SRI BALAJI VIDYAPEETH

(DEEMED TO BE UNIVERSITY)

U/S 3 OF UGC ACT 1956

Puducherry–607402

Accredited by NAAC with 'A' Grade

MD PATHOLOGY

POST GRADUATE CURRICULUM

For course conducted in

MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE

And

SRI SATYA SAI MEDICAL COLLEGE AND RESEARCH INSTITUTE

Preface 1

The promulgation of the much-awaited Competency Based Medical Education (CBME) for post graduate programs by the National Medical Council is a welcome move. Sri Balaji Vidyapeeth (SBV), Puducherry, deemed to be University, declared u/s 3 of the UGC Act. and accredited by the NAAC with A grade, takes immense privilege in preparing such an unique document in a comprehensive manner and most importantly the onus is on the Indian setting for the first time, with regard to the competency based medical education for post graduate programs that are being offered in the broad specialty departments. SBV is committed to making cardinal contributions that would be realised by exploring newer vistas. Thus, post graduate medical education in the country could be made to scale greater heights and SBV is poised to show the way in this direction.

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Preface 2

The National Medical Council has laid down the PG curricula in their website https://www.nmc.org.in/information-desk/for-colleges/pg-curricula-2 that is listing the syllabus course wise, listing competency to some extent, teaching learning methods and the assessment methods as well. The document describes competencies in three domains (knowledge, skill, and attitude). However, the most significant problem in competency-based training is the development of appropriate assessment tools.

The salient feature of this document is defining the program educational objectives (PEO) for its postgraduate program as a whole, defining program outcomes (PO) based on the competencies to be practiced by the specialist, course outcomes (CO) and program specific sub-competencies and their progression in the form of milestones. The compilation of the milestone description leads to the formation of the required syllabus. This allows the mentors to monitor the progress in sub-competency milestone levels. It also defines milestone in five levels, for each sub-competency. Although NMC has described three domains of competencies, the domain 'Attitude' is elaborated into 4 more competencies for ease of assessment. The six competency model (ACGME) for residency education: Medical Knowledge, Patient Care, Practice Based Learning and Improvement, Systems Based Practice, Professionalism, Inter personal and Communication Skills gives better clarity and in-depth explanation and is used in this document. The sub-competency and their milestone levels are mapped into the entrustable professional activities(EPA) that are specific to the individual postgraduate program. While doing all this, the syllabus prescribed by NMC is fully incorporated into the curriculum. To make the program more relevant, PEO, PO, CO and EPAs are mapped with each other. EPAs which are activity based are used for formative assessment and graded. EPA assessment is based on workplace based assessment (WPBA), multisource feedback (MSF) and eportfolio. A great emphasis is given on monitoring the progress in acquisition of knowledge, skill and attitude through various appraisal forms including e-portfolios during three years of residency period.

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Foreword

The Postgraduate curriculum in Pathology has evolved into a Competency Based Medical Education which provides an objective mode of teaching and evaluation. Based on the MCI guidelines the curriculum is modified to accommodate program outcomes, course outcomes and thereby achieving the Program Educational Objectives.

The Entrustable Professional Activities are defined with the levels of achievement for individual postgraduate student for each phase of their program, thereby enabling self assessment and improvement as well. The 360 degree feedback and e- portfolio will assist in learning and evaluation of all the three domains – cognitive, psychomotor and affective.

The new curriculum encompasses recent concepts and their applications in the core, which will provide exposure to the practical skills to be acquired.

Overall the postgraduates will get an opportunity to learn, practice, analyse and teach the basics of Pathology, during their tenure.

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1.1 Acknowledgments:

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1 List of Abbreviations and Acronyms

PEO	Programme Educational Objective
PO	Programme Outcome
CO	Course outcome
EPA	Entrustable Professional Activity
MK	Medical Knowledge
PC	Patient Care
SBP	System Based Practice
PBLI	Practice Based Learning and Improvement
IPCS	Interpersonal Communication Skills
P	Professionalism

2 Preamble

The competency based curriculum should take into account the needs of the society, both local and global. It needs to outline the demand for the present day as well as future. The curriculum needs to be reviewed at least every five years to address the trending needs, as new knowledge is evolving and communication of the same is seamless. Accordingly the competencies need to meet the societal needs detailing the cognitive, psychomotor and affective domain development for attaining these competencies.

The curriculum indicates to the candidate the knowledge, basic skills and attitudes required to become a Pathologist. It disciplines the thinking habits for problem solving and discovery of new knowledge in the field of Insert speciality. It defines the Teaching - Learning methods adopted for the resident to achieve the goals and the methods of assessment performed throughout the training period and at the completion of training. The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment.

3 Programme Educational Objective (PEO)

Programme Educational Objectives are broad statements that describe what graduates are expected to attain within few years of completing their programme. These are based on the needs of the society as analysed and outlined by the regulatory body. So as defined by NMC, the PEO for MD Pathology are as follows:

- **PEO1:** Pathologist who can provide all diagnostic information in the fraternity of laboratory medicine especially in Histopathology,Cytopathology, Clinical Pathology, Hematologyand Transfusion Medicine with a knowledge of general principles and methodology with interpretation of values.
- **PEO2:** Understands health care system and be a leader and as a part of a team, to 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.
- **PEO3:** Communicator(Affective domain) Interpret and correlate clinical and laboratory data so that clinical manifestations of diseases can be explained.
- **PEO4:** Life long learner keen on updating oneself regarding the advancement in diagnostic field and capable to teach Pathology to undergraduates, postgraduates, nurses and paramedical staff including laboratory personnel.
- **PEO5:** Professional who understands and follows the principle of bio-ethics / ethics related to health care system and biomedical waste disposal, quality system and ensures good clinical laboratory practices

4 Programme Outcome (PO)

POs represent broad statements that incorporate many areas of inter - related knowledge and skills developed over the duration of the programme through a wide range of courses and experiences. They represent the big picture and describe broad aspects of knowledge, skill and attitude development. They encompass multiple learning experiences.

After a period of 3 years, the resident should be able to attain the following PO's:

- **PO1:** Provide a definitive diagnosis in Histopathology, Cytology, Clinical Pathology and Hematology.
- **PO2:** Practice safe blood transfusion practices with management of its adverse reactions.
- **PO3:** Interpret all routine diagnostic tests and handle in trouble shootings.
- **PO 4:** Identify patient safety and system approach to different errors in laboratory in phases like pre-analytical, analytical and post-analytical.
- **PO5:** Communicate with colleagues, faculty and stake holders of the health care system.
- **PO6:** Update with recent advances and Develop communication skills to word reports and professional opinion as well as to educate students and interact with patients, peers and paramedical staff, and for effective teaching.
- **PO7:** 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.
- **PO8:** Perform Self Directed Learning and Critical appraisal of medical literature.
- **PO9:** Develop & execute a protocol for a scientific research project, collect and analyze the data and scientifically communicate to the others.

5 Course and Course Outcomes (CO)

CO's describe the learning that will take place across the curriculum through concise statements, made in specific and measurable terms, of what students will know and /or be able to do after successful completion of each course.

There are four courses for MD Pathology:

1. Course 1 (C1) : General Pathology, Pathophysiology, Immunopathology and Cytopathology
2. Course 2 (C2): Systemic Pathology.
3. Course 3 (C3): Haematology, Transfusion Medicine (Blood Banking) and Laboratory Medicine.
4. Course 4 (C4): Recent advances and Applied aspects.

5.1 Course 1 (C1) (General Pathology, Pathophysiology, ImmunoPathology and Cytology)

C1.1.Aquire Basic knowledge about the General Pathology.

C1.2 Be Familiar with the concepts of Pathophysiology and Immunopathology.

C1.3 Possess background knowledge about Cytopathology and able to perform its techniques.

C1.4 Undergo Basic Course in Biomedical Research, Data collection and analysis, Scientific communication.

5.2 Course 2 (C2) (Systemic Pathology)

C2.1 Capable of performing a systematic gross examination of the tissues and demonstrate the orientation of tissues in paraffin blocks.

C2.2 Identify and systematically and accurately describe the chief histo-morphological alterations in the tissue received in the surgical pathology service.

C2.3 Conversant with automatic tissue processing machine and the principles of its running.

C2.4 Capable of Tissue processing, make a paraffin block and cut sections of good quality on a rotary microtome and also able to stain the tissue with various stains.

C2.5 Capable to do frozen section using cryostat, to stain and interpret the slide in correlation with the clinical data provided.

C2.6 Able to understand the utility of various immunohistochemical stains especially in the diagnosis of tumour subtypes.

C2.7 Capable of performing the Adult and Fetal autopsy.

5.3 Course 3 (C3) (Hematology, Transfusion medicine, Laboratory medicine)

C3.1 Capable of performing various routine and special haematological test and also molecular investigation related to hematology.

C3.2 Capable of performing various clinical pathology investigations like urine analysis, fluid examination and semen analysis.

C3.3 Capable of performing various laboratory medicine investigation and good clinical laboratory practice (GCLP).

C3.4 Capable of Donor selection and drawing blood from donor, Prepration of components and blood grouping.

C3.5 Capable of performing Antenatal and Neonatal work up and other work up related to transfusion services.

5.4 Course 4 (C4): Recent Advances and Applied aspects

C4.1 Demonstrate familiarity with the principles and techniques of various advances in Pathology like Immunohistochemistry, Immunofluorescence and Electron microscopy.

C4.2 Possess the knowledge of various molecular techniques like PCR and FISH.

C4.3 Demonstrate familiarity with the principles of Biostatistics.

C4.4 Possess knowledge about Biomedical waste management.

5.5 Mapping of PEO, PO and CO

Programme mapping facilitates the alignment of course - level outcomes with programme outcomes. It allows faculty to create a visual map of a programme. It is

also used to explore how students are meeting program - level outcomes at the course level. Outcomes mapping focuses on student learning also.

