Department of Pathology

MD Pathology Curriculum

1. Goals

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

The post graduate student should be trained in handling and processing histopathology, clinical pathology, microbiology, biochemistry and transfusion medicine samples with knowledge of general principles and methodology.

2. Programme outcomes

2.1 Cognitive

1. Diagnose routine and complex clinical problems on the basis of histopathology (surgical pathology) and cytopathology specimens, blood and bone marrow examination and various test 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 disease (apart from purely metabolic causes).
5. Should be able to teach Pathology to undergraduates, postgraduates, nurses and paramedical staff including laboratory personnel.
6. Plan, execute analyses 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 maintain a high order of quality control.
8. Capable of safe and effective disposal of laboratory use.
9. Able to supervise and work with subordinates and colleagues in a laboratory.

2.2 Psychomotor

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-prickm 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.

2.3 Affective

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 clinical or other colleagues 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 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.

3. Syllabus

3.1 Theory

System/Section	List of topics
1. General Pathology:	Normal cell and tissue structure and function. The changes in cellular structure and function in disease. Cause of disease and its pathogenesis. Reaction of cells, tissues, organ system and the body as a whole to various sublethal and lethal injuries.
2. Systematic Pathology	The study of normal structure and function of various organ systems and the aetiopathogenesis, gross and microscopic alterations of structure of these organs systems in disease and functional correlation with clinical features.
3. Hematology	The study of Hematology includes all aspects of the disease of the blood and bone marrow. This would involve the study of the normal, and the causes of disease and the changes thereof.
4. Allied Subjects	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 principle and to interpret data in the following fields. (a) Immunopathology (b) Electron microscopy (c) Histochemistry (d) Immunohistochemistry (e) Cytogenetics (f) Molecular Biology (g) Molecular Biology (h) Maintenance of records (i) Information retrieval, use of computer and internet in medicine. (j) Quality control, waste disposal.

3.2 Practical/ Skills (wherever applicable)

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 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 of tissue, make a paraffin block and cut sections of good quality on a rotary microtome.
- Stain paraffin sections with at least the following:
  (i) Haemotoxylin and eosin.
  (ii) Stains for collagen, elastic fibres and reticulin.
  (iii) Iron stain.
  (iv) PAS stain.
  (v) Acid fast stains.
  (vi) Any other stains needed for diagnosis.
- Demonstrate understanding of 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 immune-histochemical stains especially in the diagnosis of tumor subtypes.

Cytopathology Skills:

- Independently prepare and stain good quality smears of 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 categorise them into negative, inconclusive negative.
  (ii) Demonstrate ability in the technique screening and dotting the slide for suspicious cells.
  (iii) Indicate correctly the type of tumor, if present
  (iv) Identify the reasonable accuracy the presence of organisms, fungi and parasites.

Hematology Skills:

- Correctly and independently perform the following special test, 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 Phosphate (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 leukemia
(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 hematology clinic, given the relevant clinical data.

Laboratory Medicine Skills:

- 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 a diagnosis.
- Demonstrate familiarity with the 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 flowing quantitative estimation by manual techniques and / or automated techniques.
  (i) Blood urea.
  (ii) Blood sugar.
  (iii) Serum proteins (total and fractional)
  (iv) Serum bilirubin (total and fractional)

- Demonstrate familiarity with the following quantitative estimation 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.
- 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) VDRI
(e) Malaria.

Immunohistochemistry Skills (desirable):

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

4. PG activity programme

S.No	Activity	Frequency
1	Slide Seminar	Once a week
2	Grand seminar	Once a week
3	Gross Meet	Once a week
4	Technique/Journal club/Case discussion	Once a week
5	Thesis review/	6 Monthly
6	Invited Guest Lectures	One /Month
7	Presentation by faculty and students : Peer review	Regional/National/International conferences/project submission

Note: The above will be in addition to routine departmental activities, teaching on pentahead microscopes and undergraduate teachings .

