
**CURRICULUM
FOR
2 YEARS DIPLOMA PROGRAMME
IN
CLINICAL PATHOLOGY
(DCP)**



2008

**UNIVERSITY OF HEALTH SCIENCES
LAHORE, PAKISTAN**

SR.	CONTENTS	PAGE NO
1	Foreword	1
2	Aims and Objectives of the Course	3
3	Specific Learning Outcomes	4
4	Nomenclature and Duration	5
5	Eligibility Criteria for Admission	7
6	Recognition/Equivalence of the Degree and Institution	8
7	Content Outline	9
8	Methods of Instruction/Course Conduction	19
9	Log Book	22
10	Literature Review	24
11	Examinations	25
12	Recommended Books	30

FOREWORD

University of Health Sciences (UHS) Lahore was inaugurated by the President of Pakistan on the 3rd of October 2002 with the vision to explicitly address academic and research needs in the field of health sciences and allied disciplines and to uplift their existing level to bring them on a par with the international standards.

The mission of the University is to develop an intellectual nexus to provide excellence and innovation in medical education and research in order to;

- Impart knowledge and skills to health care providers to enhance their competence in providing community oriented and multi-disciplinary patient-centered care
- Train and produce researchers and specialists in basic and clinical medical sciences
- Establish and maintain continuing professional development programmes for the faculty
- Provide trained professionals and scientists/researchers for the field of Electro Medical/Bio-Medical disciplines
- Assure quality in health education and research at all levels

A university is the zenith of knowledge that imparts quality education and awards degrees for extensive educational attainments in various disciplines with attendant advancement for the development of intellectual community. Protection of traditional knowledge, making exploration about it and obtaining deep understanding of modern technology and research techniques are some of the responsibilities of any university.

UHS is running a number of courses in the field of health sciences in Punjab. The list extends from undergraduate level courses up to the doctorate level both in basic, clinical and allied health sciences.

Since its inception, certain vital tasks were taken into serious consideration by UHS, for instance, curricula development and their up-gradation were among the most important ones besides introduction of contemporary educational programmes.

UHS has revised and finalized curricula for undergraduate Medical/Dental Education, B.Sc Nursing, and Allied Health Sciences.

In keeping with its commitment for further improvement in the standard of medical education, UHS has taken an initiative to modify and improve one year postgraduate diploma courses to 2 years structured training programmes.

I do not believe in selling an old product in a new packing with a fresh label on it, just to do the job. Original products with actual outcomes for the society must be guaranteed. Being the Vice Chancellor of a public sector health university, I believe, it is my duty to remain vigilant and committed to the cause of improvement of the conventional medical and allied health sciences' curricula on regular basis. This will help produce technically sound professionals with advanced knowledge and skills.

Presently, UHS has designed and facilitated curriculum development committees for eleven clinical disciplines namely: DTCD, DPM, DMRT, DOMS, DLO, Dip. Card, DCH, DCP, DGO, DMRD and DA.

This document precisely briefs the details of updated curriculum for Diploma in Clinical Pathology (DCP) as prepared by the Experts' Committee.

I am pleased to acknowledge the efforts made by Prof. I. A. Naveed, and Dr. Nadia Naseem from the Department of Medical Education UHS and the members of the committee for DCP consisting of: *Prof. A. H Nagi (UHS, Lahore) and Prof. Nausheen Waseem Yousaf (AIMC, Lahore)*. The contributions made by them will go a long way in the education and training of doctors in this field.

I hope, the revised course will be able to meet the needs of latest trends in Clinical Pathology and will certainly produce competent mid-level specialists in the field, which is the main objective of this programme.

Prof. M. H. Mubbashar

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AIMS AND OBJECTIVES OF THE COURSE

AIM

The aim of 2 years diploma programme in Clinical Pathology is to equip medical graduates with adequate theoretical knowledge and practical expertise in the field of Pathology which would enable these pathologists to administer and effectively run the labs at primary and secondary health care centers and tertiary care hospitals as Clinical Pathologists.

