THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

No. 69, ANNA SALAI, GUINDY, CHENNAI – 600 032.

POST GRADUATE DIPLOMA COURSES

SYLLABUS AND CURRICULUM

2021 - 2022

DIPLOMA IN CLINICAL PATHOLOGY

(DCP)

THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI

DIPLOMA IN CLINICAL PATHOLOGY (DCP)

1. GOALS:

A diploma holder in the subject of Clinical Pathology (DCP) is expected to be a specialist in the subject with adequate skill and competence. This will create suitable manpower with appropriate expertise in pathology and allied fields of laboratory medicine. The student must be able to understand the biochemical & microbiological basis of diseases and the relevance of biochemical and microbiological tests in disease conditions. Supervise modern laboratory techniques and procedures in Pathology, Clinical Biochemistry and Microbiology in the hospital. Suggest, evaluate, interpret pathological, biochemical and microbiological investigation in a given clinical situation and apply knowledge in clinical problems.

2. OBJECTIVES:

Knowledge :

Attain proficiency in both theoretical and practical aspects of the disciplines of Pathology, Microbiology and Biochemistry.

Attitude:

1) They must be able to oversee the technical staff and ensure the recommended procedures are followed in collection of samples, registering, processing, reading and interpreting diagnostic tests performed.

2) They must be able to share the knowledge and competence with others and strive to achieve the highest quality standards.

Skills:

1) The candidate should have adequate skill and competence to conduct diagnostic procedure and make confident interpretation in common histopathological, hematological and clinicopathological problems including those in transfusion medicine.

2) The candidate should possess adequate knowledge and skill to carry out and interpret majority of microbiological and biochemical investigations

3) The candidate must update knowledge and skill and be capable of pursuing clinical and laboratory based research.

4) They should be imparted training in teaching methods in the subject, which enables them to impart training to students medical, paramedical and lab technicians and also to take up teaching assignments in Medical Colleges.

3. COMPONENTS OF POST GRADUATE CURRICULUM

THEORETICAL KNOWLEDGE:

1. They should attain proficiency in theoretical aspects of disciplines of pathology, microbiology, biochemistry and transfusion medicine.

2. The student shall have knowledge about and ability to diagnose / interpret / perform the following.

    a. Basic general and surgical pathology disease patterns.
    b. Grossing and histopathology of surgical pathology specimens.
    c. Haematological investigations with knowledge on high end diagnostic procedures.
    d. Cytopathology diagnostic procedures and interpretation.
    e. Blood banking procedures.
    f. Basic microbiology
    g. Basic biochemistry.

3. Basic knowledge on good laboratory practice and SOPS.

    a. Quality control and accreditation protocols.
    b. Universal precautions and biosafety
    c. Equipment Care
    d. Biomedical Waste Management
    e. Organization of a laboratory.

PRACTICAL AND CLINICAL SKILLS

The candidate should have hands on experience in techniques, interpretation and reporting of:

1) Morbid anatomy cytopathology and histopathology

    a. Specimen collection, labeling, documentation, fixation.
    b. Grossing techniques, tissue processing.
    c. Microtomy, staining, special stains, immunohistochemistry, frozen sections, cell block preparation.
    d. Museum techniques.
    e. Cytological techniques – FNAC, fluid, cytology, vaginal cytology, preparation, staining and reporting.

2) Clinical pathology and blood banking

    a. Haemoglobinestimation, blood counts
    b. Staining of smears, interpretation
    c. ESR, PCV, Osmotic fragility, Hb electrophoresis, Red cell indices, Reticulocyte count.
    d. Automated hematology analysers

e. Cytochemical stains for Leukemia
f. Peripheral smear & Bone marrow study
g. Hemolytic work up
h. Coagulation profile
i. QBC for malaria
j. Urine analysis, Semen analysis, Sputum, Stool examination
k. Basic blood transfusion procedures, screening of donors, blood collection, Coomb's test, Quality control, Component preparation. Disposal methods, voluntary blood donation camp organization.
l.

