SYLLABUS PRIOR REVISION FOR MD PATHOLOGY

SUSHIL KUMAR THAKUR

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN PATHOLOGY

Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

This programme is meant to standardize Pathology teaching at post graduate level throughout the country so that it will benefit in achieving uniformity in teaching and resultantly creating suitable manpower with appropriate expertise. The post graduate student should be trained in handling and processing histopathology, clinical pathology, microbiology, biochemistry and transfusion medicine samples with a knowledge of general principles and methodology.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

The learning objectives in the cognitive, psychomotor and affective domains are:

A. Cognitive Domain

1. Diagnose routine and complex clinical problems on the basis of histopathology (surgical pathology) and cytopathology specimens, blood and bone marrow examination and various tests of Laboratory Medicine (clinical pathology, clinical biochemistry) as well as Blood Banking (Transfusion Medicine).
2. Interpret and correlate clinical and laboratory data so that clinical manifestations of diseases can be explained.
3. Advise on the appropriate specimens and tests necessary to arrive at a diagnosis in a problematic case.
4. Correlate clinical and laboratory findings with pathology findings at autopsy, identify miscorrelations and the causes of death due to diseases (apart from purely metabolic causes).
5. Should be able to teach Pathology to undergraduates, postgraduates, nurses and paramedical staff including laboratory personnel.

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6. Plan, execute, analyse and present research work.
7. Make and record observations systematically and maintain accurate records of tests and their results for reasonable periods of time. Identify problems in the laboratory, offer solutions thereof and maintain a high order of quality control.
8. Capable of safe and effective disposal of laboratory waste.
9. Able to supervise and work with subordinates and colleagues in a laboratory.

B. Affective Domain

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

C. Psychomotor Domain

1. Able to perform routine tests in a Pathology Laboratory including grossing of specimens, processing, cutting of paraffin and frozen sections, making smears, and staining.
2. Able to collect specimens by routinely performing non-invasive out-patient procedures such as venipuncture, finger-prick, fine needle aspiration of superficial lumps and bone-marrow aspirates, and provide appropriate help to colleagues performing an invasive procedure such as a biopsy or an imaging guided biopsy.
3. Perform an autopsy, dissect various organ complexes and display the gross findings.
4. Should be familiar with the function, handling and routine care of equipments in the laboratory.

SUBJECT SPEIFIC COMPETENCIES

A. Cognitive domain

A post graduate student upon successfully qualifying in the MD (Pathology) examination should have acquired the following broad theoretical competencies and should be:

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1. Capable of offering a high quality diagnostic opinion in a given clinical situation with an appropriate and relevant sample of tissue, blood, body fluid, etc. for the purpose of diagnosis and overall wellbeing of the ill.

2. Able to teach and share his knowledge and competence with others. The student should be imparted training in teaching methods in the subject which may enable the student to take up teaching assignments in Medical Colleges/Institutes.

3. Capable of pursuing clinical and laboratory based research. He/she should be introduced to basic research methodology so that he/she can conduct fundamental and applied research.

B. Affective domain

1. The student will show integrity, accountability, respect, compassion and dedicated patient care. The student will demonstrate a commitment to excellence and continuous professional development.
2. The student should demonstrate a commitment to ethical principles relating to providing patient care, confidentiality of patient information and informed consent.
3. The student should show sensitivity and responsiveness to patients' culture, age, gender and disabilities.

C. Psychomotor domain

At the end of the course, the student should have acquired skills, as described below:

Surgical pathology

Skills

- Given the clinical and operative data, the student should be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and be able to correctly diagnose at least 80% of the lesions received on an average day from the surgical service of an average teaching hospital.
- A student should be able to demonstrate ability to perform a systematic gross examination of the tissues including the taking of appropriate tissue sections and in special cases as in intestinal mucosal biopsies, muscle biopsies and nerve biopsies, demonstrate the orientation of tissues in paraffin blocks.
- The student should be able to identify and systematically and accurately describe the chief histo-morphological alterations in the tissue received in the surgical pathology service. He/she should also correctly interpret and

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correlate with the clinical data to diagnose at least 90% of the routine surgical material received on an average day.