Refer Annexure 1 for List of topics, level of competence and teaching learning and assessment methods and Annexure 2 as timeline for departmental T/L activities and Annexure 3- semester wise T/L activities

5. Rotations/postings

S.No	Department (Internal/External)	Duration & timing	Rotation objectives
1	Surgical Pathology and Autopsy and Pathology Techniques	15	
2	Haematology and Laboratory Medicine	10	
3	Cytopathology	06	
4	Transfusion Medicine/Blood Bank	01	
5	Microbiology	01	
6	Biochemistry	01	
7	Extramural: Immunopathology, Electron microscopy, Molecular Biology, Research Techniques and cytogenetics	01	

6. Dissertation

Activity	January admission	July admission
Selection of topic in consultation with PG Guide	March / April	September / October
Approval by Department PG Committee		
Institute Scientific Committee approval	May / June	November / December
Institute Ethics Committee approval		
Final approval letter by Academics Section	30th June	31st December
Final submission to academic section		

7. Assessment plan

7.1 Six monthly reports: as per standard format. Format to be attached as Annexure - 4

Continuous assessment of knowledge and skills will be done in each section. Assessment of affective domain will be an ongoing process done by direct observation during patient care, lab work and undergraduate teaching. Constructive feedback will be given to improve learning, professionalism and communication skills.

7.2 List of certifiable skills

1. Diagnose routine and complex clinical problems on the basis of histopathology (surgical pathology) and cytopathology specimens, blood and bone marrow examination and various test of laboratory medicine (clinical pathology, clinical biochemistry) as well as Blood Banking (Transfusion Medicine)
2. Able to perform and interpret routine tests in a Pathology Laboratory including grossing of specimens, processing, cutting of paraffin and frozen sections, making smears and staining., CBC, PT, APTT, urine examination and examination of body fluids and blood grouping, cross matching.
3. 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.
4. Perform an autopsy, dissect various organ complexes and display the gross findings .
5. Able to communicate results to patients, explain procedures, work as part of team
6. Able to counsel regarding ancillary tests to be done for arriving at final diagnosis , prognostication and guide the therapy

Note: The skills outlined in syllabus need to acquired as basic competency and would be evaluated as continuous assessment.

With advances in diagnostic modalities the list of skills will keep expanding .

7.3.1 Theory

a. a. Formative Assessment

S.N.	Schedule	Marks
1.	At end of First year	100 (1 Paper)
2.	At end of Second year	100 (1 Paper)
3.	Pre-professional	400 (4 Papers of 100 marks each)
	Total	600 Marks

7.3.2 Practical

S.N.	Schedule	Marks
1.	At end of First year	100
2.	At end of Second year	100
3.	Pre-professional	400 (Practical 300 + Viva 100)
	Total	600 Marks

Eligibility for Professional assessment:

- Candidate should secure a minimum of 40% marks in Theory and Practical separately in formative assessments, in order to be eligible to appear for Professional Examination
- Atleast four out of six monthly progress report should be satisfactory
- Acceptance of Dissertation is mandatory
- Successful completion of Research Methodology programme at induction
- The post graduate students would be required to present one poster presentation, to read one paper at a national/state conference and to submit one research paper for publication/ during period of their postgraduate studies.

b. Final Professional Assessment

A	Theory	4 Papers each of 100 marks = 400 marks
B	Practical	Practical/ Clinical Case + Viva = 400 marks

Refer Annexure 5 for Theory paper topics, Annexure 6 for practical exercises and Annexure 7 for marks distribution in Professional examination.