3) **BIOCHEMISTRY** : The candidate should develop competency in programming and operating semi-autoanalyser and should be able to perform, report and interpret each of the following tests.

1. Glucose estimation in plasma / serum and Glucose tolerance test.
2. Estimation of HbA1c
3. Estimation of cholesterol, Triacylglycerol and HDL –C plasma/serum.
4. Estimation of serum Proteins , Albumin and calculation of A:G ratio
5. Estimation of Calcium and Phosphorus
6. Estimation of Electrolytes (Sodium, Potassium) in Serum/Plasma using Flame photometer or Ion Selective electrolyte analyser
7. Estimation of urea acid, creatininein blood and urine.
8. Biochemical analysis CSF, ascitic, pleural and other fluids
9. Estimation of urine proteins and detection of Bence-Jones protein in urine.
10. Analysis of renal and biliary calculi
11. T3 and T4 assays and TSH measurement using ELISA Reader and washer.

4) **MICROBIOLOGY :**The candidate shall be posted to the Department of Microbiology for a period of minimum two months during their course of study .The following skills need to be acquired by the student during their postings.

- Care and operation of light microscopes
- Collection and transport of various clinical specimens
- Performance of different stains including Grams, Albert, Ziehl-Neelsen
- Inoculation of clinical specimen on media for isolation, identification of bacteria
- Identification of Bacteria of Medical importance upto species level by routine and special tests.
- Performance of antibiotic sensitivity test – Kirby bauer method
- Test for drug resistance including MRSA, VRE, ESBL
- Disinfection, sterilization techniques
- Sterility check (Dry / moist methods)
- Decontamination of cultures
- QC of media, reagents, antibiotic discs
- Safe laboratory practices including bio safety

5) **IMMUNOLOGY**

- Collection / separation / preservation of blood samples
- Serological test including rapid / conventional (Latex agglutination test , Immunochromatography, tube agglutination, slide flocculation

6) **GENERAL**

- Laboratory automation
- Principles of sample collection for hematology and clinical pathology
- Pregnancy tests
- Cytogenetics
- Immunopathology
- Computer, Internet in Medicine, microphotography

It is mandatory that the students have to submit atleast one research paper to the University Journal of Medical Sciences.

Attitudes including communication skills

1) Should be able to function as a part of a team, develop an attitude of cooperation with collegues to provide the best possible diagnosis or opinion.
2) Always adopt ethical principles and maintain proper etiquette in dealing with patients, relatives and other health personnel and respect the rights of the patient including the right to information and second opinion.
3) Develop communication skills to word reports and professional opinions with clarity as well as to interact with patients, relatives, peers and paramedical staff and also for effective teaching.

Training in research methodology Medical Ethics / Bioethics / Medicolegal aspects
Training in research methodology

- Must be able to plan, execute, analyse and present research work.
- Must be familiar with statistical methods in assessing data from patient material and experimental studies.
- Students are encouraged to attend workshops/CME's on Bioethics conducted by the University and other reputed Institutions.

Good Laboratory Practices:

Should be conversant with good laboratory practices pertaining to universal precautions, biomedical waste management, requirements, storage and maintenance of laboratory samples, equipment and reagents and quality control.

Medical Audit:

Must attend medical audit to analyse the problems and pitfalls faced in laboratory and wards to prevent errors in diagnosis.

4. THEORY SYLLABUS:

Pathology
General Pathology

- **Cellular components** - Genome, cell metabolism, stem cells

- **Cellular responses** - Adaptation, reversible and irreversible injury, accumulations, cellular ageing

- **Inflammation** – Causes, acute inflammatory events and mediators with examples, chronic inflammation events and mediators with examples, tissue repair mechanisms, abnormalities.