OBJECTIVES

DCP training should enable a student to:

- Learn the details of quality assurance/ quality control in all the four disciplines of pathology.
- Understand the significance of pre-analytic, analytic and post-analytic errors in all the four disciplines of pathology
- Execute proper collection and dispatch of samples from the patient to the local or distant referral labs for all the 4 disciplines.
- Understand the technical details of semi-automated and fully automated latest lab equipment.
- Interpret results with a sound theoretical background knowledge correlating the lab results with clinical profile of the patient and communicate with, and discuss the results with consultants if necessary.
- Work independently and organize the staff at DHQ & THQ labs .
- Assess and formulate the demands for technical staff and lab equipment to be forwarded to competent higher authorities for sanction.
- Train the lab staff for routine work and quality control.
- Be aware of latest information about lab equipment, kits, techniques and guidelines of International clinical Pathology services,
- Show initiative, be progressive and become life long self-directed learner .
- Understand ethics in delivering pathology services

SPECIFIC LEARNING OUTCOMES

Following competencies will be expected from a student completing 2 years course in DCP, student should be able to:

- Discuss the theoretical details of the topics of General and special Pathology, Microbiology, Hematology, and Chemical Pathology listed in the Course contents.
- Independently organize , administer and run the labs at DHQ & THQ health services maintaining appropriate quality control.
- Select alternate techniques , manual procedures and reagents if required for imparting the lab services in resource limited situations.
- Execute trouble shooting in the lab.
- Implement Health and safety precautions at the lab according to the International protocols.
- Train lab staff and teach basic Pathology to undergraduates at affiliated teaching institutions.
- Impart ethical Pathology services

NOMENCLATURE AND DURATION

NOMENCLATURE OF THE PROPOSED COURSE:

The name of diploma course should be retained as DCP. This name has been recognized and established for the last many decades worldwide. The duration of course shall be two years structured training in a recognized department under an approved supervisor.

Course Title: D.C.P. (Diploma in Clinical Pathology)

Training Centers: Departments of Pathology (accredited by UHS) in affiliated institutes of the University of Health Sciences Lahore

Course Duration and Scheme of the Course:

Total Duration: 2 years structured training (6 months in Part I and one & a half year in Part II) in a recognized department under the guidance of an approved supervisor

Part I -SIX MONTHS

Theoretical Component

- General Pathology
- Parasitology
- Basic Biochemistry, specially biochemical techniques in relation to their application to Chemical Pathology
- Behavioral Sciences
- Introduction to Biostatistics and Research

Clinical Component

1. Sample collection ,receiving , documenting, record keeping
2. Basic routine Microbiology lab work
3. Basic routine Haematology lab work
4. Basic routine Chemical pathology lab work
5. Histopathology ,Processing and staining

Part II- YEAR & a HALF

Theoretical Component

1. Systemic Pathology
2. Microbiology
3. Haematology
4. Chemical Pathology

Practical component

1. Performing Routine lab work under supervision and then independently in the last 6 months of training in Microbiology, Haematology and Chemical Pathology labs
2. Executing Quality assurance in all 3 disciplines mentioned above.
3. Lab administration.
4. Instrument maintenance, reagents /kits handling, QC sera utilization and maintaining L J charts in the lab

ELIGIBILITY CRITERIA FOR ADMISSION

DOCUMENTS REQUIRED FOR THE ADMISSION

1. Completed DCP application form
2. Copy of MBBS degree with mark sheets of professional examinations and certificate of number of attempts in professional examinations
3. Copy of PMDC registration certificate
4. Three latest passport size photographs
5. Reference letters from two consultants, with whom the applicant has worked
6. Certificates of completion of required experience

GENERAL REQUIREMENTS

Candidates eligible for admission should have MBBS or equivalent qualification, registered with PMDC and can fulfill one of the following criteria:

- a. One year experience in Pathology as Demonstrator from a recognized teaching institution
- b. Six months experience in Pathology as a Demonstrator and six months house job in one of the major clinical disciplines (Medicine, Surgery, Gynae/Obs).
- c. Two years experience of working in a reputable accredited Pathology lab with all 4 pathology disciplines, belonging to non teaching institution.
- d. Above mentioned experience should be within the past 5 years from the time of application

SPECIAL REQUIREMENTS

1. Securing pass percentage in the entry test as determined by the UHS
2. Qualifying the interview successfully
3. Having up to the mark credentials as per UHS rules (no. of attempts in each professional, any gold medals or distinctions, relevant work experience, research experience in a recognized institution, any research article published in a National or International Journal)

REGISTRATION AND ENROLLMENT

- Total number of students enrolled for the course must not exceed 8 per unit
- UHS Lahore will approve supervisors for diploma courses
- Candidates selected for the courses will be registered with relevant supervisors and enrolled with UHS

RECOGNITION/EQUIVALENCE OF THE DEGREE AND INSTITUTION

After two years training course, candidate should be given status of mid-level specialist equivalent to any other similar qualification.