Table1. Mapping of PEO, PO and CO

	PEO1		PEO1PEO3	PEO1	PEO2 PEO3	PEO2 PEO3 PEO4 PEO5	PEO2 PEO4	PEO4 PEO5	PEO5
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
C1	Y		Y	Y	Y		Y	Y	Y
C2	Y		Y	Y	Y	Y	Y	Y	Y
C3	Y	Y	Y	Y	Y	Y	Y	Y	Y
C4					Y	Y		Y	Y

All courses run concurrently for 3 years, with a summative assessment at the end.

6 Competencies, Sub - competencies and milestones

The post graduate programme is competency based, consisting of six domains of competency. Sub - competencies under these domains, specific to the speciality, have been mentioned in general terms. The progression through the curriculum is detailed in sub - competency milestone levels, that direct the prescribed syllabus. These sub - competency milestones are mapped to the Entrustable Professional Activities (EPAs), identified as essential for a specialist. Formative assessment includes EPA assessment, and is carried out every quarter using appropriate tools, for identifying eligibility for transfer of trust, to the resident.

6.1 Domain of Competencies

1. **Medical Knowledge (MK)**–Acquiring Knowledge of established and evolving biomedical, clinical, epidemiological, and social – behavioural sciences and the application of this knowledge to patient care.
2. **Patient Care/Procedural Skill (PC/PS)**–Demonstrate ability to provide patient - centred care/demonstrate skills required for teaching and conducting research.
3. **System Based Practise (SBP)** - Demonstrate the ability to follow the standard operating procedures relevant to practices of the organisations for patient care, inculcating quality and economical practices.
4. **Practice Based Learning and improvement (PBLI)** - Demonstrate the commitment to learn by literature search, feedback, practice and improve upon their ability.
5. **Interpersonal Communication skills (IPCS)** - Demonstrate behaviour and skills that result in the effective communication, exchange of information and cooperation with patients, their families, and health professionals
6. **Professionalism (P)** - Demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.

6.2 Sub - competencies

6.2.1 Medical Knowledge (MK)

Mk 1: knowledge specific to General pathology and Pathophysiology.

Mk 2: Knowledge required for Immunopathology.

Mk 3: Knowledge specific to Diagnostic Cyto-Pathology and Cytological techniques.

Mk 4: Knowledge required for Systemic Pathology.

Mk 5: Knowledge specific to Surgical Pathology.

MK6: Knowledge required for Autopsy Pathology.

Mk 7: Knowledge required for Haematology.

Mk 8: Knowledge specific to Blood Banking (Transfusion Medicine).

Mk 9: Knowledge required for principles and practices of Laboratory Medicine.

Mk 10: Knowledge specific to recent advances and applied aspects.

Mk 11: Knowledge required for presenting Seminars and Journal club.

6.2.2 Patient Care/ Procedural skill (PC/PS)

PS 1: Perform gross examination of surgical pathology specimens

PS2: Perform grossing in grossing station.

PS 3: Interpretation of Microscopic findings in tissue.

PS 4: Perform Histotechniques in Histopathology laboratory

PS 5: Perform And Interpretation of FNAC and other Cytological smears (PAP smear, Sputum, Bronchial washings, Serous effusions, etc.

PS 6: Interpretation of Frozen sections

PS 7: Selection, performance and interpretation of appropriate Immuno-histochemical (IHC) markers.

PS 8: Interpretation of Bone Marrow Smears

PS 9: Perform and Interpretation of routine haematological investigations like haemoglobin, TLC, DLC, ESR PCV, Blood indices and peripheral smear.

PS 10: Perform and Interpretation of special investigations like Reticulocyte count, Sickling test, Osmotic Fragility Test, Haemoglobin Electrophoresis, Fetal Haemoglobin, etc.

PS 11: Planning investigations for a Clinical case

PS 12: Perform and Interpret Urine Examination, Body fluids and semen analysis

PS 13 : Interpretation of ancillary techniques like Immunofluorescence, Karyotyping, FISH, PCR and Electron Microscopy.

PS 14 : Demonstration of familiarity within laboratory investigations in Microbiology and Biochemistry

PS 15 : Perform and interpret Blood banking techniques (Blood grouping , Rh typing, Cross-matching and Coomb's test, ELISA for infectious disease)

PS 16 : Selection of blood donors and Management of adverse donor reactions.

PS 17 : Perform investigation for a case of mismatched blood transfusion.

PS 18 : Participation and Presentation in multidisciplinary meetings like tumor boards, CPCs, Dermato-Pathological conferences.

PS 19 : Teaching pathology to undergraduates (MBBS), and allied health sciences like BDS, BSc (Nursing), BSc (MLT), BSc (Radiology), etc.

6.2.3 System Based Practice

IPCS 1: Communicate the reports effectively with clinician, patients and families.

IPCS 2: Communication with Colleagues and Technical staffs

IPCS 3: Teaching to Undergraduates students and other colleagues

6.2.4 Practice based learning and improvement

PBLI 1: Self-directed Learning/Critical Appraisal of Medical Literature.

6.2.5 Interpersonal communication skills

SBP 1: Laboratory safety and Systems. Approach to Laboratory Errors.

6.2.6 Professionalism

P 1: Compassion, Integrity, and Respect for Others

P 2: Feedback

6.3 Milestone Levels for Sub–competencies.

6.3.1 Medical Knowledge

MK 1: Knowledge specific to General pathology and Pathophysiology.

Knowledge specific to General pathology and Pathophysiology.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate a knowledge of normal anatomy, histology and functions of various organs Demonstrate the Knowledge of basic pathophysiology, cellular adapataions and cell injury	In addition to milestone level 1 Demonstrate the knowledge about inflammation and repair. Also demonstrate the knowledge about the mechanism of Hypersensitivity and Neoplasia.	In addition to milestone level 2 demonstrate the knowledge about various genetic disorders and pathophysiology of various genetic diseases and autoimmunity Also demonstrate the knowledge about the various infectious diseases	In addition to milestone level 3 Demonstrate an in-depth knowledge regarding environmental and childhood disease.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in Pathophysiology of diseases.

MK 2: Knowledge required for Immunopathology.

Knowledge required for Immunopathology.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate knowledge of normal structure and function of immune system.	In addition to milestone level 1 Demonstrate the knowledge about classification and mechanism of various Immunological diseases. Also demonstrate the knowledge about the mechanism of Hypersensitivity and Neoplasia.	In addition to milestone level 2 demonstrate the knowledge about various autoimmune diseases. Also demonstrate the knowledge about scope and principles of various immunological test like (a) ELISA techniques (b) Radioimmunoassay (c) HLA typing	In addition to milestone level 3 Demonstrate in-depth knowledge regarding interpretation of 1.Immuno- electrophoresis, 2 .Immunofluorescence techniques especially on kidney and skin biopsies, 3.Anti-nuclear antibody and 4.Anti-neutrophil cytoplasmic antibody.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in Immunopathology.

MK 3: Knowledge specific to Diagnostic Cyto-Pathology and Cytological techniques.

Knowledge specific to Diagnostic Cyto-Pathology and Cytological techniques.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge of cytological techniques and basic cytology of various organs. Demonstrate the knowledge about FNAC procedure and stains used in Cytopathology.	In addition to milestone level 1 Demonstrate the knowledge about basic cyto-pathology of reactive and benign lesion of various organs. Also exhibit the knowledge of fluid cytology like Pleural fluid, CSF, etc.	In addition to milestone level 2 demonstrate the knowledge about malignant cytology of various organs. Demonstrate the familiarity of knowledge related to diagnosis of Bronchoalveolar lavage, Urine cytology, etc.	In addition to milestone level 3 should possess in-depth knowledge regarding cytology of rare lesions and able to discuss the differential diagnosis with cytological findings. -Demonstrate the familiarity of knowledge related to procedure and diagnosis of cell block technique.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in Cyto-Pathology.

MK 4: Knowledge required for Systemic Pathology

Knowledge required for Systemic Pathology				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge of normal anatomy, embryology, histology, physiology of various systems.	In addition to milestone level 1 Demonstrate the knowledge about aetiopathogenesis, gross and microscopic alterations of common diseases in various system like Diabetes Mellitus, Pneumonia, Rhematic heart disease, etc.	In addition to milestone level 2 demonstrate the knowledge about aetiopathogenesis, gross and microscopic alterations of various tumors in different system.	In addition to milestone level 3 exhibit the knowledge about aetiopathogenesis, morphology of rare diseases and complex syndromes.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in aetiopathogenesis and morphology of various organs.

MK 5: Knowledge specific to Surgical Pathology

Knowledge specific to Surgical Pathology				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate a knowledge of normal basic hitopathological techniques and basic Histology of various organs.	In addition to milestone level 1 Demonstrate the knowledge about grossing and microscopy of small specimen like appendicectomy, cholecystectomy,etc Also demonstrate the knowledge about various special stains.	In addition to milestone level 2 demonstrate the knowledge about grossing and microscopy of specimens like Hysterectomy, Parotidectomy,etc In addition to milestone level 3 Demonstrate an in-depth knowledge about grossing and microscopy of bigger specimens like mastectomy, colectomy, gastrectomy,etc with assistance.	In addition to milestone level 3 Demonstrate an in-depth knowledge about grossing and microscopy of bigger specimens like mastectomy, colectomy, gastrectomy,etc without assistance. Also demonstrate the knowledge about the various immunohistochemical markers	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in surgical pathology.

MK 6: Knowledge required for Autopsy Pathology

Knowledge required for Autopsy Pathology				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate knowledge about basic autopsy techniques. Also possess the knowledge about the prerequisites for autopsy.	In addition to milestone level 1Demonstrate the knowledge of different dissection methods of various organs and to give representative sections from the organs. Also possess knowledge about collection of samples in different cases for biochemical and microbiological investigation. Also exhibit the knowledge about identification of various pathological changes during autopsy.	In addition to milestone level 2 demonstrate the knowledge about performing fetal autopsy with assistance. Also exhibit the knowledge about identification of various pathological changes during autopsy.	In addition to milestone level 3 Demonstrate an in-depth knowledge regarding microscopic examination of various disease. Also demonstrate the knowledge about performing fetal autopsy without assistance.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in autopsy pathology.