- **Hemodynamic disorders** – Edema, hyperemia, congestion, hemorrhagic disorders, DIVC, Embolism and types of emboli, infarction, shock.

- **Genetic disorders** – Mutations, Mendelian disorders, chromosomal disorders – normal karyotype, autosomal disorders, sex chromosomal disorders, principles in molecular genetic diagnosis PCR, FISH, polymorphic markers, Southern blotting, RNA analysis, next generation sequencing.

- **Immune system** – Normal Immune response, cells of immune system, hypersensitivity reactions, autoimmune diseases, rejection of tissue transplants, immunodeficiency syndrome – primary and secondary – AIDS.

- **Neoplasia**– Nomenclature, characteristics of benign and malignant neoplasms, epidemiology of cancer, molecular basis of cancer, metastasis, carcinogenic agents, clinical aspects of neoplasia.

- **Infections** – General principles, special diagnostic techniques, viral infections, bacterial infections, fungal infections, parasitic infections.

- **Environmental and Nutritional Diseases** – Effects of Tobacco, alcohol, drugs, physical injury, nutritional diseases, obesity.

- **Diseases of infancy and childhood** – Congenital abnormalities, prematurity, neonatal respiratory distress syndrome, perinatal infections, inborn errors of metabolism, sudden infant death syndrome, tumours and tumour like lesions of infancy and childhood.

Systemic Pathology

- **Blood vessels** – Hypertensive vascular disease, arteriosclerosis, atherosclerosis, Aneurysims, vasculitis, vascular tumours.

- **Heart** – Heart failure, congenital heart diseases, ischemic heart disease, hypertensive heart disease, valvular heart disease, cardiomyopathy, pericardial diseases.

- **WBC Disorders, Lymph nodes, Spleen, Thymus –** Leucopenia, Leucocytosis, Neoplastic proliferation of white cells, splenomegaly,thymic hyperplasia, thymoma.

- **RBC Disorders, Bleeding disorders –**Anaemias, Polycythemia, bleeding disorders, transfusion reactions.

- **Lung** – Atelectasis, pulmonary edema, ARDS, obstructive and restrictive lung diseases, emphysema, asthma, chronic bronchitis, bronchiectasis, interstitial lung diseases, vascular diseases, pulmonary infections, lung tumours, pleural diseases.

- **Head and Neck** – Precancerous and cancerous lesions of oral cavity, cysts of neck, laryngeal carcinoma, salivary gland inflammation and neoplasms.

- **Gastrointestinal tract** – Barettsoesophagus, oesophagealtumours, gastritis, gastric polyps and tumours, ischaemic bowel disease, inflammatory bowel disease, polyps of colon, colonic and rectal adenocarcinoma, acute appendicitis, tumours of appendix, peritoneal disorders.

- **Liver and bile ducts** – Gallbladder, liver failure, cirrhosis, portal hypertension, viral hepatitis, alcoholic liver disease, autoimmune hepatitis, drug and toxin induced liver injury. Non alcoholic fatty liver disease, metabolic liver disease, hemochromatosis, Wilson disease, α1AT deficiency, cholestatic diseases, benign and malignant tumours of liver.

- **Gall bladder** – Cholelithiasis, cholecystitis, carcinoma,

- **Pancreas –** Acute and chronicpancreatitis, cysts, neoplasms.

- **Kidney** – Glomerular disease – pathogenesis, nephritic syndrome, nephrotic syndrome, tubulointerstitial diseases, vascular diseases, cystic disease, obstructive uropathy, neoplasms of kidney.

- **Lower urinary tract and male genital system** – Cystitis, bladder neoplasm, inflammation and tumours of penis.
    - **Testis** – cryptorchidism, inflammatory disorders, testicular tumours.
    - **Prostate** – Benign prostatic hyperplasia, tumours.