Accreditation related issues of the Institution:

1. Faculty

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC)

2. Adequate Space

Including class-rooms (with audiovisual aids), computer lab and pathology lab

3. Library

Departmental library should have latest editions of recommended books for DCP, reference books and latest journals (two National and one International) or facility for online journals.

CONTENT OUTLINE

PART-1 DCP

1. General Pathology

Cell Injury and adaptation

- Reversible and Irreversible Injury
- Fatty change, Pigmentation, Pathologic calcification
- Necrosis and Gangrene

Cellular adaptation

- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia

Inflammation

- Acute inflammation --- Vascular changes, Chemotaxis, Opsonization and Phagocytosis
- Enlist the cellular components and chemical mediators of acute inflammation
- Differentiate between exudates and transudate
- Chronic inflammation
- Etiological factors, Granuloma

Cell repair and wound healing

- Regeneration and Repair
- Healing--- steps of wound healing by first and second intention
- Factors affecting healing
- complications of wound healing

Haemodynamic disorders

- Define and classify the terms Edema, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia
- Define and classify Shock with causes of each.
- Describe the compensatory mechanisms involved in shock
- Describe the pathogenesis and possible consequences of thrombosis
- Describe the difference between arterial and venous emboli

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

Immunity and Hypersensitivity

- Humoral and cell mediated immunity and types of Hypersensitivity with examples.

2. Parasitology

- General parasitology: definitions; classification, source of infection, pathogenicity
- Protozoology
- Entamoeba histolytica; life cycle; amoebic dysentery, complications and diagnosis
- Flagellates:
 - Intestinal oral and genital flagellates; 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

3. 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
- O₂ 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, electrophoresis, chromatography and centrifugation

Nucleotide And Nucleic Acids

- Nucleotides and their biochemical role
- Structure, function and biochemical role of nucleotides
- Synthesis of purines and pyrimidines 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
- Electrophoresis
- Chromatography
- Elisa etc.

4. BEHAVIOURAL SCIENCES

1. Bio-Psycho-Social (BPS) Model of Health Care
2. Use of Non-medicinal Interventions in Clinical Practice
 - Communication Skills
 - Counselling
 - Informational Skills

3. Crisis Intervention/Disaster Management
4. Conflict Resolution
5. Breaking Bad News
6. Medical Ethics, Professionalism and Doctor-Patient Relationship
 - Hippocratic Oath
 - Four Pillars of Medical Ethics (Autonomy, Beneficence, Non-maleficence and justice)
 - Informed Consent and Confidentiality
 - Ethical Dilemmas in a Doctor's Life
7. Delivery of Culturally Relevant care and Cultural Sensitivity
8. Psychological aspects of Health and Disease
 - Psychological Aspect of Health
 - Psychological Aspect of Disease
 - Stress and its management
 - Psychological aspect of Pain
 - Psychological Aspect of Aging

5. Introduction to Biostatistics and Research

1. Introduction to Bio-Statistics
2. Introduction to Bio- Medical Research
3. Why research is important?
4. What research to do?
 - Selecting a Field for Research
 - Drivers for Health Research
 - Participation in National and International Research
 - Participation in Pharmaceutical Company Research
 - Where do research ideas come from
 - Criteria for a good research topic
5. Ethics in Health Research
6. Writing a Scientific Paper
7. Making a Scientific Presentation
8. Searching the Literature

Part II DCP

1. 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
- Ischemic heart disease and its lab diagnosis and complications
- Rheumatic fever ,complications and lab diagnosis
- Bacterial endocarditis, etiology, type, pathogenesis, complications, lab diagnosis
- Pericardial effusion, causes ,pathogenesis and lab diagnosis.