MK 7: Knowledge required for Hematology

Knowledge required for Hematology				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate a knowledge of basic haematological techniques. Demonstrate the knowledge about hematopoiesis and morphology of each hematopoietic cells.	In addition to milestone level 1Demonstrate the knowledge common haematological disorders like Iron deficiency anemia, thalassemia, etc Able to demonstrate the knowledge about various haematological techniques.	In addition to milestone level 2 demonstrate the knowledge about haematological neoplasm like leukemia, lymphoma, etc. Possess the knowledge about special haematological tests, cytochemical stains and basic flowcytometry.	In addition to milestone level 3 Demonstrate an in-depth knowledge regarding rare haematological disease like Congenital dyserythropoeitic anemia, histiocytic disorders, etc. Should possess knowledge regarding approach to Anemia, Leukemia, Bleeding disorders, etc.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in haematological disorders.

MK 8: Knowledge specific to Transfusion Medicine (Blood Banking)

Knowledge specific to Transfusion Medicine (Blood Banking)				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about basic Immunology and Blood grouping system.	In addition to milestone level 1 Demonstrate the knowledge about clinical significance of blood groups.	In addition to milestone level 2 demonstrate the knowledge about rationale of pre-transfusion testing.	In addition to milestone level 3 Demonstrate an in-depth knowledge Blood component therapy. In addition to milestone level 3 Demonstrate an in-depth knowledge about blood transfusion reaction and its management.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances in Transfusion medicine. Also demonstrate the knowledge about Quality control in blood bank.

MK 9: Knowledge required for Principles and practice of Laboratory Medicine

Knowledge required for Principles and practice of Laboratory Medicine				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate knowledge of the normal range of values of the biochemical content of body fluids, significance of the altered values and its interpretation.	In addition to milestone level 1 Demonstrate the knowledge about basic principles like Renal function test, Liver function test, Pancreatic function test,etc.	In addition to milestone level 2 demonstrate the knowledge about the principles, advantages and disadvantages, scope and limitation of automation in the laboratory.	In addition to milestone level 3 Demonstrate an in-depth knowledge the principles and methodology of quality control in the laboratory.	In addition to milestone level 4 Demonstrate the knowledge the principles good clinical laboratory practices (GCLP).

MK 10: Knowledge specific to Recent Advances and applied aspects.

Knowledge specific to Recent Advances and applied aspects.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate knowledge of importance of statistical methods inassessing data from patient material and experimental studies. Demonstrate familiarity with Biomedical Waste management disposal as per Biomedical Waste Management amendment.	In addition to milestone level 1 Demonstrate the knowledge about the principles and techniques of electronmicroscopy and the working of an electron microscope (includingTransmission and Scanning Electron microscope: TEM and SEM).	In addition to milestone level 2 demonstrate the knowledge about Recognise the appearance of the normal subcellular organelles and their common abnormalities (when provided with appropriate photographs).	In addition to milestone level 3 Demonstrate an in-depth knowledge regarding recent advances in hematology.	In addition to milestone level 4 Demonstrate the knowledge regarding recent advances Histopathology and Cytopathology.

MK11: Knowledge required for presenting seminar and journal club

Knowledge required for presenting seminar and journal club				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Understands the basic concepts relevant to the topic being presented. Understands the relevance of journal articles	Knowledge of analysing Journals, articles, methodology and statistics Knowledge of gathering relevant information from various sources and cites the references.	Understands how to critically analyse and compare articles relevant to topic/practise Able to form concepts on the subject and critically evaluate the limitation of the article.	Understands the direction of growth of the various Sub-speciality in the field of Pathology.	Updates the knowledge in recent advances in various branches of Pathology.

6.3.2 Patient Care/Procedural Skill – PC/PS

PC/PS.1. **Perform gross examination of surgical pathology specimens**

Perform gross examination of surgical pathology specimens				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate a knowledge of normal anatomy, histology and functions of various organs Demonstrate the ability to attained proper sample collection and sample receiving	In addition to milestone 1 Demonstrate the ability to identify the normal tissue and diseased tissue during grossing.	In addition to milestone level 2 Identifies the gross morphological changes in organs. Understand the grossing protocol for various organs.	In addition to milestone level 3 Ability to give various differential diagnoses by identifying the different gross morphology.	In addition to milestone level 4 Demonstrate the knowledge regarding grossing rare diseases and Large cancer specimens..

PC/PS.2. **Perform grossing in grossing station.**

Perform grossing in grossing station.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the ability to attained proper sample identification, labelling and sample receiving	In addition to milestone 1 Demonstrate the ability to assists in grossing the seniors and colleagues. Ability to enter and correct the final report in Hospital information system. In addition to milestone level 2 demonstrate the ability to ink the specimen and fixation of large specimens.	In addition to milestone level 2 Demonstrate the ability to perform grossing of small specimen like Appendicectomy, Cholecystectomy, etc. In addition to milestone level 2 demonstrate the ability to differentiate between the neoplastic and non neoplastic lesions	In addition to milestone level 3 Demonstrate the ability to perform grossing of large specimens Mastectomy, Gastrectomy etc with assistance. In addition to milestone level 3 Demonstrate the ability to perform grossing of tumor area, lymph node dissection and margins status.	In addition to milestone level 4 Demonstrate the ability to perform grossing of large specimens Mastectomy, Gastrectomy etc without assistance.

PC/PS.3. **Interpretation of Microscopic findings in tissue.**

Interpretation of Microscopic findings in tissue.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the ability to identify the normal histology of various tissues and organs.	In addition to milestone 1 Demonstrate the ability to identify the basic pattern and reporting protocol in Histopathology. Able to approve the report in hospital information system with assistance.	In addition to milestone level 2 Demonstrate the ability to perform histopathology reporting of small specimens like Appendicectomy, Cholecystectomy, etc. Able to write the miscroscopic description and impression of non neoplastic specimens.	In addition to milestone level 3 Demonstrate the ability to perform histopathology reporting of large specimens like Mastectomy, Gastrectomy etc with assistance. Able to write the microscopic description for tumors and comment about the margin status and lymph node metastasis.	In addition to milestone level 4 Demonstrate the ability to perform histopathology reporting of large specimens like Mastectomy, Gastrectomy etc without assistance. Able to give the final microscopic impression of tumor specimens with staging. Demonstrate the knowledge in recent advances.

PC/PS.4. **Perform histotechniques in Histopathology laboratory**

Perform histotechniques in Histopathology laboratory				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about basics in histotechniques and staining.	In addition to milestone 1 Demonstrate the ability to observe the various techniques in tissue processing, section cutting and staining.	In addition to milestone level 2 Demonstrate the ability to tissue processing and staining. Demonstrate the ability to perform Microtomy with assistance.	In addition to milestone level 3 Demonstrate the ability to perform microtomy without assistance. Demonstrate the ability to perform special stains with assistance.	In addition to milestone level 4 Demonstrate the ability to perform special stains without assistance. Possess the knowledge about the Internal and External quality control in Histopathology laboratory.

PC/PS.5. **Perform And Interpretation of FNAC and other Cytological smears (Pap smear, Sputum, Bronchial washings, Serous effusions, etc.**

Perform And Interpretation of FNAC and other Cytological smears (Pap smear, Sputum, Bronchial washings, Serous effusions, etc.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about FNAC procedure Demonstrate the knowledge about Sample collection, Identification, Receiving. To know the basics in normal cytology reporting.	In addition to milestone 1 Demonstrate the ability to observe the various techniques in cytology and to perform FNAC procedure with assistance. Able to approve the report in hospital information system.	In addition to milestone level 2 Demonstrate the ability to sample processing and staining in cytology. Demonstrate the ability to perform FNAC procedure without assistance. Able to describe the microscopic findings of non neoplastic lesion in FNAC and NGC Ability to identify the reactive and inflammatory lesions in Pap smear.	In addition to milestone level 3 Demonstrate the ability to describe the microscopic findings of neoplastic lesion in FNAC, NGC and cell block techniques.. Ability to identify LGSIL, HGSIL and Invasive carcinoma in Pap smear.	In addition to milestone level 4 Demonstrate the ability to perform Special stains and additional test in cytology. Demonstrate the ability to perform reporting various cytological smears without assistance. Demonstrate the knowledge about recent advances in Cytology.

PC/PS.6. **Interpretation of Frozen sections**

Interpretation of Frozen sections				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about sample collection, receiving for Frozen section Demonstrate the knowledge about functioning of frozen section microtome.	In addition to milestone 1 Demonstrate the ability to observe the various techniques in cytology. To know the basics in normal frozen section histology.	In addition to milestone level 2 Demonstrate the ability to do quick stain for frozen sections. Demonstrate the ability to perform reporting various frozen section with assistance. Ability to identify the lymph node metastasis and margins status in tumor cases.	In addition to milestone level 3 Demonstrate the ability to perform reporting various frozen section without assistance. Ability to differentiate between benign and malignant tumors in frozen section.	In addition to milestone level 4 Demonstrate the knowledge about recent advances in frozen section.

PC/PS.7. **Selection, performance and interpretation of appropriate Immuno-histochemical (IHC) markers.**

Selection, performance and interpretation of appropriate Immuno-histochemical (IHC) markers.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about Basic requirement for IHC and IHC procedure Demonstrate the knowledge about Sample collection, Identification, Receiving.	In addition to milestone 1 Demonstrate the ability to observe the various procedures in IHC. To know the basics in normal IHC pattern. Demonstrate the ability to perform IHC procedure with assistance.	In addition to milestone level 2 Demonstrate the knowledge about IHC markers panel for various tumors to differentiate between epithelial or mesenchymal origin. Demonstrate the ability to perform IHC reporting using CK 7 and CK 20 to identify the native of origin of metastatic tumors.	In addition to milestone level 3 Demonstrate the ability to perform IHC reporting using various markers of each system.(Lymphoma panel, Small blue round cell tumor Panel, etc) Demonstrate the ability to perform IHC procedure without assistance.	In addition to milestone level 4 Demonstrate the ability to perform reporting various IHC smears without assistance. Demonstrate the knowledge about recent advances in IHC.

