porphyrias- Jaundice, causes, types, major sign and symptoms
13	**Chemistry & metabolism of Nucleotides & Nucleic acid** Structure & functions of nucleotides, biological important free nucleotides, synthetic analogues of nucleotides. DNA: Structure, Types, Functions, organization of DNA in chromosome. DNA Denaturation RNA: Structure, Types, Functions. Biosynthesis, degradation of purines, Gout & hyperuricemia. Biosynthesis, degradation of Pyrimidine. inborn errors of metabolism
14	**Molecular Biology & Recombinant DNA technology** DNA- Replication, Mutations Transcription, Genetic code, Translation, Regulation of gene expression. Recombinant DNA technology & its applications in medicine
15	**Organ function tests** Liver, pancreatic, Renal, gastric, Thyroid, adrenal function tests.
16	**Manual vs Automation in Clinical Laboratory** Types of analyzers- Semi-auto analyzer- Batch analyzer - Random Access auto-analyzers. Steps in the automated systems - Responsibilities ofatechnician in the maintenance of the analyzers.
17	**PreparationofReagents &Quality Control** Solution Preparation-Molarity - Normality - Dilutions- Preparation ofStockSolutions– PercentSolutions- PH– Buffers-Definition of Quality control- need for quality control in the laboratory- Internal quality control (QC) programme- External QCprogramme

Learning Outcomes: -

At the end of course, the students are expected to:

- Know the basic biochemical processes taking place in the body
- Know abnormal and pathological conditions, which are related to biochemical defects
- Perform accurate and precise quantitative measurements
- Use and understand principles of current instruments.
- Interpret experimental results and reasonable conclusions.

Books Recommended: -

- Textbook of Medical Laboratory Technology by Dr. Praful B. Godkar.
- Biochemistry for Physiotherapy & Allied Health Science Students by B. V. Shetty
- Biochemistry Made Easy (A problem based approach) by N Haridas
- Essentials of Biochemistry by PankajaNaik
- Textbook of Biochemistry by D M Vasudevan
- Biochemistry (with clinical concepts & case studies) by U. Satyanarayan

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DEPARTMENT OF ALLIED HEALTH SCIENCES

COURSE: PGDMLT
SEMESTER: I
SUBJECT NAME: CLINICAL BIOCHEMISTRY-PRACTICAL
SUBJECT CODE: 3SC01CBP1

Teaching & Evaluation Scheme: -

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
					Sessional Exam		University Exam		Internal		University	Total Marks
Th	Tu	Pr	Total									
					Marks	Hrs	Marks	Hrs	Pr	TW		
-	-	8	8	4	-	-	-	-	30	-	70	100

Objectives: -The objective of this course is that the students can learn about basics of Clinical Biochemistry.

Prerequisites: -Basic knowledge of Biological Sciences.

Sr. No.	LIST OF PRACTICALS
1	**Qualitative Tests:** Carbohydrates, Lipids, Proteins & Vitamins
2	**Diabetic Profile** Estimation of Blood Glucose, Gtt, Glycated Hemoglobin
3	**Cardiac / Lipid Profile** Estimation of Serum Cholesterol (Total),Serum Triglycerides, HDL& LDL Cholesterol.
4	**Renal Functiontest (RFT)** Estimation of Blood Urea, Serum Creatinine,Serum Uric Acid, &Total Protein
5	**Liver Function Test (LFT)** Estimation of Serum Bilirubin,Serum Alkalinephosphatase, Aminotransferases, Transaminases (ALT/AST),Serum Albumin andglobulin.
6	**Electrolytes Analysis** Estimation of Serum Phosphorus,Sodium, Potassium And Calcium.
7	**Analysis of Urine:** Normal & Pathological Urine
8	**Semen Analysis-** Estimation of Fructose
9	**Hormones Estimations:** T3, T4, TSH, Insulin, LH, FSH, ICSH, Progesterone, LH, GH Etc.
10	**Special Investigations:** Estimation of Vitamin D_3, B_{12}, Etc.

Learning Outcomes: -

A t the end of course, the students are expected to:

- Biomolecules like carbohydrates, lipids, proteins, vitamins etc.
- Qualitative analysis of various body fluids such as CSF, Normal & Abnormal urine.
- Quantitative estimations of glucose, urea, creatinine, proteins, cholesterol, uric acid etc. & can Interpret experimental results and reasonable conclusions.

Books Recommended: -

1. Clinical Biochemistry (principle & Practice) by Praful B. Godkar
2. Practical Biochemistry by GeetaDamodaran.
3. Manual of Practical Biochemistry for Medical Students by M. D. Rafi
4. Comprehensive viva & practical Biochemisty by Dr A. C. Deb
5. Medical Laboratory Technology: Methods & Interpretations by RamnikSood

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COURSE: PGDMLT
SEMESTER: I
SUBJECT NAME: CLINICAL PATHOLOGY-THEORY
SUBJECT CODE: 3SC01CLP1

Teaching & Evaluation Scheme: -

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
					Sessional Exam		University Exam		Internal		University	Total Marks
Th	Tu	Pr	Total									
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	-	-	4	4	30	1.5	70	3	-	-	-	100

Objectives: - The objective of this course is that the students can learn about basics of Clinical pathology.