- **Female genital tract** – Vulvar cysts, neoplastic lesions of vulva
    - **Vagina** – Premalignant and malignant neoplasms of vulva.
    - **Cervix** – Cervicitis, premalignant and malignant lesions of cervix, cancer screening.
    - **Uterus** – Endometrial histology in menstrual cycle, functional endometrial disorders, inflammatory disorders, benign and malignant tumours of uterus.
    - **Fallopian tubes** – Inflammation, tumours, cysts.
    - **Ovaries** – Cysts, ovarian tumours
    - **Gestational and placental disorders -** Ectopic pregnancy, gestational trophoblastic disease

- **Breast –** Inflammatory disorders, proliferative breast disease, carcinoma breast, stromal tumours.
- **Endocrine system -** Pituitary Adenomas, Hypopituitarism.

- **Thyroid –** Hyperthyroidism, hypothyroidism, thyroiditis, Gravesdisease, diffuse and multinodular goiter, neoplasms of thyroid.
- **Parathyroid –** Hyperparathyroidism, hypoparathyroidism.
- **Endocrine pancreas –** Diabetes Mellitus, Pancreatic neuroendocrine tumours.
- **Adrenal glands** – Adrenal cortex, hyperadenalism, adrenocortical insufficiency, adrenocortical neoplasms, adrenal medulla, phaechromocytoma, MEN syndromes.
- **Skin** – Nevi, adnexal tumours, premalignant and malignant tumors of skin, chronic inflammatory dermatosis, bullous diseases.
- **Bone, Joints, soft tissue -** Structure and function of bone, Paget disease, osteoporosis, osteomalacia and rickets, fracture healing, osteomyelitis, bone tumors and tumor like conditions.
- **Joints** – Rheumatoid arthritis, gout.
- **Soft tissues –** Benign and malignant soft tissue tumors including benign and malignant peripheral nerve sheath tumours
- **CNS –**Tumours of CNS, Infections of CNS, Cerebrovascular diseases.
- **Cytopathology -** Thyroid, Salivary gland, breast, lymph node, soft tissue, bone, vaginal cytology, sputum cytology, CSF cytology, Body Fluid cytology.

MICROBIOLOGY SYLLABUS

General Microbiology:

- History of Microbiology.
- Microscopy.
- Biosafety including universal containment.
- Sterilization and disinfection.
- Morphology of bacteria and other microorganisms.
- Nomenclature and classification of microorganisms.
- Normal flora of human body.
- Growth & nutrition of bacteria.
- Bacterial metabolism.
- Bacterial toxins.
- Culture media and methods
- Identification of bacteria
- Host-parasite relationship.
- Antibacterial substances and drug resistance.
- Bacterial genetics & bacteriophages.
- Quality assurance & quality control in microbiology.

Immunology:

- Components of immune system.
- Innate and acquired immunity.
- Cells involved in immune response.
- Antigens.

- Immunoglobulins.
- Complement system
- Antigen and antibody reactions
- Hypersensitivity.
- Immunodeficiency diseases
- Auto-immunity.
- MHC complex.
- ImmunoHaematology.

Systematic Bacteriology:

- Gram positive cocci of medical importance including Staphylococcus, Micrococcus, Streptococcus
- Gram negative cocci of medical importance including Neisseria, Moraxella
- Gram positive bacilli including Coryneform organisms, Bacillus, Actinomyces, Nocardia, Listeria
- Non sporing anaerobic bacteria
- Spore bearing Anaerobic bacteria including Clostridium spp
- Gram negative bacilli of medical importance including Vibrios, Aeromonas, Plesiomonas, Haemophilus, Bordetella, Brucella, Pseudomonas ,Acinetobacterspp,
- Helicobacter, Campylobacter &Spirillium.
- Enterobacteriaceae.
- Mycobacteria.
- Spirochaetes.
- Chlamydiaae.
- Mycoplasmatales; Mycoplasma, Ureaplasma, Acholeplasma and other Mycoplasmas.
- Rickettsiae, Coxiella, Bartonella

Mycology :