RESPIRATORY SYSTEM

- COPD, classification, clinical features and pathogenesis.
- Infections:
 - 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

GIT

- Peptic Ulcer: Etiology. Pathogenesis, clinical features and lab diagnosis
- Malabsorption Syndrome: Causes, Coeliac disease, Lab diagnosis
- Ulceroinflammatory conditions of Intestine
- Appendicitis: Clinical presentation. Morphology, Lab diagnosis

HEPATOBIILIARY SYSYTEM

- Hepatitis
- Cirrhosis
- Tumors
- Gall stones
- Cholecystitis
- Pancreatitis

URINARY SYSTEM

- Nephrotic and Nephritic Syndrome
- Pyelonephritis
- Renal Stones

FEMALE GENITAL SYSTEM

- Cervical Cancer
- Pap smear
- Gestational trophoblastic disease, HCG and its role in lab diagnosis of mole and choriocarcinoma.

MALE GENITAL SYSTEM

- Infertility/ Sperm count

ENDOCRINE SYSTEM

- Goiter
- Autoimmune thyroiditis. in relation to thyroid function tests
- Diabetes mellitus: Latest classification , complications and Diagnosis.

BONES & JOINTS

- Osteoporosis
- Osteomalacia & Rickets
- Osteomyelitis
- Rheumatoid Arthritis
- Gout
- Osteoarthritis

CENTRAL NERVOUS SYSTEM

Meningitis: Etiology, CSF findings

2. 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

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

3. 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
 - Control systems
 - Disturbances of hydrogen ion homeostasis
 - Investigation of hydrogen ion homeostasis
- Hypothalamus & Pituitary gland
 - Hypo and Hyperpituitarism, Investigation protocol.
- Adrenal cortex
 - Disorders of adrenal cortex and congenital adrenal hyperplasia
- Gonads, Prolactin
 - Hypothalamic-pituitary-gonadal axis
 - Hyperprolactinemia
 - Investigation of pituitary, adrenal and gonadal disorders
- Thyroid
 - Hypo and hyperthyroidism
 - Thyroid function tests
- Carbohydrate metabolism
 - Diabetes Mellitus, its latest classification and criteria according to American Diabetes Association and WHO
 - Metabolic complications
 - Investigation protocol, GTT
 - Hypoglycemia, investigation protocol and management
- Lipids and Lipoproteins
 - Physiology and disorders of lipid metabolism,
 - Primary disorders
 - Risk factor for coronary heart disease
 - Principles of treatment , use of statins and other 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
- Malabsorption syndromes:
 - Causes and investigations for gastric , pancreatic and intestinal
 - Function, steatorrhoea, fecal fat estimation
- Hepatobiliary system:
 - Jaundice, types ,causes, cholestasis
 - Liver Function tests and their interpretation in acute and chronic liver disease and
 - Cirrhosis.
 - Bile & Gall stones.
 - Hepatotoxic drugs and their effect on LFT's
 - Urine tests in jaundice.
- Plasma proteins:
 - Classification
 - Electrophoretic pattern in normal and various disorders
 - 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 phosphatase
 - Clinical significance and interpretation in relation to diseases.
- Urate metabolism:
 - Normal metabolism
 - Hyper and hypouracemia
 - Gout
 - 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

4. 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,
- Vit. 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
- 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 medicine.
- Blood banking-basic principles, practical aspects.

METHODS OF INSTRUCTION/COURSE CONDUCTION

As a policy, active participation of students at all levels will be encouraged.

Following teaching modalities will be employed:

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 and microbiology)
9. Self study, and use of internet

In addition to the conventional teaching methodologies following interactive strategies will also be introduced to improve both communication and clinical skills in the upcoming consultants:

1.1. Monthly Student Meetings

Each affiliated medical college approved to conduct training for DCH will provide a room for student meetings/discussions such as:

- a. Journal Club Meeting
- b. Core Curriculum Meetings
- c. Skill Development

a. Journal Club Meeting

Two hours per month should be allocated to the presentation and discussion of a recent journal article related to Pathology. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department of each medical college. Students of different medical colleges may be given an opportunity to share all such interesting articles with each other.

b. Core Curriculum Meetings

All the core topics of DCH should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief student (elected by the students of the relevant diploma). Each student should be given an

opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

c. Laboratory Skill Development

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
- Monospot test; Mantoux test.
- CBC on automated heamatology analysers 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 chemistory 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 .