PC/PS.8. Interpretation of Bone Marrow Smears

Interpretation of Bone Marrow Smears				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about Basics in Bone marrow Aspiration procedure Demonstrate the knowledge about Sample collection, Identification, Receiving. To know the basics in normal Bone marrow histology.	In addition to milestone 1 Demonstrate the ability to observe the Bone marrow aspiration procedure. Demonstrate the knowledge about Bone marrow reporting for various anemia like Nutritional anemia and haemolytic anemia.	In addition to milestone level 2 Demonstrate the knowledge about Bone marrow reporting for various acute leukemia and Myelodysplastic syndrome, etc. Demonstrate the ability to perform Bone marrow aspiration procedure and staining without assistance.	In addition to milestone level 3 Demonstrate the ability to perform reporting of chronic leukemia, Non-Hodgkins lymphoma, plasma cell disorder and metastasis.	In addition to milestone level 4 Demonstrate the ability to perform bone marrow smears of rare lesions. Demonstrate the knowledge about recent advances in Bone marrow pathology.

PC/PS.9. **Perform and Interpretation of routine haematological investigations such as haemoglobin, TLC, DLC, ESR PCV, Blood indices and peripheral smear.**

Perform and Interpretation of routine haematological investigations such as haemoglobin, TLC, DLC, ESR PCV, Blood indices and peripheral smear.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about Sample collection, Identification, Receiving. Demonstrate the ability to perform phlebotomy. Demonstrate the ability to report the emergency haematological investigation with assistance during stay duties	In addition to milestone 1 Demonstrate the ability to observe the various routing haematological procedure. Demonstrate the ability to perform Peripheral smear and staining. Demonstrate the ability to report the nutritional anemia, causes for leukocytosis,etc	In addition to milestone level 2 Demonstrate the knowledge about peripheral smear findings for acute leukemia, Neonatal jaundice, Haemolytic anemia, etc. Demonstrate the working principle of Automated hematology analyzer. Demonstrate the ability to report the emergency haematological investigation without assistance during stay duties.	In addition to milestone level 3 Demonstrate the ability to report various peripheral smear of chronic leukemia, Non-Hodgkins lymphoma, plasma cell disorder and metastasis Demonstrate the ability to Handle trouble shooting in Automated hematology analysers.	In addition to milestone level 4 Demonstrate the ability to perform internal and external quality control in hematology laboratory Demonstrate the knowledge about recent advances in hematology. Demonstrate the knowledge about NABL, NABH and Biomedical Waste Management.

PC/PS.10. Perform and Interpretation of special investigations like Reticulocyte count, Sickling test, Osmotic Fragility Test, Haemoglobin Electrophoresis, Fetal Haemoglobin, etc.

Perform and Interpretation of special investigations like Reticulocyte count, Sickling test, Osmotic Fragility Test, Haemoglobin Electrophoresis, Fetal Haemoglobin, etc.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about Sample collection, Identification, Receiving.	In addition to milestone 1 Demonstrate the ability to observe the various special haematological procedures in new born smear. Demonstrate the ability to perform Knowledge about various Special haematological test.	In addition to milestone level 2 Demonstrate the ability to report the special haematological investigation for Hereditary spherocytosis, Thalassemia, Sickle cell anemia, etc	In addition to milestone level 3 Demonstrate the ability to report the special haematological investigation for Dyserthyropoeitic anemia, Pancytopenia, etc.	In addition to milestone level 4 Demonstrate the ability to perform internal and external quality control in hematology laboratory Demonstrate the knowledge about recent advances in hematology. Demonstrate the knowledge about NABL, NABH and Biomedical Waste Management.

PC/PS.11. **Planning investigations for a Clinical case**

Planning investigations for a Clinical case				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about Basic pathology of various diseases.	In addition to milestone 1 Demonstrate the knowledge about investigation for various diseases.	In addition to milestone level 2 Demonstrate the ability to correlate Clinical, Radiological and other findings	In addition to milestone level 3 Demonstrate the ability to interact with clinicians and plan a investigation for a particular disease.	In addition to milestone level 4 Demonstrate the knowledge about recent advances in Investigations for various diseases.

PC/PS.12. **Perform and Interpret Urine Examination, Body fluids and semen analysis**

Perform and Interpret Urine Examination, Body fluids and semen analysis				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about Sample collection, Identification, Receiving.	In addition to milestone 1 Demonstrate the ability to observe the various clinical pathological procedure and semen analysis Demonstrate the ability to report the emergency fluid counts and urine ketone investigation during stay duties. Ability to perform test for Bence zones proteins.	In addition to milestone level 2 Demonstrate the ability to report the Urine microscopy like sediments, cast and crystals. Demonstrate the ability to report the Reactive non-neoplastic lesions in various Body fluids. Demonstrate the ability to report the Oligospermia and azoospermia in semen analysis.	In addition to milestone level 3 Should posses the knowledge about automations in Urine analysis, Computer Assisted Semen Analysis (CASA). Demonstrate the ability to report the Malignant lesions like Adenocarcinoma and Squamous cell carcinoma in various Body fluids	In addition to milestone level 4 Demonstrate the ability to perform internal and external quality control in clinical pathology laboratory Demonstrate the knowledge about recent advances in clinical pathology Demonstrate the knowledge about NABL, NABH and Biomedical Waste Management.

PC/PS.13. Interpretation of ancillary techniques like Immunofluorescence, Karyotyping, FISH, PCR and Electron Microscopy.

Interpretation of ancillary techniques like Immunofluorescence, Karyotyping, FISH, PCR and Electron Microscopy.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the Basic knowledge of various ancillary techniques. Demonstrate the knowledge about Sample collection, Identification, Receiving for various ancillary techniques	In addition to milestone 1 Demonstrate the knowledge of principle of various ancillary techniques. .	In addition to milestone level 2 Demonstrate the knowledge about procedures of various ancillary techniques	. In addition to milestone level 3 Demonstrate the knowledge about interpretation of various ancillary techniques	In addition to milestone level 4 Demonstrate the knowledge about recent advances in various ancillary techniques

PC/PS.14. Demonstration of familiarity within laboratory investigations in Microbiology and Biochemistry

Demonstration of familiarity within laboratory investigations in Microbiology and Biochemistry				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the Basic knowledge of various Microbiology and Biochemical investigation Demonstrate the knowledge about Sample collection, Identification, Receiving for various ancillary techniques	In addition to milestone 1 Demonstrate the knowledge of principle of various Microbiology and Biochemical investigation .	In addition to milestone level 2 Demonstrate the knowledge about procedures of various Microbiology and Biochemical investigation	In addition to milestone level 3 Demonstrate the knowledge about interpretation of various Microbiology and Biochemical investigation	In addition to milestone level 4 Demonstrate the knowledge about recent advances in various Microbiology and Biochemical investigation

PS/PC 15 : Perform and interpret Blood banking techniques (Blood grouping , Rh typing, Cross-matching and Coomb's test, ELISA for infectious disease)

Perform and interpret Blood banking techniques (Blood grouping , Rh typing, Cross-matching and Coomb's test, ELISA for infectious disease)				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about Sample collection, Identification, Receiving. Demonstrate the ability to perform phlebotomy.	In addition to milestone 1 Demonstrate the ability to observe the various blood banking techniques.	In addition to milestone level 2 Demonstrate the knowledge about Principle, Procedure and interpretation of Blood grouping, Cross matching and Coomb test. Demonstrate the Knowledge about interpretation of ELISA.	In addition to milestone level 3 Demonstrate the ability to report Blood grouping using gel card method, Cross matching and Coomb test. Demonstrate the ability to Handle trouble shooting in Cross matching and Coombs test (False positive and False Negative cases).	In addition to milestone level 4 Demonstrate the ability to perform internal and external quality control in Blood Bank. Demonstrate the knowledge about recent advances in Blood banking techniques. Demonstrate the knowledge about FDA regulations and Biomedical Waste Management.

PC/PS. 16 : Selection of blood donors and Management of adverse donor reactions.

Selection of blood donors and Management of adverse donor reactions.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about criteria for selection of blood donors. Demonstrate the knowledge about Adverse donor reaction.	In addition to milestone 1 Observe and know the procedure and criteria for Donor selection. Ability to know the procedure for Blood collection from donors.	In addition to milestone level 2 Demonstrate the knowledge about various local and systemic adverse blood donor reactions.	In addition to milestone level 3 Demonstrate the ability to recognise and management of Adverse blood donor reaction. .	In addition to milestone level 4 Demonstrate the knowledge about recent advances in Blood donors and management of Adverse donor reactions.

PS /PC-17 : Perform investigation for a case of mismatched blood transfusion.

Perform investigation for a case of mismatched blood transfusion				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about routine blood transfusion and its protocol.	In addition to milestone 1 Demonstrate the knowledge about various causes for mismatch blood transfusion.	In addition to milestone level 2 Demonstrate the ability to perform the Root Cause Analysis of mismatch blood transfusion with assistance.	In addition to milestone level 3 Demonstrate the ability to perform the Root Cause Analysis of mismatch blood transfusion without assistance.	In addition to milestone level 4 Demonstrate the ability to perform Internal and External quality control in Blood Bank. Demonstrate the knowledge about recent advances in Mismatched blood transfusion. Demonstrate the knowledge about FDA regulations and Biomedical Waste Management.

PC/PS 18 : Participation and Presentation in multidisciplinary meetings like tumor boards, CPCs, Dermato-Pathological conferences.