- General characteristics & classification of fungi.
- Isolation and identification of fungi.
- Yeasts and yeast like fungi of medical importance including Candida, Cryptococcus, Malassezia.
- Opportunistic Mycelial fungi of medical importance including Aspergillus, Zygomycetes
- Dimorphic fungi
- Dermatophytes.
- Fungi causing mycetoma, keratomycosis & otomycosis.
- Pneumocystis jirovecii
- Rhinosporidiumseeberi
- Mycetism & mycotoxicosis.
- Antifungal agents

Virology:

- General properties of viruses.
- Classification of viruses.
- Morphology : Viral structure, Bacteriophages.
- Viral replication.
- Laboratory diagnosis of viruses.
- Pathogenesis of viral infections.
- DNA viruses of medical importance including Poxviridae, Herpesviridae, Adenoviridiae, Hepadna virus, Papova and Parvo viruses
- RNA viruses of medical importance including Enteroviruses, Togaviridae, Orthomyxoviruses, Paramyxoviruses, Rhabdoviridae, Arenaviridae, Bunyaviridae, Retroviridae, Filoviruses, Arboviruses and Coronaviridae
- Slow viruses including prions.
- Oncogenic &Teratogenic Viruses.
- Hepatitis viruses.
- Vaccines and anti-viral drugs

Parasitology

- General characters & classification of parasites.
- Laboratory diagnosis of parasitic infections.
- Protozoan parasites of medical importance including Entamoeba, Free living amoebae, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Cryptosporidium, Microsporidium, Cyclospora, Isospora, Babesiaetc.

- Helminths of medical importance including those belonging to Cestodes (Diphyllobothrium, Taenia, Echinococcus, Hymenolepis, Trematodes (Schistosomes, Fasciola, Fasciolopsis, Paragonimus, Clonarchis etc.) and Nematodes (Trichiuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus, etc.).

- Antiparasitic agents.

Applied Microbiology

- Hospital acquired infections and infection control
- Management of hospital waste.
- Standard Precautions
- Vaccines.

BIOCHEMISTRY SYLLABUS

THEORY

1. **Principles of laboratory analyses and safety**- Units of measurement. International system of units in laboratory medicine. Conversion from conventional units to SI units. Reference materials.

2. **Instrumentation and techniques**: Centrifugation. Spectrophotometry. Flame emission photometry. Principles of ELISA and immunochemistry. Automation in clinical chemistry.

3. **Laboratory Management**: Common hazards in the laboratory. Management of biological, chemistry and radioactive wastes. Computer applications in clinical chemistry.

4. **Sample Collection**: Anticoagulants and preservatives for blood. Timed urine collections and urine preservatives

5. **Quality assurance**: Use of reference values. Quality assurance in clinical laboratories.

6. **Overview of the Chemistry and Metabolism** (including digestions and absorption) of Carbohydrates, Proteins , Lipids, Nucleic acids with specific emphasis on biochemical basis of diseases and relevant investigations .Inherited and storage disorders involving each metabolism.

7. **Enzymes**: Biomedical importance. Nomenclature. Classification. General properties. Coenzymes and cofactors. Mechanism of action. Inhibitors of enzymes, naturally occurring enzyme inhibitors. Enzymes in clinical medicine. Isoenzymes and the use of enzymes as laboratory tools (for diagnostic and research applications)

8. **Porphyrins and Heme metabolism**, laboratory diagnosis of jaundice

9. **Vitamins**: Structure, sources, recommended dietary allowances (RDA), biochemical role, metabolism in the body and deficiency manifestations of water soluble and fat-soluble vitamins. Use of vitamins in therapy.

10. **Minerals** : Sources , functions , daily requirements and disorders of Calcium, Phosphorus, Iron, Sodium, Potassium, Magnesium

11. **Hydrogen ion homeostasis**: Maintenance of pH, Associated disorders and laboratory diagnosis.

