CURRICULUM

DIPLOMA IN CLINICAL PATHOLOGY (DCP)
DEPARTMENT OF PATHOLOGY

Peoples University of Medical & Health Sciences,
Nawabshah, Sindh.

Patho dept. No. 413-15
Dated:. 12-10-2015

DEPARTMENT OF PATHOLOGY

PEOPLES UNIVERSITY OF MEDICAL & HEALTH SCIENCES FOR WOMEN, SHAHEED BENAZIRABAD

Syllabus/Curriculum

For

DIPLOMA IN CLINICAL PATHOLOGY (DCP)

PUMHS Nawabshah

Updated on 17/09/2015

TEACHING STAFF

Prof. Dr. Rabia Shams: Chairperson

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9	DR. SADIA BUKHARI	LECTURER	MBBS	39817-S
10	DR. SIKANDAR ALI SIYAL	LECTURER	MBBS	18702-S
11	DR. SHABANA	LECTURER	MBBS	29452-S
12	DR. NOOR MUSTAFA ANSARI	LECTURER	MBBS	48593-S
13	DR. LARAIB MEMON	LECTURER	MBBS	
14	DR. MISBAH ZAHOOR	LECTURER	MBBS	
15	DR. WASEEM AKRAM	LECTURER	MBBS	

COURSE OUTLINES

- **The duration of course: Two years.**

QUALIFICATION FOR ADMISSION AND COURSE OF STUDY:

- Basic Qualification: MBBS.
- Each candidate shall get admission in the course on merit basis after passing Entry test comprising of written and oral examination as per University rules and regulations.

Test will be of subjects of General and special pathology, Haematology, Chemical pathology & Microbiology.

METHODS OF INSTRUCTION/COURSE CONDUCTION

1) Lectures
2) Seminar Presentation and Journal Club Presentations
3) Group Discussions
4) Grand Rounds
5) Clinico -pathological conferences
6) SEQ as assignments on the content areas
7) Assigning routine lab work
8) Slide sessions on multiheaded microscope (Haematology, Histopathology and microbiology)
9) Self study and use of internet

Eligibility to appear in the Examination:

- The candidates who have attended the course for the duration of 2 years with regularity and punctuality shall be issued a certificate from the Department of Pathology, considered as eligible to appear in the examination.

EXAMINATION:

- Each examination shall be held as per University rules after completion of course. Examination will consist of Theory, Practical & Viva Voce. Paper-I will include Best Choice Questions and Paper-II will be of Short Essay type questions.

Theory Examination:

Paper -I

- Single best : 75 BCQ,
- Duration : 3 hours.
- Marks : 150

TABLES OF SPECIFICATIONS FOR PAPER-I **BCQ: 75 Questions**

S. NO	Subject	BCQ
01	General Pathology	05
02	General Microbiology	03
03	Parasitology	03
04	Special Pathology	13
05	Special Microbiology	15
06	Chemical Pathology	18
07	Hematology	18

Paper – II:

- Short Essay : 10 Questions
- Duration : 3 hours
- Marks : 100.

TABLES OF SPECIFICATIONS FOR PAPER-II **Short Essay Questions (SEQ) 10**

S. NO	Subject	SEQ
01	General Pathology	01
02	General Microbiology	01
03	Parasitology	01
04	Special Pathology	02

05	Special Microbiology	01
06	Chemical Pathology	02
07	Hematology	02

Criteria of Passing:

- **Passing marks in each paper will be 60%**

Practical and viva voce examination:

Conducted by external & internal examiners.

Maximum marks= 200
Passing Marks = 120 (60%)

NOTES:
If the candidate fail in the Practical and Viva voce examination, shall be declared as failure in the examination and will reappear in theory and Practical examinations.

AWARD OF DEGREE:

A certificate to be called "Diploma of Clinical Pathology" under the seal of Peoples University of Medical & Health Sciences for women Nawabshah will be awarded to each successful candidate.

TUTION FEES AND STIPEND:

- As per University rules.

APPLICTIONS:

- Applications may be sent on prescribed form, As per University rules.