- Be conversant with automatic tissue processing machine and the principles of its running.
- Process a tissue, make a paraffin block and cut sections of good quality on a rotary microtome.
- Stain paraffin sections with at least the following:

    (i) Haematoxylin and eosin
    (ii) Stains for collagen, elastic fibers and reticulin
    (iii) Iron stain
    (iv) PAS stain
    (v) Acid fast stains
    (vi) Any other stains needed for diagnosis.

- Demonstrate understanding of the principles of:
    (i) Fixation of tissues
    (ii) Processing of tissues for section cutting
    (iii) Section cutting and maintenance of related equipment
    (iv) Differential (special) stains and their utility
- Cut a frozen section using cryostat, stain and interpret the slide in correlation with the clinical data provided.
- Demonstrate the understanding of the utility of various immuno-histochemical stains especially in the diagnosis of tumour subtypes.

Cytopathology

Skills

- Independently prepare and stain good quality smears for cytopathologic examination.
- Be conversant with the techniques for concentration of specimens: i.e. various filters, centrifuge and cytocentrifuge.
- Independently be able to perform fine needle aspiration of all lumps in patients; make good quality smears, and be able to decide on the types of staining in a given case.
- Given the relevant clinical data, he/she should be able to independently and correctly:

    (i) Diagnose at least 75% of the cases received in a routine laboratory and categorize them into negative, inconclusive and positive.

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(ii) Demonstrate ability in the technique of screening and dotting the slides for suspicious cells.

(iii) Indicate correctly the type of tumour, if present

(iv) Identify with reasonable accuracy the presence of organisms, fungi and parasites

Haematology

Skills

- Correctly and independently perform the following special tests, in addition to doing the routine blood counts:

  (i) Haemogram including reticulocyte and platelet counts.

  (ii) Bone marrow staining including stain for iron

  (iii) Blood smear staining

  (iv) Cytochemical characterization of leukemia with special stains like Peroxidase, Leukocyte Alkaline Phosphatase (LAP), PAS, Sudan Black, etc.

  (v) Hemolytic anemia profile including HPLC, Hb electrophoresis etc.

  (vi) Coagulation profile including PT, APTT, FDP.

  (vii) BM aspiration and BM biopsy

- Demonstrate familiarity with the principle and interpretation of results and the utility in diagnosis of the following:

  (i) Platelet function tests including platelet aggregation and adhesion and PF3 release

  (ii) Thrombophilia profile: Lupus anticoagulant (LAC), Anticardiolipin Antibody (ACA), Activated Protein C Resistance (APCR), Protein C (Pr C), Protein S (Pr S) and Antithrombin III (AT III)

  (iii) Immunophenotyping of leukaemia

  (iv) Cytogenetics

  (v) Molecular diagnostics.

- Describe accurately the morphologic findings in the peripheral and bone marrow smears, identifying and quantitating the morphologic abnormalities in disease states and arriving at a correct diagnosis in at least 90% of the cases referred to the Haematology clinic, given the relevant clinical data.

Laboratory Medicine

Skills

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- Plan a strategy of laboratory investigation of a given case, given the relevant clinical history and physical findings in a logical sequence, with a rational explanation of each step; be able to correctly interpret the laboratory data of such studies, and discuss their significance with a view to arrive at a diagnosis.
- Demonstrate familiarity with and successfully perform:
    i) routine urinalysis including physical, chemical and microscopic, examination of the sediment.
    ii) macroscopic and microscopic examination of faeces and identify the ova and cysts of common parasites.
    iii) a complete examination: physical, chemical and cell content of Cerebrospinal Fluid (C.S.F), pleural and peritoneal fluid.
    iv) semen analysis.
    v) examination of peripheral blood for commonly occurring parasites.

- Independently and correctly perform at least the following quantitative estimations by manual techniques and/or automated techniques.