Note:
(A) Minimum 40% marks in each paper and aggregate of 50% marks in order to be declared pass in theory exam
(B) Minimum 50% marks required in Theory & Practical separately, in order to be declared successful in summative exam

7. Recommended Reading
   a. Books

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

   b. Journals

1. ActaCytologica
2. The American Journal of Pathology
3. The American Journal of Surgical Pathology
4. The American Journal of Hematology
5. The American Journal of Clinical Pathology
6. British Journal of Haematology
7. Blood
8. Diagnostic Cytopathology
9. Histopathology
10. Indian Journal of Pathology and Microbiology
11. Indian J of Cancer
12. Indian J of Cytology

Annexure – I

T/L Methods , Level and Assessment method

Sr.No.	Cognitive Domain	Level	T/L Methods	Assessment
1.	Advice a test, collect sample, interpret and analyse to arrive at a diagnosis in the given clinical situation	Analyse, evaluate, synthesize	SGD, seminars, PBL, SDL	Formative assessments Summative: Theory Viva Quiz
2.	Teach ,communicate ,train team members and students	Internalise, express	Small group teachings, Practical teaching, PG activity	Formative Assessment
3.	Research capability	Synthesis	Thesis, Participation in departmental projects	Thesis , publication
Affective Domain				
1.	Upholds professional standards Sensitive to gender, culture and age Ethical issue	Valuing, organization, Characterization Sympathy , Integrity	Role play	DOPS OSPE WPBA
	PSYCHOMOTOR	Level	T/L Method	Assessment
Surgical Pathology				
1.	Gross and microscopic examination and clinic-pathological correlation Tissue processing staining	Perform	Practical demonstration Performance	WPBA: (S)Viva Practical Examination
2.	Frozen Section	Know, interprete	Demonstration Interpretation of slides	(F) WPBA of Accuracy of diagnosis
3.	IHC staining	Know, interprete	Demontration	WPBA of Accuracy of interpretation
Cytology				
1.	Routine and special stains , microscopy, diagnosis PAP,MGG, HE,AFB, PAS	Know, interpret Integrate	Demonstration Interpretation of slides	(F)& (S)Accuracy of differentiating benign from malignant and type of tumor Id of organism Practical Exam Viva
2.	Cell block, IHC	Know, interprete	Demonstration Interpretation	(F) &(S)Viva, accuracy
3.	Use of special techniques ROSE, Imprints Filters	Know, interprete	Demonstration Utility &Interpretation	Viva, DOPS(S)
4.	Technique of FNAC and scrape	Perform	Perform, interpret	Adequacy of material, interpretation (F)

Hematology				
1.	Routine tests Haemogram including reticulocyte and platelet counts. Bone marrow staining including stain for iron Blood smear staining Cytochemical characterization of leukemia with special stains like Peroxidase, Leukocyte Alkaline Phosphatase (LAP) PAS, Sudan Black, etc Hemolytic anemia profile including HPLC, Hb electrophoresis etc. Coagulation profile including PT, APTT, FDP. BM aspiration and BM biopsy PS, Clinical correlation	Know, perform, interpret	Demonstration Performance	(F)Quality Interpretation Use and care of equipments (S)Viva Practical Exam(S)
Specialized tests				
1.	Platelet function tests including platelet aggregation and adhesion and PF3 release 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) 1.Immunophenotyping of leukaemia 2.Cytogenetics 3. Molecular diagnostics.	Know interpret	Demonstration PBL CBL OMP Mini-Cex	Interpretation (S)Viva
Lab Medicine				
1.	Routine urinalysis including physical, chemical and microscopic, examination of the sediment. Macroscopic and microscopic examination of faeces and identify the ova and cysts of common parasites. A complete examination: physical, chemical and cell content of Cerebrospinal Fluid (C.S.F), pleural and peritoneal fluid. semen analysis. Examination of peripheral blood for commonly occurring parasites.	Perform	Demonstration Performance	(S)Viva DOPS OSPE Formative at the end of each semester