Participation and Presentation in multidisciplinary meetings like tumor boards, CPCs, Dermato-Pathological conferences.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about various pathological diseases.	In addition to milestone 1 Demonstrate the knowledge about reports, its Clinical findings and radiological investigations.	In addition to milestone level 2 Demonstrate the ability to perform clinic-Radio-Pathological correlation. Demonstrate the ability to participate in multidisciplinary meetings.	In addition to milestone level 3 Demonstrate the ability to do presentation in multidisciplinary meetings.	In addition to milestone level 4 Demonstrate the ability to help in guiding the clinician for further management to investigate a particular case.

PS/PC 19 : Teaching pathology to undergraduates (MBBS), and allied health sciences like BDS, BSc (Nursing), BSc (MLT), BSc (Radiology), etc.

Teaching pathology to undergraduates (MBBS), and allied health sciences like BDS, BSc (Nursing), BSc (MLT), BSc (Radiology), etc.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge about basic concepts in pathology.	In addition to milestone 1 Demonstrate the knowledge to perform practical teaching for undergraduates.	In addition to milestone level 2 Demonstrate the ability to perform theory teaching for BSC Nursing and Allied Health Sciences.	In addition to milestone level 3 Demonstrate the ability to perform theory teaching and small group discussions for BDS and MBBS. Demonstrate the ability to teach the Technical staffs in the Department.	In addition to milestone level 4 Demonstrate the ability to teach the colleagues and Junior Resident in the Department.

6.3.3 System based practice

SBP 1. Laboratory safety and Systems Approach to Laboratory Errors.

Laboratory safety and Systems. Approach to Laboratory Errors.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the knowledge of the laboratory safety and errors.	In addition to milestone level 1 Demonstrate knowledge of institutional surveillance systems to monitor for patient safety (e.g., Laboratory error reporting) Demonstrate knowledge of the epidemiology of laboratory errors and the differences between Pre-analytical, Analytical and Post-analytical errors.	In addition to milestone level 2 Participate in laboratory safety reporting and analyzing systems Demonstrate knowledge national laboratory safety standards, as well as their use/application in the institution	In addition to milestone level 3 Report errors and near- misses to the institutional surveillance system and superiors Participate in quality improvement (QI)/Laboratory safety practices.	In addition to milestone level 2 Organize and leads institutional QI/Laboratory safety projects. Recognize when root cause analysis is necessary, and is capable of participating in root cause analysis

6.3.4 Practice based learning and improvement

PBLI 1: Self-directed Learning/Critical Appraisal of Medical Literature.

Self-directed Learning/Critical Appraisal of Medical Literature.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate an understanding of critical appraisal of the literature Demonstrate responsiveness to constructive feedback	In addition to milestone level 1 Identify resources (e.g., texts, search engines) to answer questions while providing patient care Recognize limits of knowledge, expertise, and technical skills. Describe commonly used study designs (e.g., randomized controlled trial [RCT], cohort; case-control, cross-sectional)	In addition to milestone level 2 Critically review and interprets the literature with the ability to identify study aims, hypotheses, design, and biases	In addition to milestone level 3 Tailor evidence-based practice based on the values and preferences of each cases Reads and assess strength of evidence in current literature and applies it to one's own practice	In addition to milestone level 4 Design a hypothesis-driven or hypothesis-generating study Contribute to peer-reviewed medical literature

6.3.5 Interpersonal communication skills

IPCS 1: Communicate the reports effectively with clinician, patients and families

Communicate the reports effectively with clinician, patients and families				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Demonstrate the ability of basic communication skills.	In addition to milestone level 1 Maintain communication with clinicians and surgeons regarding the status of the pathology report.	In addition to milestone level 2 Communicate effectively the reports to clinicians and patient relatives	In addition to milestone level 3 Participate in various inter and Intradepartmental meetings like CPC, etc	In addition to milestone level 4 Capable of presentation in various forums about the case report.

IPCS 2: Communication with Colleagues and Technical staffs

Communication with Colleagues and Technical staffs				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Understand the importance of relationship development, information gathering and sharing, and	In addition to milestone level 1 **Demonstrate** an understanding of the roles of health care team members, and communicates effectively within the team	In addition to milestone level 2 **Communicate** effectively with colleagues within department and with technical staffs.	In addition to milestone level 3 **Participate** in various Departmental meetings.	In addition to milestone level 4 **Role model** for effective communication to junior colleagues

teamwork		Able to communicate the technical orders to the technical staffs regarding laboratory investigation		

IPCS 3: Teaching to Undergraduates students and other colleagues

Teaching to Undergraduates students and other collaegues				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Understand the importance of concepts in pathology and able to communicates to juniors.	In addition to milestone level 1 Assist in teaching the Undergraduate students.	In addition to milestone level 2 Participate in teaching undergraduates both theory and practical.	In addition to milestone level 3 Participate in multidisciplinary family/patient/team member conferences for informed consent and shared decision making.	In addition to milestone level 4 Model and coach shared decision making in complex and highly stressful situations

6.3.6 Professionalism

P.1- Compassion, Integrity, and Respect for Others.

Compassion, Integrity, and Respect for Others				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Understand the importance of compassion, integrity, and respect for others Demonstrate sensitivity and responsiveness to patients	In addition to milestone level 1Consistently show compassion, integrity, and respect in typical situations with patients, peers, and members of the health care team Consistently demonstrate sensitivity and responsiveness to the diagnostic services.	In addition to milestone level 2 Modify one's own behaviour based on feedback to improve his or her ability to demonstrate compassion, integrity, and respect for others	In addition to milestone level 3 Consistently model compassion, integrity, and respect for others. Coach others to improve compassion, integrity, and respect to diagnostic services	In addition to milestone level 4 Assume long-term or leadership role in community outreach activities to improve the health of vulnerable populations

P.2- Feedback.

Feedback.				
Milestone Level 1	Milestone Level 2	Milestone Level 3	Milestone Level 4	Milestone Level 5
Seeks constructive feedback from faculty members and colleagues.	Accepts feedback from faculty members and incorporates suggestions into practice.	Correlates feedback with self-reflection and incorporates it into lifelong learning to enhance patient care.	Provides constructive feedback to juniors in a tactful and supportive way to enhance patient care.	Effectively seeks and provides constructive feedback in challenging situations.

7 Syllabus

7.1 Course 1 General Pathology, Pathophysiology, Immunopathology and Cytopathology

7.1.1 General Pathology and pathophysiology

- 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.
- Basic Course in Biomedical Research, Data collection and analysis, Scientific communication.

7.1.2 Immunopathology

- 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)

7.1.3 Cytopathology

- 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

7.2 Course 2: Systemic Pathology:

7.2.1 Systemic Pathology

- Normal structure and function of various organ systems.
- Aetiopathogenesis, gross and microscopic alterations of structure of these organ systems in disease and functional correlation with clinical features.

7.2.2 Surgical Pathology

- Histogenetic and patho-physiologic processes associated with various lesions.
- Problems in the laboratory and offer viable solutions.

7.2.3 Autopsy Pathology

- Technique of autopsy.
- Various disease processes so that a meaningful clinico-pathological correlation can be made.

7.3 Course 3:Haematology, Transfusion Medicine (Blood Banking) and Laboratory Medicine

7.3.1 Hematology

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

7.3.2 Transfusion Medicine (Blood Banking)

- 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.

7.3.3 Laboratory Medicine

- Possess knowledge of the normal range of values of the biochemical 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

  (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 automation in the laboratory.
- Know the principles and methodology of quality control in the laboratory.
- Know the principles good clinical laboratory practices(GCLP)

7.4 Course 4: Recent Advances and Applied aspects

7.4.1 Recent advances:

- Recent advances in Histopathology and Cytology
- Recent advances in Hematology and Transfusion medicines.

7.4.2 Applied aspects:

- Demonstrate familiarity with the principles and techniques of electronmicroscopy and the working of an electron microscope (includingTransmission and Scanning Electron microscope: TEM and SEM).
- Recognise the appearance of the normal subcellular organelles and their common abnormalities (when provided with appropriate photographs).
- Should be familiar with the principles, use and interpretation of common enzyme histochemical procedures (Alkaline Phosphatase, Acid Phosphatase, Glucose-6-Phosphate Dehydrogenase, Chloroacetate Esterase).
- Demonstrate familiarity with the principles and exact procedures of various immunohistochemical stains using both PAP (Peroxidase-antiperoxidase)and AP-AAP (Alk. Phosphatase-anti-Alk. Phosphatase) ABC(Avidin-Biotin Conjugate) systems; employing monoclonal and polyclonalantibodies.
- Be aware of the limitations of immuno-histochemistry.
- 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.
- Demonstrate familiarity with methods of Karyotyping and Fluorescent in-situ Hybridisation (FISH).
- Demonstrate familiarity with methods of tissue culture.
- Demonstrate familiarity with importance of statistical methods in assessing data from patient material and experimental studies.
- Demonstrate familiarity with Biomedical Waste management disposal as per Biomedical Waste Management amendment. (2016 guidelines)

8 Teaching and Learning Method

The trainee will undergo a graded training over a period of three years.

- Orientation

At the beginning of the course each resident should be given an orientation to the department and subject. The candidate shall be assigned dissertation guides so as to help them prepare protocols

8.1 Theory (Knowledge/ Cognitive Domain)

The teaching learning methods does not totally depend on didactic lectures. Only the introductory lectures by faculty are in this format.

8.1.1 Introductory lectures

8.1.2 Teaching programme

- Lectures, seminars, symposia, Inter- and intra- departmental meetings (clinic-pathological, Tumor board, Derm path, OG- Path, Ortho-Path meet), maternal morbidity/mortality meetings and journal club. Records of these are to be maintained by the department.
- By encouraging and allowing the students to attend and actively participate in CMEs, Conferences by presenting papers.
- Maintenance of log book:E-portfolio:- It is an electronic portfolio to be maintained by the resident to record their activities under the section:
    - EPA,
    - Daily log
    - Diagnostic work
    - Procedure
    - Dissertation
    - Academic activities(Seminar, symposium, case presentation, journal club)
    - Co-curricular activities (Conference, CME, Workshop),
    - Teaching Assignments,
    - Awards and achievements
    - Outreach activities.