COURSE OUTLINE OF DIPLOMA IN CLINICAL PATHOLOGY

PART-I

General Pathology

1. **Cellular responses to stress & Toxic insults: Adaptation, Injury and Death**
   - Overview: Cellular Responses to stress and noxious stimuli
   - Adaptation of cellular growth and differentiation
   - Overview of cell injury and cell death
   - Causes of cell injury
   - Morphologic alterations in cell injury
   - Mechanisms of cell injury
   - Apoptosis
   - Autophagy
   - Intracellular Accumulations
2. **Acute and chronic inflammation**
   - Acute inflammation
   - Mediators of Inflammation
   - Outcomes of Acute inflammation
   - Morphologic Patterns of Acute Inflammation
   - Summary of Acute inflammation
   - Chronic inflammation
   - Systemic effects of inflammation
   - Consequences of Defective or excessive inflammation
3. **Tissue Renewal, Regeneration & Repair**
   - Control of Normal cell proliferation and tissue growth
   - Cell cycle and the regulation of cell replication
   - Mechanisms of tissue and organ regeneration
   - Extracellular matrix and cell-matrix interactions
   - Healing by repair, scar formation and fibrosis
4. **Hemodynamic disorders, Thromboembolic disease and shock**
   - Edema
   - Hyperemia and congestion
   - Hemorrhage
   - Hemostasis and thrombosis
   - Embolism
   - Infarction
   - Shock
5. **Neoplasia**
   - Dysplasia and Neoplasia
   - Differences between benign and malignant neoplasms
   - Enlist the common etiological factors for neoplasia

- Define and discuss the different modes of metastasis
- TNM staging system and tumor grade
- Carcinogens
- Carcinogenesis
- Tumour markers
- Tumour immunity
- Laboratory diagnosis of tumour

6. Immunity and Hypersensitivity

- Cell of immunity
- Innate & acquired immunity
- Humoral and cell mediated immunity
- Types of Hypersensitivity with examples.
- Immune deficiency disorders
- Auto immune disorders
- Graffe rejection
- Amyloidosis

General Microbiology

- General Microbiology
  Introduction to microbiology
- Role of microbes in various human diseases
- Sources of infection
- Classification of microorganisms.
- Morphology and identification of bacteria.
- Bacterial metabolism and growth.
- Sterilization and disinfection. Definition, use of physical and chemical disinfectants and their practical utility in clinical practice.
- Infection and immunity pathogenicity, pathology of infection, resistance and natural immunity, antigens and antibodies.
- Common bacterial and viral diseases of man.
- Yeast and fungi, classification, identification.
- Nosocomial infections
- Important viruses.
- Handling of clinical samples in laboratory including sputum, urine, stool, cerebrospinal fluid(CSF), pus, aspirates

Parasitology

- General parasitology: definitions; classification, source of infection, pathogenecity
- Protozology

- Entamoeba histolytica; life cycle; amoebic dysentery, complications and diagnosis
- Flaggelates:
- Intestinal oral and genital flaggelates; giardia; trichomonas;
- Blood and tissue flagellates;
- Leshmania; trypanosoma
- Sporozoa: malarial parasite; its life cycle, lab diagnosis; complications
- Helminthology:introduction;
- Cestodes' classification; echinococcus granulosis; life cycle, diagnosis
- Trematodes
- Nematodes
- Parasitic opportunistic infections in aids and nosocomial parasitic infections
- Diagnostic procedures in parasitology

Basic Biochemistry

Cell Biochemistry

- Biochemical composition and functions of the cell
- Cell membranes and their chemical composition
- Importance of lipids and proteins in cell membranes
- Chemistry of signals and receptors
- Membrane transport including active transport, passive transport, simple and facilitated diffusion
- Methods to study cell biochemistry

Acid-base, fluid and electrolyte control

- Homeostasis in human body.
- Interpretation from the body chemistry and variation of fluid pH and electrolytes
- Composition from normal.
- Relation of pH and electrolytes to possible metabolic or respiratory imbalance.
- Relation between body fluid solutes and osmolar regulation

Enzymes

- Classification/ Nomenclature
- Enzymes and catalysts
- Function of enzymes and catalysts
- Co-enzymes and co -factors
- Regulation of enzyme activity.

Haemoglobin

- Porphyrins and metabolism of Haem
- Synthesis and structure of haemoglobin
- Types and function of haemoglobin

- O_2 binding capacity of haemoglobin and factors regulating it Breakdown of haemoglobin, formation of bile pigments their transport and excretion
- Biochemical causes of hyper-bilirubinaemia and differentiation between different types of jaundice

Water soluble and fat soluble vitamins.

- Sources, Chemistry.
- Required daily dietary allowance (RDA) in different physiologic conditions
- Deficiency symptoms.
- Role of vitamins as co-enzymes

Minerals

- Important minerals in human nutrition, sources, biochemical actions and Recommended daily allowance (RDA).