    (i) Blood urea
    (ii) Blood sugar
    (iii) Serum proteins (total and fractional)
    (iv) Serum biIirubin (total and fractional)

- Demonstrate familiarity with the following quantitative estimations of blood/ serum by Automated Techniques:
  Serum cholesterol, Uric acid, Serum Transaminases (ALT and AST/SGOT and SGPT), etc.
- Prepare standard solutions and reagents relevant to the above tests, including the preparation of normal solution, molar solution and buffers.
- Explain the principles of Instrumentation, use and application of the instruments commonly used in the labs eg. Photoelectric colorimeter, Spectrophotometer, pH meter, Centrifuge, Electrophoresis apparatus, ELISA Reader, flow cytometer, PCR, chemiluminiscence.

Transfusion Medicine

Skills

The student should be able to correctly and independently perform the following:

- Selection and bleeding of donors
- Preparation of blood components i.e. Cryoprecipitates, Platelet concentrate, Fresh Frozen Plasma, Single Donor Plasma, Red Blood Cell concentrates.

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- ABO and Rh grouping.
- Demonstrate familiarity with Antenatal and Neonatal work up.
    (i) Direct antiglobulin test
    (ii) Antibody screening and titre
    (iii) Selection of blood for exchange transfusion
- Demonstrate familiarity with principle and procedures involved in:

    (i) Resolving ABO grouping problems.
    (ii) Identification of RBC antibody.
    (iii) Investigation of transfusion reaction.
    (iv) Testing of blood for presence of:
        (a) HBV (Hepatitis B Virus Markers).
        (b) HCV (Hepatitis C Virus Markers)
        (c) HIV (Human Immunodeficiency Virus Testing)
        (d) VDRL
        (e) Malaria

Immunohistochemistry

Skills (desirable)

- Be able to perform immuno-histochemical staining using paraffin section with at least one of the commonly used antibodies (Cytokeratin or LCA) using PAP method.

Syllabus

Course contents:

The study of Pathologic Anatomy includes all aspects of Pathology as encompassed in the branches of General and Systemic Pathology. Only the broad outlines are provided.

A) General Pathology:

Normal cell and tissue structure and function.

The changes in cellular structure and function in disease.

Causes of disease and its pathogenesis.

Reaction of cells, tissues, organ systems and the body as a whole to various sublethal and lethal injuries.

B) Systemic Pathology:

The study of normal structure and function of various organ systems and the aetiopathogenesis, gross and microscopic alterations of structure of these organ systems in disease and functional correlation with clinical features.

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C) Haematology

The study of Haematology includes all aspects of the diseases of the blood and bone marrow. This would involve the study of the normal, and the causes of diseases and the changes thereof.

1. Laboratory Medicine (Clinical Biochemistry/Clinical Pathology including Parasitology).
2. Transfusion Medicine (Blood Banking).
3. The student is expected to acquire a general acquaintance of techniques and principles and to interpret data in the following fields.

    a) Immunopathology
    b) Electron microscopy
    c) Histochemistry
    d) Immunohistochemistry
    e) Cytogenetics
    f) Molecular Biology
    g) Maintenance of records
    h) Information retrieval, use of Computer and Internet in medicine.
    i) Quality control, waste disposal

It is difficult to give a precise outline of the Course Contents for post graduate training. A post graduate is supposed to acquire not only the professional competence of a well-trained specialist but also academic maturity, a capacity to reason and critically analyse scientific data as well as to keep himself abreast of the latest developments in the field of Pathology and related sciences. A brief outline of what is expected to be learnt during the MD Course is given under each head.

Surgical Pathology

Knowledge

- The student should be able to demonstrate an understanding of the histogenetic and patho-physiologic processes associated with various lesions.
- Should be able to identify problems in the laboratory and offer viable solutions.