- **E-portfolio** shall be checked and assessed periodically by the faculty members. This will enable to monitor progress of the resident, his level of attainment of milestone and impart the training accordingly

- Writing thesis following appropriate research methodology, ethical clearance and good clinical practice guidelines.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- 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.
- Department should encourage e-learning activities.

8.1.3 Structured Graded Training–Year wise Knowledge / cognitive domain

8.2 Practical skills training (psychomotor domain)

8.2.1 Resident Rotations

- Details of 3 years posting in the PG programme (6 terms of 6 months each)

	1st Mon	2nd Mon	3rd Mon	4th Mon	5th Mon	6th Mon	7th Mon	8th Mon	9th Mon	10th Mon	11th Mon	12th Mon
1st year	TEC	HM	HM	HM	C	C	C	H	H	H	BB	BB
2nd year	HM	HM	HM	C	C	C	H	H	H	H	MT	AP*
3rd year	HM	HM	HM	C	C	H	H	H	MP	MP	H	H

TEC– Lab techniques, **HM-** Hematology, **C**-Cytopathology,**H**- Histopathology, **BB**-Blood banking, **MT**- Museum Technique, **MP**- Molecular Pathology, **AP**-Allied post

*Allied posts should be done during the course – for 4 weeks

- Biochemistry- 2 weeks
- Microbiology - 2 weeks

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 Sciences including Immunopathology, Electron microscopy, Molecular Biology, Research Techniques and cytogenetics etc	02
Total	**35**

Details of training in the subject during resident posting.

The student should attend to the duties (Routine and emergency).

8.2.2 Structured Graded Training –Year - wise Practical training objectives

8.2.3 Practical Training

- Collection of specimens including Fine Needle Aspiration of lumps.
- Grossing of specimens.
- Performing autopsies.
- Processing and Block making
- H&E staining
- PAP smear staining
- Peripheral smear staining.
- Bone marrow aspiration.
- 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.
- Research Presentation and review of research work.
- Laboratory work of haematological test.
- Selection and bleeding of donors
- Blood grouping and cross matching
- Coombs test
- Use and maintenance of equipment.
- Maintenance of records.

E - portfolio

It is an electronic portfolio to be maintained by the resident to record their day to day academic and patient care activities under the following sections:

- Entrustable Professional Activity assessment
- Daily log
- Patient care
- Procedure

- Dissertation
- Academic activities(Seminar, symposium, case presentation, journal club)
- Co - curricular activities (Conference, CME, Workshop),
- Teaching Assignments,
- Awards and achievements
- Outreach activities.

E – portfolio will be monitored and endorsed periodically by the faculty supervisors. This will enable faculty to monitor residents progress, attainment of milestones and impart the training accordingly.

9 Assessment

Assessment will have 2 components Formative and Summative

9.1 Formative assessment

9.1.1 Cognitive Assessment

- Assessment in Cognitive Domain
- Schedule of theory tests
  - 1st year – 2 papers consisting of syllabus from Course 1
  - 2nd year – 2 papers consisting of syllabus from Course 2 and 3
  - 3rd year – one paper consisting of syllabus from Course 4
  - 3rd year – Mock exams one month prior to University examination, consisting of 4 papers, including syllabus from all the four courses.

9.1.2 EPA Assessment

- Assessment of Entrustable Professional Activities (EPA) done during the OT posting by the consultant in - charge. EPA assessment will be done once by the end of the 1st week of the posting and then again at the end of the posting, for monitoring of resident progress.

Table 3: List the of Entrustable Professional Activity

EPA No.	**Entrustable Professional Activity**
1.	Perform gross examination of surgical pathology specimens and Interpretation of Microscopic findings in tissue.
2	Perform histotechniques (Tissue processing, embedding, microtomy, Staining and special staining)
3.	Perform And Interpretation of FNAC and other Cytological smears (Sputum, Bronchial washings, Serous effusions, etc.
4.	Interpretation of Frozen sections
5.	Selection, performance and interpretation of appropriate Immunohistochemical markers.
6.	Interpretation of Bone Marrow Smears
7.	Perform and Interpretation of routine haematological investigations like haemoglobin, TLC, DLC, ESR PCV, Blood indices and peripheral smear.
8.	Perform and Interpretation of special investigations like Reticulocyte count, Sickling test, Osmotic Fragility Test, Haemoglobin Electrophoresis, Fetal Haemoglobin, etc.
9.	Planning investigations for a Clinical case
10.	Perform and Interpret Urine Examination, Body fluids and semen analysis.
11	Interpretation of ancillary techniques like Immunofluorescence, Karyotyping, FISH, PCR and Electron Microscopy.
12	Demonstration of familiarity within laboratory investigations in Microbiology and Biochemistry
13	Perform and interpret Blood banking techniques (Blood grouping, Rh typing, Cross-matching and Coomb's test, ELISA for infectious disease like HIV, HBsAg).
14	Selection of blood donors and Management of adverse donor reactions. Perform investigation for a case of mismatched blood transfusion.
15	Participation and Presentation in multidisciplinary meetings like tumor boards, CPCs, Dermato-Pathological conferences. Teaching pathology to undergraduates (MBBS), and allied health sciences like BDS, BSc (Nursing), BSc (MLT), BSc (Radiology), etc.

EPA Descriptions (Enter all the EPA and their descriptions)

9.1.3 Table : 4. EPA description

9.1.4 EPA 1: Perform gross examination of surgical pathology specimens and Interpretation of Microscopic findings in tissue.

<table>
<tr><td colspan="5">EPA 1: Perform gross examination of surgical pathology specimens and Interpretation of Microscopic findings in tissue.</td></tr>
<tr><td>1. Description of the activity:</td><td colspan="4">Residents should be able to identify various pathological changes grossly and take section for further microscopic examination. Able to interpret the microscopic findings of various tissues.</td></tr>
<tr><td>2. Most relevant domains of competence:</td><td colspan="4">MK, PS, ICS, P</td></tr>
<tr><td>3. Sub-Competencies within each domain:</td><td colspan="4">MK1,4,5,6
PS 1,2,3
ICS1&2
P1
SBP 1
PBLI 1</td></tr>
<tr><td>4. Methods of assessment</td><td colspan="4">1. MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio.
2. Communication skills and professionalism will be assessed by multisource feedback.
3. Assessment done during the end posting test.</td></tr>
<tr><td rowspan="6">5. Resident will be entrustable when this subcompetency milestones levels are attained.</td><td>MK</td><td>1 L4</td><td>4 L3</td><td>5&6 L4</td></tr>
<tr><td>PS</td><td>1 L4</td><td>2 L3</td><td>3 L4</td></tr>
<tr><td>ICS</td><td>1 L3</td><td>2 L2</td><td></td></tr>
<tr><td>P</td><td>1 L3</td><td></td><td></td></tr>
<tr><td>SBP</td><td>1 L3</td><td></td><td></td></tr>
<tr><td>PBLI</td><td>1 L3</td><td></td><td></td></tr>
</table>

EPA 2: Perform histotechniques (Tissue processing, embedding, microtomy, Staining and special stainning)

EPA :				
1.Description of the activity:	Residents should be able to perform various histotechniques (Tissue processing, embedding, microtomy, Staining and special staining). Also to address any technical issues in the histopathology lab			
2. Most relevant domains of competence:	MK, PS, ICS, P			
3. Sub-Competencies within each domain:	MK 5 PS 4 ICS 2 P1 SBP 1 PBLI 1			
4. Methods of assessment	4. MK and PS will be assessed by faculty during grossing in histopathology postings, written exam & eportfolio. 5. Communication skills and professionalism will be assessed by multisource feedback. 6. Assessment done during the end posting test.			
5. Resident will be entrustable when this subcompetency milestones levels are attained.	MK	5 L3		
	PS	4 L4		
	ICS	2 L2		
	P	1 L3		
	SBP	1 L2		
	PBLI	1 L3		

EPA 3: Perform And Interpretation of FNAC and other Cytological smears (Sputum, Bronchial washings, Serous effusions, etc.)

EPA :				
1. ***Description of the activity:***	Residents should be able to perform And Interpret FNAC and other Cytological smears (Sputum, Bronchial washings, Serous effusions, Pap smear, etc.)			
2. **Most relevant domains of competence:**	MK, PS, ICS, P			
3. **Sub-Competencies within each domain:**	MK3 PS 5 ICS1&2 P1 SBP 1 PBLI 1			
4. **Methods of assessment**	MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. Communication skills and professionalism will be assessed by multisource feedback. Assessment done during the end posting test.			
5. **Resident will be entrustable when this subcompetency milestones levels are attained.**	MK	3 L4		
	PS	5 L4		
	ICS	1 L2	2 L2	
	P	1 L3		
	SBP	1 L3		
	PBLI	1 L3		

EPA 4: Interpretation of Frozen sections

EPA :				
1.Description of the activity:	Residents should know the process and interpretation of frozen section.			
2. Most relevant domains of competence:	MK, PS, ICS, P			
3. Sub-Competencies within each domain:	MK 5 PS 1&6 ICS1 P1 SBP 1 PBLI 1			
4. Methods of assessment	MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. Communication skills and professionalism will be assessed by multisource feedback. Assessment done during the end posting test.			
5. Resident will be entrustable when this subcompetency milestones levels are attained.	MK	5 L3		
	PS	1 L 3	6 L3	
	ICS	1 L2		
	P	1 L1		
	SBP	1 L2		
	PBLI	1 L1		

EPA 5: Selection, performance and interpretation of appropriate Immunohistochemical markers.