Carbohydrates, Proteins, Fats and Lipids

- Biomedical importance of carbohydrates , proteins, amino acids and lipids
- Digestion, absorption and transport
- Role in nutrition and homeostasis.
- Separation of proteins, salting out, electrophoreisis, chromatography and centrifugation

Nucleotide And Nucleic Acids

- Nucleotides and their biochemical role
- Structure, function and biochemical role of nucleotides
- Synthesis of purines and pyramidines and their clinical role

Structure, function and types of nucleic acids

Biochemical Techniques

- Principle, applications and interpretation of biochemical techniques being utilized in laboratory for;
    - ❖ Spectrophotometry
    - ❖ Flame Photometry
    - ❖ Electrophoreisis
    - ❖ Chromatography
    - ❖ Elisa etc.

PART-II

Systemic Pathology

Candidate is supposed to have a sound theoretical background of following selected topics in order to interpret the lab investigation results. Histopathological morphological details will not be required.

CARDIOVASCULAR SYSTEM

- Atherosclerosis and risk factors
- Left Ventricular hypertrophy
- Cardiac failure
- Ischemic heart disease and its lab diagnosis and complications
- Rheumatic fever, complications and lab diagnosis
- Bacterial endocarditis, etiology, type, pathogenesis, complications, lab diagnosis
- Cardiomyopathies
- Pericardial effusion, causes, pathogenesis and lab diagnosis.

RESPIRATORY SYSTEM

- Pulmonary oedema
- Atelactasis
- Adult respiratory distress syndrome
- Chronic Obstructive Pulmonary Diseases (COPD), classification, clinical features and pathogenesis.
- Infections, its various types
- Restrictive lung diseases
- Pneumonia- etiology, morphology, pathogenesis, lab diagnosis
- Lung abscess
- Fungal infections of lung and its lab diagnosis.
- Lung Tumors: classification. Lab diagnosis
- Pleural Effusion: causes, Lab diagnosis

Gastro-Intestinal Tract

- Gastro-esophageal reflux diseases
- Carcinoma oesophagus
- Peptic Ulcer disease: Etiology. Pathogenesis, clinical features and diagnosis
- Malabsorbtion Syndrome: Causes, Coeliac disease, Lab diagnosis Ulceroinflammatory conditions of Intestine
- Intestinal obstruction
- Diarrhoeal diseases
- Appendicitis: Clinical presentation. Morphology, Lab diagnosis
- Colonic polyps
- Carcinoma colon

HEPATOBILIARY SYSYTEM

- Hepatitis
- Cirrhosis of liver
- Tumors of liver
- Gall stones
- Cholecystitis
- Pancreatitis
- Tumours of gall bladder & pancreas

URINARY SYSTEM

- Glomerulonephritides
- Nephrotic and Nephritic syndrome
- Pyelonephritis
- Renal Stones
- Renal failure
- Acute tubular necrosis
- Tumours of kidney
- Inflammatory conditions of urinary bladders
- Tumours of urinary bladder

FEMALE GENITAL SYSTEM

- Inflammatory conditions of female genital tract
- Cervical intraepithelial neoplasia
- Cervical Cancer
- Pap smear and its importance
- Diseases of uterus
- Diseases of ovary
- Gestational trophoblastic diseases

MALE GENITAL SYSTEM

- Disease of Testis
- Disease of Prostate
- Infertility/ Sperm count

ENDOCRINE SYSTEM

- Hypopituitarism
- Hyperpitutiarism
- Tumours of pituitary gland
- Goiter
- Hyperthyroidism
- Hypothyroidism
- Autoimmune thyroiditis. in relation to thyroid function tests
- Tumours of thyroid gland
- Diabetes mellitus: Classification, complications and Diagnosis.

BONES & JOINTS

- Osteomyelitis
- Osteoporosis
- Osteomalacia & Rickets
- Rhematoid Arthritis
- Gout
- Osteoarthritis
- Tumours of bones