1.2 Annual Grand Meeting

Once a year all students enrolled for DCP should be invited to the annual meeting at UHS Lahore.

One full day will be allocated to this event. All the chief students from affiliated institutes will present their annual reports. Issues and concerns related to their relevant diploma courses will be discussed. Feedback should be collected and suggestions should be sought in order to involve students in decision making.

The research work done by students and their literary work may be displayed.

In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.

LOG BOOK

The trainees must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for DCP examination. Log book should include adequate number of diagnostic and therapeutic procedures, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

Proposed Format of Log Book is as follows:

Candidate's Name: _____

Roll No. _____

PROCEDURES:

1. Stains, routine and special (Grams, ZN, Haematoxylin-Eosin, PAS, KOH preparation)
2. Microscopic examination of fluids (urine, CSF, body fluid aspirates).
3. Stool examination for parasites.
4. Culture /sensitivity of clinical specimens on routine aerobic media and anaerobic cultures.
5. TB culture on LJ media
6. Fungal culture on Sabroud's media.
7. CBC on automated heamatology analyzers and manually, DLC
8. Blood smear reading for identifying atypical cells for referral to consultant haematologist.
9. Manual conduction of PT/APTT and INR calculation
10. ESR determination by Westergren method
11. 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.
12. Electrolyte analysis on Flame photometer and ion –selective electrode (ISE)
13. Serology, Device tests

Procedures Performed

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure Performed	Supervisor's Signature
1					
2					

Case Presented

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Case Presented	Supervisor's Signature
1				
2				

Seminar/Journal Club Presentation

Sr.#	Date	Topic	Supervisor's signature
1			
2			

Evaluation Record

(Excellent, Good, Adequate, Inadequate, Poor)

Sr.#	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Supervisor's Signature
1				
2				

LITERATURE REVIEW

Students will be assigned a clinical problem most commonly encountered in the relevant specialty and will be specifically trained to review literature in the relevant field and write a '**Review of an Article**' comprising of:

- Topic
- Introduction
- Discussion of the reviewed literature
- Conclusion
- References

EXAMINATIONS

Assessment

It will consist of action and professional growth oriented ***student-centered integrated assessment*** with an additional component of ***informal internal assessment, formative assessment*** and measurement-based ***summative assessment***.

Student-Centered Integrated Assessment

It views students as decision-makers in need of information about their own performance. Integrated Assessment is meant to give students responsibility for deciding what to evaluate, as well as how to evaluate it, encourages students to '**own**' the evaluation and to use it as a basis for self-improvement. Therefore, it tends to be growth-oriented, student-controlled, collaborative, dynamic, contextualized, informal, flexible and action-oriented.

In the proposed curriculum, it will be based on:

- Self Assessment by the student
- Peer Assessment
- Informal Internal Assessment by the Faculty

Self Assessment by the Student

Each student will be provided with a pre-designed self-assessment form to evaluate his/her level of comfort and competency in dealing with different relevant clinical situations. It will be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address those weaknesses.

Peer Assessment

The students will also be expected to evaluate their peers after the monthly small group meeting. These should be followed by a constructive feedback according to the prescribed guidelines and should be non-judgmental in nature. This will enable students to become good mentors in future.

Informal Internal Assessment by the Faculty

There will be no formal allocation of marks for the component of Internal Assessment so that students are willing to confront their weaknesses rather than hiding them from their instructors.

It will include:

- a. Punctuality
- b. Ward work
- c. Monthly assessment (written tests to indicate particular areas of weaknesses)
- d. Participation in interactive sessions

Formative Assessment

Will help to improve the existing instructional methods and the curriculum in use

Feedback to the faculty by the students:

After every three months students will be providing a written feedback regarding their course components and teaching methods. This will help to identify strengths and weaknesses of the relevant course, faculty members and to ascertain areas for further improvement.

Summative Assessment

It will be carried out at the end of the programme to empirically evaluate **cognitive, psychomotor** and **affective domains** in order to award diplomas for successful completion of courses.