2.	Quantitative estimates of Blood Sugar KFT LFT Electrolytes Metabolites	Perform	Demonstration Performance	(S)Viva DOPS OSPE Formative at the end of each semester
3.	Handling of equipments, quality checks, principles	Know	SGD, Peer teaching	Viva
4.	Ordering and preparation, storage of reagents	Know	SGD, Peer teaching	Viva
Transfusion Medicine				
1	Perform routine procedures in blood bank Selection of blood Donor ABO grouping Collection of blood Preparation of com[ponents Workup of transfusion reactions, coombs test Cross matching	Perform	Perform	(F)& (S)Viva DOPS/WPBA OSPE
2.	Specialized tests Resolving issues in blood grouping Antibody screening TTI workup NAT testing	Know	Demonstration PEER Teaching SGD CBL	Viva
Ancillary tests				
1.	Immunofluorescence and	Know	Demonstration *Extramural	Theory
2.	applications			Viva
3.	FISH			Quiz
4.	Flow cytometry			Case Discussion
5.	Molecular diagnosis			
6.	Cytogenetics			

Annexure – II

TEACHING LEARINING ACTIVITIES:

Timeline for departmental T/L activities

SR NO	Category	Activity	1	2	3	4	5	6
1	Academic	UG Teaching PG Activity Case Based Learning Ward Visits						
2	Dissertation	Selection of topic & synopsis submission						
		Review of Lit &Data Collection						
		Analysis & Submission						
3	Rotational Posting	Sectional duties Sample collection &processing Daily participation in reporting						
4	Resident Emergency duties	Practice of clinical and lab skills						
5	Clinicopathological conferences	Intra & Interdepartmental CME, Discussions						
		Presentation of poster and paper						
6	Workshop	Research Methodology						
		MET						
7	Publication	Indexed Journal						
8	Community Service	Participation in screening camps, blood donation camp, awareness program						
9	Lab Maintenance	Participation in quality checks, BMW training, Maintenance of records and equipments						

The teaching learning activities would consist of:

- Participating in preparing and conducting undergraduate classes under supervision.
- Microteaching sessions.
- Journal clubs moderated by teachers.
- Seminars, symposia, panel discussion of suitable topics moderated by teachers.
- Small group discussion.
- Dissertation work presentation.
- Attend & participate in CME, conferences, workshops & share knowledge & experiences with others.
- Rotation in Clinical Departments to gain the knowledge of techniques used to study the functions of various systems.

Annexure – III

Teaching Program: (Semester wise)

To achieve the above objectives in three years, following structured programme will be implemented in six semesters:

Semester I	1. Orientation to the Department. 2. Enroll for 6 month "Basic Course in Biomedical Research" conducted by National Programme on Technology Enhanced Learning (NPTEL). 3. Selection of topic for Dissertation under the guidance of allotted guide. 4. Writing and submission of the Dissertation synopsis to Research committee and Institutional Ethical committee. 5. Participate in preparing and conducting undergraduate classes. 6. Rotation in cytology/Clinical Pathology/Hematology
Semester II	1. Participate in Basic Course of Medical Education Training 2. Participate in preparing and conducting undergraduate classes. 3. Dissertation work – Review of Literature, Data Collection. 4. Rotations to Clinical pathology/Hematologys. 5. Attend National/ State Conference (Oral/Poster Presentation).
Semester III	1. Participate in preparing and conducting undergraduate classes. 2. Seminar presentation. 3. Journal club. 4. Dissertation work- Data collection. 5. Rotation to Cytology/histopathology/Hematology Laboratories.
Semester IV	1. Participate in preparing and conducting undergraduate classes. 2. Seminars. 3. Journal clubs. 4. Dissertation work- Data collection and Dissertation writing. 5. Rotation to Histopathology/extramural. 6. Clinical Rotation to other Departments. (4 weeks) 7. Paper presentation in National Conference.
Semester V	1. Participate in preparing and conducting undergraduate classes. 2. Seminars. 3. Journal club. 4. Submission of Dissertation. 5. Rotation to Histopathology/revision posting/ancillary techniques. 6.Clinical Rotations to other Departments.: Biochemistry/Microbiology/Transfusion medicine Each 1 month) 7. Paper publication in peered reviewed journal.
Semester VI	1. Participate in preparing and conducting undergraduate classes. 2. Seminars. 3. Journal clubs. 4. Rotation to Histopathology