CENTRAL NERVOUS SYSTEM

- Meningitis: Etiology, CSF findings
- Tumours of central nervous system

Haematology

- Blood formation: General aspects of blood formation.
- Development of blood cells, control of haemopoiesis
- Red blood cells: Normal Red cells values
- Classification of anaemias
- Investigations of anaemic patient.
- Iron Deficiency anaemia
- Iron metabolism, causes, Investigations of iron deficiency anaemia; Iron studies
- Megaloblastic anaemia; macrocytic anaemia, Lab investigation, Vitamin B12 and Folic acid deficiency
- Normocytic and aplastic anaemias.
- Disorders of Haemoglobin structure and synthesis
- Thalassemias and sickle cell anaemias
- Lab investigation for sickle test disease
- Haemoglobin electrophoretic pattern
- Haemolytic anaemias; causes, classification, lab investigation.
- White Blood cells: Normal white cells development and physiology
- Agranulocytosis, neutropenia, infectious mononucleosis
- Types of Leukaemias and lymphomas-A brief introduction
- Haemorrhagic disorders
- Platelet disorders
- Thrombocytopenia
- Lab investigations including PT/APTT
- Haemophilia, and other coagulation disorders
- Blood Groups and transfusion. Reaction and its complications
- Blood banking-basic principles, practical aspects.

Special Microbiology

- Gram positive bacteria;
- Gram negative bacteria
- Spirochetes
- Anaerobic infections
- Diagnosis of infections by body systems
- Upper and lower respiratory tract infections

- Urinary tract infections
- Sexually transmitted Diseases
- Gastrointestinal tract infections
- Obstetric and perinatal infections
- Central nervous system infections
- Infections of the eye
- Vector borne infections
- Infections in the compromised host
- Diagnosis of infection and assessment of host defense mechanism.
- Antimicrobial agents and chemotherapy
- Vaccination
- Passive and non specific immunotherapy

Chemical Pathology

- Units in Chemical Pathology:
- Chemical Pathology of Kidneys
- Reduced GFR with normal tubular function
- Reduced tubular with normal glomerular function.
- Renal tubular defects
- Clinical syndromes of renal disease
- Acute and chronic renal failure
- Renal Function Tests and their interpretation
- Glomerular function tests
- Biochemical Principles of treatment of renal disease.
- Renal calculi
- Sodium & water metabolism
- Distribution of sodium & water in the body
- Plasma osmotic pressure , osmolarity & osmolality control
- Renin-angiotensin-aldosterone mechanism
- Disturbances of sodium &water metabolism
- Clinical significance of hypo &hyper natremia
- Biochemical basis of treatment of sodium & water disturbances
- Potassium metabolism & Diuretic therapy
- Factors effecting plasma potassium concentration
- Hypokalemia and hyperkalemia
- Relation of potassium and hydrogen ion and diuretics
- Diuretic therapy
- Treatment of potassium disturbances
- Investigations of renal water and electrolyte disorders
- Hydrogen ion homeostasis: Blood gas levels
- Disturbances of hydrogen ion homeostasis
- Investigation of hydrogen ion homeostasis
- Hypothalamus & Pituitary gland

- Hypo and Hyperpituatrism, Investigation protocol.
- Disorders of adrenal cortex and congenital adrenal hyperplasia
- Gonads, Prolactin
- Hypothalamic-pituitary-gonadal axis
- Hyperprolactinemia
- Investigation of pituitary, adrenal and gonadal disorders
- Hypo and hyperthyroidism
- Thyroid function tests
- Carbohydrate metabolism
- Diabetes Mellitus, its classification and criteria according to American Diabetes Association and WHO
- Metabolic complications
- Investigation protocol, Glucose Tolerance Test (GTT)
- Hypoglycemia, investigation protocol and management
- Lipids and Lipoproteins
- Physiology and disorders of lipid metabolism.
- Risk factor for coronary heart disease
- Principles of treatment, cholesterol lowering agents
- Investigation of suspected hyperlipidemia , proper sample collection
- Calcium, Phosphate & Magnesium metabolism:
- Normal control mechanism, interrelation of parathyroid hormone and Vit.D
- Clinical effects of hypercalcemia and hypocalcemia.
- Biochemical aspects of osteoporosis and osteomalacia.
- Hyper and hypoparathyroidism
- Investigation protocol for disorders of calcium metabolism and biochemical basis for treatment
- Malabsorbtion syndromes:
- Causes and investigations for gastric , pancreatic and intestinal function
- Jaundice, types ,causes, cholestasis
- Liver Function tests and their interpretation in acute and chronic liver diseases and Cirrhosis.
- Bile & Gall stones.
- Hepatotoxic drugs and their effect on LFT's
- Urine tests in jaundice.
- Plasma proteins: its classification
- Electrophoretic pattern in normal and various disorders of plasma protein
- Acute phase reactants
- Immunoglobulins - structure, types
- Primary and secondary disorders
- Proteinuria, causes.
- Testing proteins in blood and urine.
- Plasma Enzymes:
- Physiological and pathological causes of altered enzyme levels
- Transaminases, LDH, CPK, Amylase, ALP, acid phoaphatase
- Clinical significance and interpretation in realation to diseases.