12. **Cerebrospinal and other body fluids**: Analysis in health and disease

13. **Laboratory diagnosis of Diabetes mellitus** including gestational diabetes mellitus, Diabetic ketoacidosis. Hypoglycemia .Urinary albumin excretion.

14. **Function tests**: Liver, Kidney, Thyroid , Pancreas.

15. **Human Nutrition**: General nutritional requirements. Energy requirements. Balanced diet. Dietary fibre. Dietary supplements. Fortification of foods. Disorders of nutrition (protein malnutrition and protein energy malnutrition).

16. **Basics of Human Genetics** , Antibiotics and transcription. Post-transcriptional and Post-translational modifications, Viral genetics – DNA and RNA viruses. HIV and drugs in the treatment of HIV.

17. **Molecular basis of carcinogenesis**, Inherited conditions that predispose to development of cancer (e.g., ataxia telangiectasia, xerodermapigmentosum, Fanconi syndrome). Mechanisms of action of cytotoxic drugs. Basics of Cytogenetics.

BIOETHICS

Must strictly adhere to bioethics pertaining to

a) Careful handling, precautions, disposal and preservation of biological samples.
b) Must follow and abide by ethical issues pertaining to blood transfusion with reference to blood donation, screening of donors, promptdespatch of appropriate blood component with strict adherence to integrity and quality.
c) Must adhere to ethics in analyzing the necessity and prudency in choice of investigations.
d) Confidentiality needs to be maintained in report disclosure, pre and post test counselling.
e) In case of refusal of tests an informed consent must be obtained.
f) Practice of dichotomy should be strongly condemned.
g) Should be conversant with quarantine and its impact on patient, vector carrier, bioterrorism.

Pathology

1. Ethics related to use of Biological material
2. Ethics in Blood transfusion.
3. Ethical pathologists

Biochemistry

1. Necessity and prudency in the choice of tests.
2. Informed consent and refusal of tests.
3. Confidentiality.
4. Dichotomy.

Microbiology

1. Lab reports – Confidentiality, privacy, notification & report disclosure Pre & Post-test counselling.

2. Quarantine & its impact – patient, vector, carrier specimen transport Bioterrorism.

5. TEACHING LEARNING METHODS:

Based on the available facilities, the department can prepare a list of post graduate experiments pertaining to basic and applied pathology, biochemistry and microbiology. Active learning should form the main stay of post graduate training. There should be lectures for post graduates at least 20 year along with seminars, symposia, group discussion, journal clubs. Each college should have a medical education unit to conduct PG orientation programmes. The post graduate should regularly interact with various clinical departments and learn cases of interest for discussion with surgical medical, super speciality faculty. The post graduate should actively involve in generating teaching resource material for undergraduate and evolving of problem solving modules.

6. STRUCTURED TRAINING PROGRAMMES

The two year training programme for the Diploma in Clinical Pathology may be arranged in the form of Postings to different laboratories for specified periods as outlined below. The period of such posting is recommended for 23 months. Posting schedules may be modified depending on needs, feasibility and exigencies.

First Year :

Clinical Pathology	:	2½ months
Hematology	:	15 days
Blood Bank	:	15 days
Microbiology	:	2 months
Biochemistry	:	1½ months
Surgical Pathology	:	3 months
Cytology	:	2 months

Total	:	12 Months

Second Year :

Clinical Pathology	:	2½ months
Hematology	:	15 days
Blood Bank	:	15 days
Microbiology	:	1 month
Biochemistry	:	1½ months
Surgical Pathology	:	3 months
Cytology	:	2 months

Total	:	11 Months

During IInd year, the Students are encouraged to undergo special postings for learning new advanced techniques / procedure / skills in institutions of higher reputate where the requisite facilities are available without affecting the duties of the parent department.