Annexure – IV

अखिल भारतीयआयुर्विज्ञान संस्थान, नागपुर

All India Institute of Medical Sciences, Nagpur

Six monthly Progress Report for Postgraduate Students

SECTION I

Name of the PG student: _____

Department:_____

Admitted in (Month and Year):_____

Name of the PG Guide:_____

Report for the period:_____ to_____

Attendance: _____days out of days (_____%)

SECTION II

Grading as per performance

	80% and above
	65% to 79%
	50% to 64%
	Below 50%

1. **OPD work:** **2. Lab skills:**
3. **Self Directed learning:** **4. Departmental assigned work:**
5. **Emergency Duties:** **6.Teaching assignments:**

Section III

Progress of Dissertation

_____
_____
_____

Section IV

1. **Case Presentations:**

Sr. No.	Title of case	Date	Faculty I/C	Marks

2. **Microteaching:**

Sr. No.	Topic	Date	Faculty I/C	Marks

3.Seminars:

Sr. No.	Title of presentation	Date	Faculty I/C	Marks

4. Journal Clubs:

Sr.	Journal	Title of Paper	Date	Faculty I/C	Marks

5. Marks obtained in tests:

Sr. No.	Date	Theory / Practical	Marks obtained

6. Any other academic activity conducted:

Section V

1. Papers presented

Sr. No.	Title of Paper	Authors	Event	Date

2. Posters presented

Sr. No.	Title of Poster	Authors	Event	Date

3. Publications

(Note: Mention only those publications that are published or are accepted for publication during the said period only)

Sr. No.	Title of Paper	Authors	Journal	Year/ Vol/ Issue	Page Nos	Indexed /Non-Indexed	Status

Section VI

Any other significant achievement:

Certificate by the PG Guide and Head of Unit

This is to certify that Dr._____, has an attendance of _____%, during the period _____to_____.

Overall Grading:_____

Date:_____

Name and Signature of PG Guide:

Name and Signature of Head of Unit:

Certificate by the Head of Department

This is to certify that the performance of Dr._____, during the period _____to_____, has been **satisfactory/ average / unsatisfactory.**

Overall Grading:_____

Date:_____

Name and Signature of HOD:

Annexure – V

Theory Papers:Topic Distribution

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

Annexure – VI

Practicals/Clinical and Oral/viva voce Examination:

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

I. Clinical Pathology:

1. Discussion of a clinical case history.
2. Plan relevant investigations of the above case and interpret the biochemistry findings.
3. 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:

1. Discuss haematology cases given the relevant history. Plan relevant investigations
2. Perform complete hemogram and at least two tests preferably including one coagulation exercise
3. 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:

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

IV. Histopathology:

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

V. Autopsy:

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

VI. Gross Pathology

1. 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:

1. 10-15 spots based on basic sciences be included
2. Identify electron micrographs
3. Identify gels, results of PCR, immunological tests including interpretation of Immunofluroscence pictures.
4. Identify histochemical and immuno-histochemistry stains
5. Teaching exercise 10 min

All practical exercises are to be evaluated jointly by all the examiners.
An oral question-answer session shall be conducted at the end of each exercise.

Grand Viva:

a) Viva on dissertation and research methodology

b) General Viva-Voce

Annexure – VII

Distribution of Marks: Professional and Preprofessional Examination

	Time	**Assessment Tool**	**Marks**		**Total**
Theory	3 Hours	Paper 1,II,III,IV	100 Each		400
Pattern		2 structured LAQ	50		
		5 SAQ	50		
Practical	2 days		Procedure	Viva	400
1		Clinical Case	20	15	
2		Hematology Case	20	10	
3		Gross & Autopsy	10	15	
4		Histopathology Technique	10	10	
5		Slides: Histopathology: 25 Cytology:7 Hematology: 8	200		
6		Transfusion Medicine	10	10	
7		Basic Sciences Spots	30	-	
8		Grand Viva	-	50	
		Total	300	100	