- Urate metabolism:
- Normal metabolism
- Hyper and hypouracemia
- Gout, its lab investigations
- Iron metabolism:
- Causes of low and high iron values
- Investigation of disorders of Iron metabolism.
- Biochemical effects of tumors and tumor markers
- Catecholamine secreting tumors
- Pheochromocytoma and its investigation
- Carcinoid syndrome & its investigation, CSF, its biochemical testing, significance, procedure
- Appropriate sample collection for various tests in chemical pathology
- Advising the patient and clinicians and interpretation of results in view of clinical profile
- Basic principle, applied aspects and scope of Immunopathological techniques with respect to their importance in clinical pathology diagnoses.
- ELISA
- PCR
- Radioimmunoassay
- Western and southern blot

Practical Skill

Two hours a day should be assigned for learning and practicing laboratory procedures.

List of Lab Procedures to be learnt during these sessions is as follows:

- Stains, routine and special (Grams, ZN, Haematoxylin-Eosin, PAS, KOH preparation)
- Microscopic examination of fluids (urine, CSF, body fluid aspirates).
- Stool examination for parasites.
- Culture /sensitivity of clinical specimens on routine aerobic media and anaerobic cultures.
- TB culture on LJ media
- Fungal culture on Sabroud's media.
- Hepatitis screening with Device methods for HBV and HCV and for HIV.
- Serology for Rheumatoid factor, Pregnancy test, Widal test.
- Mono spot test; Mantoux test.
- CBC on automated hematology analyzers and manually, DLC, Blood smear reading for identifying atypical cells for referral to consultant haematologist.
- Manual conduction of PT/APTT and INR calculation.
- ESR determination by Westergrene method.
- Osmotic Fragility test

- Thick and thin blood films for Malarial parasite.
- Routine chemistry tests as Renal function tests, Liver function tests.
- Blood sugar estimation, Uric acid estimation.
- Cardiac enzymes, Lipid profile, Calcium, Phosphate, LDH on semi automated and fully automated analyzers.
- Electrolyte analysis on Flame photometer and ion-selective electrode (ISE).
- To observe Grossing techniques, tissue processing, paraffin block preparation, block cutting on rotary microtome and routine Haematoxylin-Eosin staining, exposure to cryostat operation and frozen section preparation.
- For acquisition of general skills as communication skills, presentation skills, Research methodologies and scientific writing skills, the student should avail during Group discussions and Seminars

RECOMMENDED BOOKS

TEXTBOOK

- Pathological basis of disease. Kumar Abbas Fausto 8th edition, 2008 • Practical Haematology. Dacie and Lewis .9th Edition
- Clinical Chemistry in Diagnosis and treatment. John F Zilva 6th edition
- Lab practice in Tropical countries; by Monica Cheesbrough, Part 1and 11, 4th edition, 2005
- Parasitology by Chatterjee
- Theory and Practice of Histological Techniques, Bancroft, 5th edition

Further studies

- Clinical chemistry. Principles, Methods and interpretations. Prof. Abdus Salam Khan Gandapur, Prof Tayyab. 11th edition, 2004
- Haematology by Hoffbrand, 5th edition.
- Clinical Haematology in medical Practice by De -Gruchy's. 5th edition • Pathological basis of disease: Self-Assessment and Review. 5th edition • Wintrobe's Clinical Haematology, 11th edition
- Postgraduate Haematology by Hoffbrand, 4th edition
- Blood transfusion in clinical medicine by Mollison, 9th edition • Practical Medical Microbiology by Mackie and Mccartney- 14th edition • Medical Microbiology- Levenson, 7th edition.
- Essentials of Medical microbiology- Rajesh Bhatia- 3rd edition-2004 • Manual of Bacteriology, Burges -vol1,11-2002
- Topley and Wilson-Vol.1-5, 2006
- Pathology Practical Book- 2nd edition, 2007;by Harash Mohan • Text book of Pathology, 5th edition-2006;by Harash Mohan • Mim's Medical Microbiology-4th Edition-2008
- Medical Parasitology-by Dr. R Arora- 2nd Edition
- Essentials of Medical Microbiology by Rajesh Bhatia and Rattan Lal Ichpujani -Jaypee-3rd edition -2004