<table>
<tr><td colspan="5">EPA :</td></tr>
<tr><td>1.Description of the activity:</td><td colspan="4">Residents should know the techniques of imunohistochemistry. Residents should know the IHC panel for various tumors and its interpretation.</td></tr>
<tr><td>2 Most relevant domains of competence:</td><td colspan="4">MK, PS, ICS, P</td></tr>
<tr><td>3. Sub-Competencies within each domain:</td><td colspan="4">MK 5
PS 7
ICS 1&2
P1
SBP 1
PBLI 1</td></tr>
<tr><td>4. Methods of assessment</td><td colspan="4">- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio.
- Communication skills and professionalism will be assessed by multisource feedback.
- Assessment done during the end posting test.</td></tr>
<tr><td rowspan="6">5. Resident will be entrustable when this subcompetency milestones levels are attained.</td><td>MK</td><td>5 L4</td><td></td><td></td></tr>
<tr><td>PS</td><td>7 L3</td><td></td><td></td></tr>
<tr><td>ICS</td><td>1L2</td><td>2 L2</td><td></td></tr>
<tr><td>P</td><td>1L3</td><td></td><td></td></tr>
<tr><td>SBP</td><td>1L2</td><td></td><td></td></tr>
<tr><td>PBLI</td><td>1L3</td><td></td><td></td></tr>
</table>

EPA 6: Interpretation of Bone Marrow Smears.

EPA :				
1.Description of the activity:	Resident should be able to do interpretationof bone marrow smears of various anemia, Leukemia, etc.			
2 Most relevant domains of competence:	MK, PS, ICS, P			
3 Sub-Competencies within each domain:	MK 7 PS 8 ICS1&2 P1 SBP 1 PBLI 1			
4 Methods of assessment	- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. - Communication skills and professionalism will be assessed by multisource feedback. - Assessment done during the end posting test.			
5 Resident will be entrustable when this subcompetency milestones levels are attained.	MK	7 L3		
	PS	8 L 4		
	ICS	1 L2	2 L2	
	P	1 L2		
	SBP	1 L3		
	PBLI	1 L3		

EPA 7: Perform and Interpretation of routine haematological investigations like haemoglobin, TLC, DLC, ESR PCV, Blood indices and peripheral smear

<table>
<tr><td colspan="5">EPA :</td></tr>
<tr><td>1.Description of the activity:</td><td colspan="4">Resident should be able to Perform and Interpretation of routine haematological investigations like haemoglobin, TLC, DLC, ESR PCV, Blood indices and peripheral smear.</td></tr>
<tr><td>2. Most relevant domains of competence:</td><td colspan="4">MK, PS, ICS, P</td></tr>
<tr><td>3. Sub-Competencies within each domain:</td><td colspan="4">MK 7
PS 9
ICS 2
P1
SBP 1
PBLI 1</td></tr>
<tr><td>4. Methods of assessment</td><td colspan="4">- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio.
- Communication skills and professionalism will be assessed by multisource feedback.
- Assessment done during the end posting test.</td></tr>
<tr><td rowspan="6">5. Resident will be entrustable when this sub competency milestones levels are attained.</td><td>MK</td><td>7 L4</td><td></td><td></td></tr>
<tr><td>PS</td><td>9 L3</td><td></td><td></td></tr>
<tr><td>ICS</td><td>2 L2</td><td></td><td></td></tr>
<tr><td>P</td><td>1 L2</td><td></td><td></td></tr>
<tr><td>SBP</td><td>1 L3</td><td></td><td></td></tr>
<tr><td>PBLI</td><td>1 L3</td><td></td><td></td></tr>
</table>

EPA 8: Perform and Interpretation of special investigations like Reticulocyte count, Sickling test, Osmotic Fragility Test, Haemoglobin Electrophoresis,etc

<table>
<tr><td colspan="5">EPA :</td></tr>
<tr><td>1.Description of the activity:</td><td colspan="4">Resident should be able to Perform and Interpretation of special investigations like Reticulocyte count, Sickling test, Osmotic Fragility Test, Haemoglobin Electrophoresis,etc</td></tr>
<tr><td>2. Most relevant domains of competence:</td><td colspan="4">MK, PS, ICS, P</td></tr>
<tr><td>3. Sub-Competencies within each domain:</td><td colspan="4">MK 7
PS 10
ICS2
P1
SBP 1
PBLI 1</td></tr>
<tr><td>4. Methods of assessment</td><td colspan="4">- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio.
- Communication skills and professionalism will be assessed by multisource feedback.
- Assessment done during the end posting test.</td></tr>
<tr><td rowspan="6">5. Resident will be entrustable when this subcompetency milestones levels are attained.</td><td>MK 7</td><td>L3</td><td></td><td></td></tr>
<tr><td>PS 10</td><td>L4</td><td></td><td></td></tr>
<tr><td>ICS2</td><td>L2</td><td></td><td></td></tr>
<tr><td>P1</td><td>L2</td><td></td><td></td></tr>
<tr><td>SBP1</td><td>L3</td><td></td><td></td></tr>
<tr><td>PBLI 1</td><td>L3</td><td></td><td></td></tr>
</table>

EPA 9: Planning investigations for a Clinical case

EPA :				
1.Description of the activity:	Resident should be able to plan for investigating a particular case			
2. Most relevant domains of competence:	MK, PS, ICS, P			
3. Sub-Competencies within each domain:	MK 9 PS 11 ICS 2 P1 SBP 1 PBLI 1			
4. Methods of assessment	- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. - Communication skills and professionalism will be assessed by multisource feedback. - Assessment done during the end posting test.			
5. Resident will be entrustable when this sub competency milestones levels are attained.	MK	9 L3		
	PS	11 L4		
	ICS	2 L2		
	P	1 L3		
	SBP	1 L3		
	PBLI	1 L3		

EPA 10: Perform and Interpret Urine Examination, Body fluids and semen analysis.

EPA :				
1.Description of the activity:	Resident should be able to perform and Interpret Urine Examination, Body fluids and semen analysis.			
2. Most relevant domains of competence:	MK, PS, ICS, P			
3. Sub-Competencies within each domain:	MK 9 PS 12 ICS1&2 P1 SBP 1 PBLI 1			
4. Methods of assessment	- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. - Communication skills and professionalism will be assessed by multisource feedback. - Assessment done during the end posting test.			
5. Resident will be entrustable when this subcompetency milestones levels are attained.	MK	9 L3		
	PS	12 L 4		
	ICS	1 L2	2 L2	
	P	1 L2		
	SBP	1 L3		
	PBLI	1 L3		

EPA 11: Interpretation of ancillary techniques like Immunoflourescence, Karyotyping, FISH, PCR and ElectronMicroscopy.

<table>
<tr><td colspan="5">EPA :</td></tr>
<tr><td>1.Description of the activity:</td><td colspan="4">Resident should know the techniques and Interpretation of ancillary techniques like Immunoflourescence, Karyotyping, FISH, PCR and ElectronMicroscopy.</td></tr>
<tr><td>2. Most relevant domains of competence:</td><td colspan="4">MK, PS, ICS, P</td></tr>
<tr><td>3. Sub-Competencies within each domain:</td><td colspan="4">MK 10
PS 13
ICS 2
P1
SBP 1
PBLI 1</td></tr>
<tr><td>4. Methods of assessment</td><td colspan="4">- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio.
- Communication skills and professionalism will be assessed by multisource feedback.
- Assessment done during the end posting test.</td></tr>
<tr><td rowspan="6">5. Resident will be entrustable when this subcompetency milestones levels are attained.</td><td>MK</td><td>10 L3</td><td></td><td></td></tr>
<tr><td>PS</td><td>13 L4</td><td></td><td></td></tr>
<tr><td>ICS</td><td>2 L2</td><td></td><td></td></tr>
<tr><td>P</td><td>1 L2</td><td></td><td></td></tr>
<tr><td>SBP</td><td>1 L3</td><td></td><td></td></tr>
<tr><td>PBLI</td><td>1 L3</td><td></td><td></td></tr>
</table>

EPA 12: Demonstration of familiarity within laboratory investigations in Microbiology and Biochemistry

1.Description of the activity:	Resident should be able to demonstrate the familiarity within laboratory investigations in Microbiology and Biochemistry.			
2. Most relevant domains of competence:	MK, PS, ICS, P			
3. Sub-Competencies within each domain:	MK 9 PS 14 ICS 2 P1 SBP 1 PBLI 1			
4. Methods of assessment	- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. - Communication skills and professionalism will be assessed by multisource feedback. - Assessment done during the end posting test.			
5. Resident will be entrustable when this subcompetency milestones levels are attained.	MK	9 L3		
	PS	14 L3		
	ICS	2 L2		
	P	1 L2		
	SBP	1 L3		
	PBLI	1 L3		

EPA 13: Perform and interpret Blood banking techniques (Blood grouping , Rh typing, Cross-matching and Coomb's test, ELISA for infectious disease)

EPA :				
1.Description of the activity:	Residents should be able Perform and interpret Blood banking techniques (Blood grouping , Rh typing, Cross-matching and Coomb's test, ELISA for infectious disease)			
2. Most relevant domains of competence:	MK, PS, ICS, P			
3. Sub-Competencies within each domain:	MK 8 PS 15 ICS1&2 P1 SBP 1 PBLI 1			
4. Methods of assessment	- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. - Communication skills and professionalism will be assessed by multisource feedback. - Assessment done during the end posting test.			
5. Resident will be entrustable when this subcompetency milestones levels are attained.	MK	8 L3		
	PS	15 L4		
	ICS	1 L3	2 L3	
	P	1 L2		
	SBP	1 L3		
	PBLI	1 L3		

EPA 14: Selection of blood donors and Management of adverse donor reactions. Perform investigation for a case of mismatched blood transfusion.

EPA :				
1.Description of the activity:	Resident should be able to do selection of blood donors and Management of adverse donor reactions. Perform investigation for a case of mismatched blood transfusion			
2.Most relevant domains of competence:	MK, PS, ICS, P			
3.Sub-Competencies within each domain:	MK 8 PS 16 & 17 ICS1&2 P1 SBP 1 PBLI 1			
4.Methods of assessment	- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio. - Communication skills and professionalism will be assessed by multisource feedback. - Assessment done during the end posting test.			
5.Resident will be entrustable when this subcompetency milestones levels are attained.	MK	8 L4		
	PS	16 L3	17 L4	
	ICS	1 L2	2 L2	
	P	1 L3		
	SBP	1 L3		
	PBLI	1 L3		

EPA 15: Participation and Presentation in multidisciplinary meetings like tumor boards, CPCs, Dermato-Pathological conferences. Teaching pathology to undergraduates (MBBS), and allied health sciences like BDS, BSc (Nursing), BSc (MLT), BSc (Radiology), etc.