Autopsy Pathology

Knowledge

- Should be aware of the technique of autopsy.
- Should have sufficient understanding of various disease processes so that a meaningful clinico-pathological correlation can be made.
- Demonstrate ability to perform a complete autopsy independently with some physical assistance, correctly following the prescribed instructions, correctly

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identify all major lesions which have **caused, or contributed to the patient's death, on macroscopic examination alone and on microscopy in at least 90% of the autopsies in an average teaching hospital.**

- In places where non-medico-legal autopsies are not available each student should be made to observe at least five medico-legal autopsies.
- Write correctly and systematically Provisional and Final Anatomic Diagnosis reports.

Cytopathology

Knowledge

- Should possess the background necessary for the evaluation and reporting of cytopathology specimens.
- Demonstrate familiarity with the following, keeping in mind the indication for the test.

(i) Choice of site from which smears may be taken

(ii) Type of samples

(iii) Method of obtaining various specimens (urine sample, gastric smear, colonic lavage etc.)

(iv) Be conversant with the principles and preparation of solutions of stains

Haematology

Knowledge

- Should demonstrate the capability of utilising the principles of the practice of Haematology for the planning of tests, interpretation and diagnosis of diseases of the blood and bone marrow.
- Should be conversant with various equipments used in the Haematology laboratory.
- Should have knowledge of automation and quality assurance in Haematology.
- Correctly plan a strategy of investigating at least 90% of the cases referred for special investigations in the Hematology Clinic and give ample justification for each step in consideration of the relevant clinical data provided.

Laboratory Medicine

Knowledge

- Possess knowledge of the normal range of values of the chemical content of body fluids, significance of the altered values and its interpretation.
- Possess knowledge of the principles of following specialized organ function tests and the relative utility and limitations of each and significance of the altered values.

(i) Renal function tests

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(ii) Liver function tests

(iii) Pancreatic function tests

(iv) Endocrine function tests

(v) Tests for malabsorption

- Know the principles, advantages and disadvantages, scope and limitation of **a**utomation in the laboratory.
- Know the principles and methodology of quality control in the laboratory.

Transfusion Medicine (Blood Banking)

Knowledge

The student should possess knowledge of the following aspects of Transfusion Medicine.

- Basic immunology
- ABO and Rh groups
- Clinical significance of other blood groups
- Transfusion therapy including the use of whole blood and RBC concentrates
- Blood component therapy
- Rationale of pre-transfusion testing.
- Infections transmitted in blood.
- Adverse reactions to transfusion of blood and components
- Quality control in blood bank

Basic Sciences (in relation to Pathology)

a) Immunopathology

Knowledge

- Demonstrate familiarity with the current concepts of structure and function of the immune system, its aberrations and mechanisms thereof.
- Demonstrate familiarity with the scope, principles, limitations and interpretations of the results of the following procedures employed in clinical and experimental studies relating to immunology.
  (a) ELISA techniques
  (b) Radioimmunoassay
  (c) HLA typing
- Interpret simple immunological tests used in diagnosis of diseases and in research procedures.
  (i) Immunoelectrophoresis
  (ii) Immunofluorescence techniques especially on kidney and skin biopsies
  (iii) Anti-nuclear antibody (ANA)
  (iv) Anti-neutrophil cytoplasmic antibody (ANCA)

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b) Electron Microscopy

Knowledge

- Demonstrate familiarity with the principles and techniques of electron microscopy and the working of an electron microscope (including Transmission and Scanning Electron microscope: TEM and SEM)
- Recognise the appearance of the normal subcellular organelles and their common abnormalities (when provided with appropriate photographs).

c) Enzyme Histochemistry

Knowledge

- Should be familiar with the principles, use and interpretation of common enzyme histochemical procedures (Alkaline Phosphatase, Acid Phosphatase, Glucose-6-Phosphate Dehydrogenase, Chloroacetate Esterase).

d) Immunohistochemistry

Knowledge

- Demonstrate familiarity with the principles and exact procedures of various immunohistochemical stains using both PAP (Peroxidase-anti-peroxidase) and AP-AAP (Alk. Phosphatase-anti-Alk. Phosphatase) ABC (Avidin-Biotin Conjugate) systems; employing monoclonal and polyclonal antibodies.
- Be aware of the limitations of immuno-histochemistry.