7. **Evaluation of the candidates in both theory and practical aspects at the end of every unit/posting. This will help the candidate in improvement of his/her knowledge, skills and attitude.**

8. COMPETENCY ASSESSMENT:

- **OVERALL:**
- **OVERALL:**

a) Communication / commitment / Contribution / ()
Compassion towards patients and Innovation () - 5 Marks
b) Implementation of newly learnt techniques/skills ()

- **Number of cases presented in Clinical Meetings/ Journal clubs/seminars - 5 marks**

- **Number of Posters/Papers presented in Conferences/ Publications and Research Projects - 5 marks**

- **No. of Medals / Certificates won in the conference / Quiz competitions and other academic meetings with details. - 5 marks**

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20 marks

PG NON – CLINICAL COURSE

VIVA including Competency Assessment - 60 Marks (40 + 20)

ASSESSMENT SCHEDULE IS AS FOLLOWS

Year of study	Period				Total Max. 20 Marks
I year	Upto Dec	10 marks	Upto June	10 Marks	20 Marks
II year	Upto Dec	10 marks	Upto June	10 Marks	20 Marks
				AVERAGE	20 Marks

9. UNIVERSITY JOURNAL OF MEDICAL SCIENCES

Regarding submission of articles to the University Journal of Medical Sciences for all the PG Degree/Diploma courses, it is mandatory that the students have to submit at-least one research paper. Case Reports are not considered as Research Paper

10. THEORY EXAMINATIONS:

Paper I : Basic Medical Sciences: General Pathology and Microbiology including Parasitology

Paper II : Systemic Pathology, Cytology and Haematology

Paper III: Clinical Pathology, Clinical Biochemistry and Blood Banking

PATTERN OF THEORY PAPER

Paper I :

Sec A – General Pathology	**I. Elaborate on:**	**1 x 15 = 15 marks**
	II. Write notes on:	**5 x 7 = 35 marks**
Sec B – Microbiology	**I .Elaborate on:**	**1 x 15 = 15 marks**
including Parasitology	**II. Write notes on:**	**5 x 7 = 35 marks**

Paper II :	**I .Elaborate on:**	**2 x 15 = 30 marks**
	II. Write notes on:	**10 x 7 = 70 marks**

Paper III :

Sec A – Clinical Pathology	**I .Elaborate on:**	**1 X 15 = 15 marks**
and Blood Banking	**II. Write notes on:**	**5 X 7 = 35 marks**
Sec B – Clinical Biochemistry	**I .Elaborate on:**	**1 X 15 = 15 marks**
	II. Write notes on:	**5 X 7 = 35 marks**

11. PRACTICAL EXAMINATION

The practical examination is scheduled for two days with the following exercises.

Clinical – Day 1

Forenoon

Microbiology Culture	- 25 marks
Gross spotters – 5 x 2 marks	- 10 marks
Cytology / hematology slides – 10 x 2 marks	- 20 marks

Afternoon

Histopathology techniques	- 10 marks
Special stains (Van Gieson, Perls, Reticulin, PAS)	- 5 marks
Pap Stain	- 5 marks
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	75 marks

OSPE – 2 stations x 5 marks	- 10 marks
Spotters – 2 spotters x 5 marks	- 10 marks
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	20 marks

Clinical – Day 2

Clinical Pathology (case examination and investigation)	- 25 marks
Histopathology slides – 5x2 marks	- 10 marks
Biochemistry	- 25 marks
Serology	- 15 marks
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	75 marks

Viva including Competency Assessment (40 + 20) = 60 marks

Scheme for Distribution of Marks:	
Particulars	**Marks**
Clinical	150
OSPE (2 x 5 marks)	10
Spotters (2 x 5 marks)	10
Viva	60
Log Book	20
Total	**250**

12. LOG BOOK

The Post Graduates students shall maintain a record (Log) book of the work carried out by them and the training Programme undergone during the period of training.

Periodic review of Log book and Dissertation have to be done in the Department by guide/HOD once in every 6 months.