Prerequisites: - Basic knowledge of Biological Sciences.

Course outline: -

Sr. No.	Course Contents
1	**Introduction** Formation ofurine,Collection of Urine- Special type ofcollection ofurine- Biohazard management- Urine analysis, Physical, chemical, microscopic Components of routine urine analysis- Colour - Clarity-Odour- Volume– Chemical
2	**Examination** Introduction and Physical examination of Urine. Chemical examination of Urine. Microscopic Examination of Urine.
3	**CSF** Introduction and Physical examination of CSF. Chemical examination of CSF. Microscopic Examination of CSF.
4	**SPUTUM** Introduction and Physical examination of Sputum. Chemical examination of Sputum. Microscopic Examination of Sputum.
5	**SEMEN** Introduction and Physical examination of Semen. Microscopic Examination of Semen.

6	**BODY FLUID** Introduction and Physical examination of body fluid. Chemical examination of body fluid. Microscopic Examination of body fluid.
7	**STOOL** Introduction and Physical examination of stool. Chemical examination of stool. Microscopic Examination of stool.

Learning Outcomes: - The students are expected to learn about clinical pathology including Urine, CSF, and Sputum.

Books Recommended: -

- Textbook of medical laboratory technology
- Clinical pathology practical manual Practical.
- Text Book of Medical Laboratory Technology, P.B. Godkar,2nd Edn.2003.Bhalani Publication.
- Handbook of Christen Medical Association, India (CMAI) Medical LaboratoryTechnology- Robert H. Carman. 2nd Edn. CMAI, New Delhi.
- Practical Haematology, John Dacie & S. M. Lewis 8th Edn.1995 ChurchilLivingston.
- Clinical Haematology, Maxwell M.Wintrobe, 8th Edn.1981 Lea & Febiger – Philadephia.
- Blood Bank Operations, G. Guru 1st Edn.1991, NCERT, New Delhi.
- Blood Banking Training Manual, Indian Society for Blood Banking, 1stEdn.1995,Dr. Dilip Wani, Janakalyan Bldg. , Pune.
- Text Book of Medical Laboratory Technology, P.B. Godkar,2nd Edn.2003.Bhalani Publication.
- Medical Laboratory Techniques, Vol - I, II & III, K. Mukharji 5th Edn. 1988 TataMcGrawHill , Delhi.

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COURSE: PGDMLT
SEMESTER: I
SUBJECT NAME: CLINICAL PATHOLOGY-PRACTICAL
SUBJECT CODE: 3SC01CPP1

Teaching & Evaluation Scheme: -

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
					Sessional Exam		University Exam		Internal		University	Total Marks
Th	Tu	Pr	Total									
					Marks	Hrs	Marks	Hrs	Pr	TW		
-	-	8	8	4	-	-	-	-	30	-	70	100

Objectives: - The objective of this course is that the students can learn about basics of clinical pathology.

Prerequisites: - Basic knowledge of Biological Sciences.

Sr. No.	LIST OF PRACTICALS
1.	**Urine Analysis:** Physical Examination-I
2.	**Urine Analysis:** Chemical Examination-I Urine Sugar, Protein
3.	**Urine Analysis:** Chemical Examination-Ii Urine Ketone Bodies, Bs/Bp
4.	**Urine Analysis:** Microscopy Examination-I Formed Element
5.	**Urine Analysis:** Microscopy Examination-I Unformed Element
6.	**Urine Analysis:** Special Urine Examination
7.	**Stool Examination**
8.	**CFS Examination I:** Introduction, Physical And Chemical Examination
9.	**CFS Examination II:** Microscopy and Others
10.	**Body Fluid Examination I:** Pleural, Peritoneal And Synovial-Physical
11.	**Body Fluid Examination Ii:** Chemical And Microscopic Examination

12.	**Sputum Examination**
13.	**Semen Examination I:** Physical And Chemical
14.	**Semen Examination Ii:** Microscopy And Semen Wash

Learning Outcomes: - The students are expected to learn about how to perform examination on urine and other body fluid

Books Recommended: -

- Textbook of medical laboratory technology
- Clinical pathology practical manual
- Text Book of Medical Laboratory Technology, P.B. Godkar,2nd Edn.2003.Bhalani Publication.
- Handbook of Christen Medical Association, India (CMAI) Medical LaboratoryTechnology- Robert H. Carman. 2nd Edn. CMAI, New Delhi.
- Practical Haematology, John Dacie & S. M. Lewis 8th Edn.1995 ChurchilLivingston.
- Clinical Haematology, Maxwell M.Wintrobe, 8th Edn.1981 Lea & Febiger – Philadephia.
- Blood Bank Operations, G. Guru 1st Edn.1991, NCERT, New Delhi.
- Blood Banking Training Manual, Indian Society for Blood Banking, 1stEdn.1995,Dr. Dilip Wani, Janakalyan Bldg. , Pune.
- Text Book of Medical Laboratory Technology, P.B. Godkar,2nd Edn.2003.Bhalani Publication.
- Medical Laboratory Techniques, Vol - I, II & III, K. Mukharji 5th Edn. 1988 TataMcGrawHill , Delhi.