e) Molecular Biology

Knowledge

- Should understand the principles of molecular biology especially related to the understanding of disease processes and its use in various diagnostic tests.
- Should be conversant with the principle and steps and interpretation of Polymerase Chain Reaction (PCR), Western Blot, Southern Blot, Northern Blot and Hybridisation) procedures.

f) Cytogenetics

Knowledge

- Demonstrate familiarity with methods of Karyotyping and Fluorescent in-situ Hybridisation (FISH).

g) Tissue Culture

Knowledge

- Demonstrate familiarity with methods of tissue cultu

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h) Principles of Medical Statistics

Knowledge

- Demonstrate familiarity with importance of statistical methods in assessing data from patient material and experimental studies.

TEACHING AND LEARNING METHODS

Post Graduate Training

Teaching methodology

Based on the available facilities, the Department can prepare a list of post graduate experiments pertaining to basic and applied Pathology. Active learning should form the mainstay of post graduate training; there should be lectures for post graduates (at least 20 per year), along with seminars, symposia, group-discussions and Journal clubs. The post graduate students should regularly do the ward rounds of various clinical departments and learn cases of interest for discussion with the clinical faculty. Each college should have a Medical Education Unit to generate teaching resource material for undergraduates and evolving of problem solving modules. Department should encourage e-learning activities.

Rotation:

Postings to laboratories/assignments

The three-year training programme for the MD degree may be arranged in the form of postings to different assignments/laboratories for specified periods as outlined below. The period of such assignments/postings is recommended for 35 months. Posting schedules may be modified depending on needs, feasibility and exigencies. For facilities not available in the parent institution as well as for additional knowledge and skill, extramural postings may be undertaken.

Section/Subject		Duration in months
(i)	Surgical Pathology and Autopsy and Pathology Techniques	12
(ii)	Haematology and Laboratory Medicine	10
(iii)	Cytopathology	08
(iv)	Transfusion Medicine/Blood Bank	02
(v)	Museum techniques and record management	01
(vi)	Basic Sciencesincluding Immunopathology, Electron microscopy, Molecular Biology, Research Techniques and cytogenetics etc	02
	Total	**35**

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The training programme should be designed to enable the student to acquire a capacity to learn and investigate, to synthesize and integrate a set of facts and develop a faculty to reason. The curricular programmes and scheduling of postings must provide the student with opportunities to achieve the above broad objectives. Much of the learning is to be accomplished by the student himself. Interactive discussions are to be preferred over didactic sessions. The student must blend as an integral part of the activities of an academic department that usually revolves around three equally important basic functions of teaching, research and service. As mentioned earlier, the emphasis recommended under a PG training programme is of learning while serving/working.

The following is a rough guideline to various teaching/learning activities that may be employed.

- Collection of specimens including Fine Needle Aspiration of lumps.
- Grossing of specimens.
- Performing autopsies.
- Discussion during routine activities such as during signing out of cases.
- Presentation and work-up of cases including the identification of special stains and ancillary procedures needed.
- Clinico-pathological conferences.
- Intradepartmental and interdepartmental conferences related to case discussions.
- Conferences, Seminars, Continuing Medical Education (CME) Programmes.
- Journal Club.
- Research Presentation and review of research work.
- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- Participation in workshops, conferences and presentation of papers etc.
- Laboratory work.
- Use and maintenance of equipment.
- Maintenance of records. Log books should be maintained to record the work done which shall be checked and assessed periodically by the faculty members imparting the training.
- Postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under

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supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., during the training

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination.