Eligibility to Appear in Final Examination

- Only those candidates will be eligible to take final examination, who have passed Part 1 examination (after 6 months of education) and have completed two years of structured/supervised training programme.
- Students who have completed their log books and hold certificates of 75% attendance should be allowed to sit for the exam
- Application for the final examination can be made with recommendation of the supervisor
- Only those candidates who qualify in theory will be called for clinical examination

DCP Examination

Part I DCP

Topics included in paper 1

1. General Pathology (40 MCQs)
2. Parasitology (25 MCQs)
3. Basic Biochemistry (20 MCQs)
6. Behavioral Sciences (10 MCQs)
7. Biostatistics and Research (05 MCQs)

Components of the Part-1 examination

MCQ Paper	100	One Best Type
Total Marks	100	Marks

Part II DCP

Topics included in paper 1

Systemic Pathology

Topics included in paper 2

Haematology

Topics included in paper 3

Chemical pathology

Topics included in paper 4

Microbiology

Part II Examination

Theory

Paper I

10 SEQs (No Choice)
50 MCQs

100 Marks

50 Marks
50 Marks

3 Hours

Paper II

10 SEQs (No Choice)
50 MCQs

100 Marks

50 Marks
50 Marks

3 Hours

Paper III

10 SEQs (No Choice)

100 Marks

50 Marks

3 Hours

50 MCQs

50 Marks

Paper IV

10 SEQs (No Choice)

50 MCQs

100 Marks

50 Marks

50 Marks

3 Hours

The candidates who pass in theory papers, will be eligible to appear in the practical & viva voce.

Practical Exams

280 Marks

Practical exam will evaluate the candidate in the disciplines of Systemic Pathology, Microbiology, Haematology and Chemical Pathology .

1. Systemic Pathology:

- **Spotting.** 15 spots of slides ----- 2 marks each
10 gross specimens ----- 1 mark each
- 30 marks for viva voce

Total marks=70

2. Haematology:

- **Spotting.** 15 spots ----- one mark each
- **Long slides.** 5 marks each for;
 1. Malarial parasite
 2. Virocytes
 3. Abnormal counts
 4. Low platelet count
 5. Smears with leukemic picture for suggesting referral.
- 30 marks for viva voce

Total marks=70

3. Microbiology:

- **Spotting.** 10 spots -----one mark each
- **Identification** of bacteria from **culture plates.** 10 marks each for two clinical specimens, provided for culture sensitivity and identification of bacteria. Procedure to be followed for 48 hours till completion of sensitivity report
- **Procedure technique**
 - To apply culture of commonly encountered clinical samples as Pus, urine & wound swabs. (05 marks)
 - To apply sensitivity discs. (05 marks)
- 30 marks for viva voce

Total marks=70

3. Chemical Pathology:

40 marks shall be allocated for;

- To separate serum and plasma from the provided blood sample
- To perform RFT, LFT, Enzymes and other parameters on semi automated instruments
- 30 marks for viva voce

Total marks=70

Components of the Part II examination

Theory paper 1	100 marks
Theory paper 2	100 marks
Theory paper 3	100 marks
Theory paper 4	100 marks
Practical/Oral	280 marks
Log Book	20 marks
Total Marks	700

A panel of four examiners preferably from all four disciplines of the subject (Two internal and two external) will be appointed for practical examination.

Each component of practical examination will be assessed by two examiners, awarding marks simultaneously and independently. The final score awarded will be an average score, as agreed by both examiners.

Pass Percentage and Other Regulations Regarding Examination

- Criterion referenced assessment principles will be used
- 20 marks for the log book will be included in the OSCE component
- 60 % marks will be a pass score in each component. Each candidate must pass in every component separately
- Candidate failing in any one component will have to re-sit the entire examination
- A maximum of 5 attempts to sit for the examination will be allowed, to be availed within 3 calendar years of the first attempt
- Re-admission in DCP course is not permissible under any circumstances
- The results will be announced according to the rules and regulations set by the Examination Branch of UHS Lahore

RECOMMENDED BOOKS

CORE 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 1 and 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. Dr R Arora- 2nd Edition
- Essentials of Medical Microbiology by Rajesh Bhatia and Rattan Lal Ichpujani-Jaypee-3rd edition -2004