13. VIVA

An unstructured Viva will be carried out by the examiners.

Viva including Competency Assessment (40 + 20) = 60 marks

14. OSPE (Objective Structured Practical Examination)

The following are suggested stations for the OSPE. Any 2 can be chosen at the discretion of the examiners:

Blood Grouping, charts pertaining to Karyotyping, Immunohistochemistry, Frozen section, QBC, interpretation of hematology analyser report.

15. REFERENCE BOOKS & JOURNALS

PATHOLOGY

1. Pathology, E. Rubin and J.L. Farber – Lippincott.
2. Anderson's Pathology, (Latest ED) by Kissane – C.V. Mosby.
3. Robbin's Pathologic Basis of Diseases, Cotran – W.B. Sunders.
4. Clinical Diagnosis and Management by Laboratory Methods 18th Edn. by Henry – W.B. Saunders.
5. Haematology by J.H.Jandl. – Little Brown and Co.
6. Practical Haematology, 7th Edn. Dacie and Lewis – Churchill Livingstone.
7. Comprehensive Cytopathology Bibbo – W.B.Saunders.
8. Blaustein's Pathology of Female Genital Tract, Ed. by Kurman 3rd Edn. – Springer Verlag.
9. Soft Tissue Tumours Enzinger and Weiss – C.V. Mosby.
10. Ackerman's Surgical Pathology, Rosai – C.V. Mosby.
11. Ackerman's Surgical Pathology, Rosai – Little Brown.
12. Theory and Practice of Historical Techniques, 3rd Edn. by Bancroft and Stevens – Churchill Livingstone.
13. WHO Classification of Tumours – WHO Publication.

**** Note : The editions are as applicable and the latest editions shall be the part of the syllabi.**

JOURNALS

1. American Journal of surgical pathology.
2. Histopathology
3. American Journal of Clinical pathology.
4. Journal of Clinical pathology.
5. Human pathology.
6. Clinics in Laboratory Medicine.
7. Clinics in Haematology and Oncology.
8. Cancer.
9. Pathology.
10. New England Journal of Medicine.
11. The Lancet
12. A.M.A. Archives of Pathology and Laboratory Medicine.
13. Diagnostic histopathology.
14. Journal of Pathology.

MICROBIOLOGY

1) Textbook of Microbiology by Ananthanarayan and Paniker
2) Practical Medical Microbiology J.G. Mackie and MC Cartney
3) Bailey and Scott's Diagnostic Microbiology
4) Roitt Ivan M, Essential Immunology
5) Parasitology by K.D.Chatterjee

**** Note :** The editions are as applicable and the latest editions shall be the part of the syllabi.

JOURNALS

1. Journal of Clinical Microbiology
2. Journal of Infectious Diseases
3. European Journal of Clinical Microbiology & Infectious Diseases
4. American Journal of Bacteriology
5. PLOS Pathogen
6. Indian Journal of Medical Microbiology
7. Indian Journal of Pathology & Microbiology
8. Indian journal of Medical Microbiology
9. International journal of Medical Microbiology
10. International Journal of Antimicrobial Agents

BIOCHEMISTRY

1) Textbook of Biochemistry for Medical Students, 8th Ed. - D.M. Vasudevan.
2) Lippincott's Illustrated Reviews: Biochemistry, 5th Ed.
3) Harper's Illustrated Biochemistry, 30th Ed.

**** Note :** The editions are as applicable and the latest editions shall be the part of the syllabi.

JOURNALS

1. Science
2. Nature and its associated publications (Eg, Nature Medicine, Nature Genetics, etc.)
3. Annual Review of Biochemistry
4. Clinical Chemistry
5. The Journal of Biological Chemistry (JBC)
6. Proceedings of National Academy of Sciences of the United States of America
7. Public Library of Sciences (PLOS) publications
8. Journal of Clinical Investigation (JCI)
9. Indian Journal of Clinical Biochemistry

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