Quarterly assessment during the MD training should be based on:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I)

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

Post Graduate Examination

The Post Graduate examination shall be in three parts:-

1. **Thesis:**

   Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis,

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acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. **Theory**:

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

There shall be four theory papers:

Paper I:	General Pathology, Pathophysiology, Immunopathology and Cytopathology
Paper II:	Systemic Pathology
Paper III:	Haematology, Transfusion Medicine (Blood Banking) and Laboratory Medicine
Paper IV:	Recent advances and applied aspects

3. **Practicals/Clinical and Oral/viva voce Examination:**

The practical/clinical examination should consist of the following and should be spread over two days.

I. Clinical Pathology:

- Discussion of a clinical case history.
- Plan relevant investigations of the above case and interpret the biochemistry findings.
- Two investigations should be performed including at least one biochemistry exercise/clinical pathology exercise like CSF, pleural tap etc. analysis and complete urinalysis.

II. Haematology:

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- Discuss haematology cases given the relevant history. Plan relevant investigations
- Perform complete hemogram and at least two tests preferably including one coagulation exercise
- Identify electrophoresis strips, osmotic fragility charts etc. Interpretation of data from autoanalysers, HPLC and flow cytometry.

Examine, report and discuss around ten cases given the history and relevant blood smears and/or bone marrow aspirate smears and bone marrow biopsy interpretation.

III. Transfusion Medicine:

- Perform blood grouping
- Perform the necessary exercise like cross matching.
- Coomb's test, gel cards interpretation.

IV. Histopathology:

- Examine, report and discuss 12-15 cases histopathology and 5-8 cytopathology cases, given the relevant history and slides.
- Perform a Haematoxylin and Eosin stain and any special stain on a paraffin section. Should be conversant with histopathology techniques including cryostat.

V. Autopsy:

- Given a case history and relevant organs (with or without slides), give a list of anatomical diagnosis in a autopsy case.

VI. Gross Pathology

- Describe findings of gross specimens, give diagnosis and identify the sections to be processed. The post graduate student should perform grossing in front of the examiners for evaluation.

VII. Basic Sciences:

- 10-15 spots based on basic sciences be included
- Identify electron micrographs
- Identify gels, results of PCR, immunological tests including interpretation of Immunofluroscence pictures.
- Identify histochemical and immuno-histochemistry stains
- Teaching exercise 10 min

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All practical exercises are to be evaluated jointly by all the examiners.

An oral question-answer session should be conducted at the end of each exercise.

(a) Viva on dissertation and research methodology

(b) General Viva-Voce

Recommended Reading:

Books (latest edition)

1. Rosai and Ackerman's Surgical Pathology
2. Atlas and Text of Haematology by Tejinder Singh
3. Orell's Atlas of Aspiration Cytology
4. Lever's Dermatopathology
5. Novak's Gynecologic and Obstetric Pathology with Clinical and Endocrine Relations by Edmund R. Novak
6. Bone Pathology by H. Jaffe
7. MacSween's Pathology of the liver
8. Iochim's Lymph Node Pathology
9. Text Book on Breast Pathology by Tavasoli
10. Text Book on Thyroid Pathology by Geetha Jayaram
11. Theory and Practice of Histological Techniques by Bancroft
12. Gray's Diagnostic Cytopathology
13. Sternberg's Diagnostic Surgical Pathology
14. Dacie's Practical Haematology
15. Wintrobe's Haematology
16. Heptinstall's Pathology of the Kidney
17. Enzinger's Soft Tissue Tumours

Journals

03-05 international Journals and 02 national (all indexed) journals

~~1. Acta Cytologica~~

~~2. Journal of Pathology~~

~~3. Histopathology~~

~~4. British Journal of Haematology~~

~~5. Blood~~

~~6. Journal of Clinical Pathology~~

~~7. Diagnostic Cytopathology~~

~~8. Human Pathology~~

~~9. New England Journal of Medicine~~

~~10. Indian Journal of Pathology and M~~

~~11. Lancet~~

~~12. American Journal of Surgical Pathology~~

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~~13. Cancers~~

~~14. Modern Pathology~~

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Annexure 1

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE of ASSESSEE **SIGNATURE OF CONSULTANT** **SIGNATURE OF HOD**

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