<table>
<tr><td colspan="5">EPA :</td></tr>
<tr><td>1.Description of the activity:</td><td colspan="4">Resident should be able to participation and Presentation in multidisciplinary meetings like tumor boards, CPCs, Dermato-Pathological conferences. Teaching pathology to undergraduates (MBBS), and allied health sciences like BDS, BSc (Nursing), BSc (MLT), BSc (Radiology), etc.</td></tr>
<tr><td>2. Most relevant domains of competence:</td><td colspan="4">MK, PS, ICS, P</td></tr>
<tr><td>3. Sub-Competencies within each domain:</td><td colspan="4">MK 1&5
PS 18& 19
ICS 2&3
P1
SBP 1
PBLI 1</td></tr>
<tr><td>4. Methods of assessment</td><td colspan="4">- MK and PS will be assessed by faculty during grossing in histopathology postings, Written exam & eportfolio.
- Communication skills and professionalism will be assessed by multisource feedback.
- Assessment done during the end posting test.</td></tr>
<tr><td rowspan="6">5. Resident will be entrustable when this subcompetency milestones levels are attained.</td><td>MK</td><td>1 L3</td><td>5 L3</td><td></td></tr>
<tr><td>PS</td><td>18 L3</td><td>19 L3</td><td></td></tr>
<tr><td>ICS</td><td>2 L2</td><td>3 L2</td><td></td></tr>
<tr><td>P</td><td>1 L 3</td><td></td><td></td></tr>
<tr><td>SBP</td><td>1 L 3</td><td></td><td></td></tr>
<tr><td>PBLI</td><td>1 L 3</td><td></td><td></td></tr>
</table>

9.1.5

9.1.6 Mapping of EPA to Programme Outcomes (PO)

Table 4 showing mapping of the EPA's to the Programme outcomes
(*Tick the boxes as appropriate)*

	PO1.	PO2.	PO3.	PO4.	PO5.	PO6.	PO7.	PO8.	PO9.
EPA1.	✓			✓					✓
EPA2.	✓			✓					✓
EPA3.	✓			✓					✓
EPA4.	✓			✓					✓
EPA5.	✓			✓		✓		✓	✓
EPA6.	✓			✓					✓
EPA7.	✓			✓					✓
EPA8.	✓			✓					✓
EPA9.	✓	✓	✓						✓
EPA10.	✓								✓
EPA11.	✓		✓	✓		✓		✓	✓
EPA12.			✓	✓	✓				✓
EPA13.		✓	✓	✓	✓				✓
EPA14.		✓	✓	✓		✓			✓
EPA15.							✓	✓	✓

9.2 Summative assessment

9.2.1 Dissertation

Objectives

1. The student should be able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
2. Communicate scientific information for health planning.

Guide for dissertation

1. Chief guide will be allocated from the Department of Anesthesiology.
2. Co - guides can be selected from within the department or from other disciplines related to the dissertation topic.

Submission of dissertation protocol

It should be submitted at the end of six months after admission in the course, in the format prescribed by the institute:

1. Protocol in essence should consist of:
   a) Introduction and objectives of the research project.
   b) Brief review of literature
   c) Suggested materials and methods, and (scheme of work)
   d) Statistician should be consulted at the time of selection of groups, number of cases and method of study. He should also be consulted during the study.
   e) Bibliography
2. The protocol must be presented in the Department of Anesthesiology before being forwarded to the Institutional Research Committee (IRC) for review.
3. Protocol must be approved by the research committee, which is appointed by the Dean / Principal to scrutinize the dissertation protocol in references to its feasibility, statistical validity, ethical aspects, etc.
4. Once approved by the IRC, the protocol will be forwarded to the Institutional Human Ethics Committee (IHEC) for review.
5. After presentation and approval of the protocol by the IHEC, the dissertation must be registered in the Clinical Trial Registry of India - http://ctri.nic.in, following which data collection may be initiated.

Submission of dissertation

1. The dissertation shall relate to the candidates own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.
2. The dissertation shall be written in English, printed or typed double line spacing, on white bond paper 22x28 cm with a margin of 3.5 cm, bearing the

matter on one side of paper only and neatly bound with the title, the name of the College and University printed on the front cover.

3. The dissertation shall contain: Introduction, review of literature, material and methods, observations, discussion, conclusion and summary and reference as per index medicus.
4. Each candidate shall submit to the Dean four copies of dissertation, through their respective Heads of the Department not later than six months prior to the date of commencement of theory examination in the subject.

Evaluation of Dissertation:

1. The dissertation shall be referred by the University for Evaluation, to External Examiners appointed by the University. The examiners will evaluate and report independently to the Controller of Examinations using Proforma for Dissertation Evaluation Form and recommend whether the dissertation
   a. Accepted as submitted
   b. Accepted pending modification as suggested
   c. Not Accepted for reasons specified
2. The dissertation shall be deemed to be accepted when it has been approved by at least two external examiners, who will allocate marks from which an average will be taken.
3. If the dissertation is rejected by one of the external examiners it shall be referred to another external examiner (other than the one appointed for initial evaluation) whose judgment shall be final for purposes of acceptance or otherwise of the dissertation.
4. Where improvements have been suggested by the external examiners, the candidate shall be required to re - submit the dissertation, after making the required improvements for evaluation.
5. When a dissertation is rejected by the examiners, it shall be returned to the candidate who shall have to rewrite it. The second version of the dissertation, as and when submitted shall be treated as a fresh dissertation and processed.
6. Acceptance of dissertation submitted by the candidate is a pre - condition for his / her admission to the written, oral and practical / clinical part of the examination.

a. Provided that under special circumstances if the report from one or more examiners is not received by the time the Post - Graduate examination is due, the candidate may be permitted provisionally to sit for the examination but the result be withheld till the receipt of the report, subject to the condition that if the dissertation is rejected then the candidate in addition to writing a fresh dissertation, shall have to reappear for the examination.

7. A candidate whose dissertation stands approved by the examiners but fails in the examination, shall not be required to submit a fresh one if he/she appears in the examination in the same branch on a subsequent occasion.

9.2.2 Eligibility Criteria

- Candidates will be eligible to appear for the university examinations after completion of 3years and when following criteria are fulfilled:
  1. Attendance of 80%
  2. Submission of dissertation and acceptance by external examiner
  3. One research Publication based on the Dissertation
  4. One poster and one Podium presentation at National or Regional conferences, recognised by Theory (Subject contents already outlined in syllabus)

9.2.3 Theory

- Final Theory Papers: 4 papers
- All papers should have 10 short answer questions.
- Question papers are prepared based on the prescribed blueprint described later (see blueprint section)
- Model question paper is attached for ready reference.

9.2.4 Practical

Each student will be evaluated with all the components of Practical and viva-voce

- **Practical(300)**

1. Clinical Pathology: Discussion of a clinical case history, plan relevant investigations of the above case, perform them..

2. Haematology: Discuss haematology cases given the relevant history Plan relevant investigations Perform atleast two tests: one routine and one special exercise. Identify

3. Electrophoresis strips, osmotic fragility chart etc. Examine report and discuss ten cases given the history and relevant blood smears and/or bone marrow aspirate smears.

4. Transfusion (Medicine): Perform blood grouping or cross matching or Direct coomb's test

5. Histopathology (Cytopathology): Examine, report and discuss fifteen histopathology and five cytopathology cases given the relevant history and slides. Perform a Haematoxylin and Eosin stain and any special stain on a paraffin section Report on a frozen section

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

7. Gross Pathology : Describe findings of at least 10 gross specimens, give diagnosis and identify the sections to be processed

8. Basic Sciences : Identify electronmicrographs, Identify gels, results of PCR, immunological tests including staining for direct/indirect immunofluorescence, Identify histochemical and immunohistochemistry stains

9.1.3. Viva-voce is expected to be conducted at every stage of the practical examination. Additionally a formal "grand" viva-voce may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time.

Duration: 2 Days

1. Histopathology & Cytology..... 70 marks

2. Autopsy .....15 marks

3. Surgical Pathology .....20 marks

4.Hematology case discussion and exercised including
i) Hb/TLC/DLC/PBS -.....15 Marks

ii) Special Haematology Exercise .....10 marks
(Retic count/Platelet count/PCV/ESR estimation / sickling test)

5. Transfusion Medicine (Blood Group / DCT/ cross matching) .....15 marks

6. Haematology slides .....15 marks

7. Clinical Pathology case discussion and Exercise (Urine examination) .....20 marks

8. Histotechnique –……..20 marks

Microtomy.....10 marks

H & E stain.....05 marks

Special stain..... .....05 marks

Total 200 marks

VIVA 100 marks

GRAND TOTAL 300 marks

- Recommendations for passing:

1. The candidate will be required to secure minimum 50% marks in theory and 50% marks in Practical and viva - voce separately, which is mandatory for passing the whole examination.
2. There will be enough gap between theory and practical examination as recommended by NMC rules.
3. There university practical examination will be conducted by 2 external and 2 internal examiners.

10 Blueprint of Theory exam paper

Paper I: General Pathology, Pathophysiology, Immunopathology and Cytopathology

:MÐ	b m	b	fft fft		M : tti m
1	General Pathology	Cell injury & Cellular adaptation, Inflammation, Tissue repair, Hemodynamic disorders, Neoplasia, Genetics disorder, infectious disease, childhood and environmental disease.	**29**	**29**	**2**
2	Pathophysiology	Cell injury & Cellular adaptation, Inflammation, Tissue repair, Hemodynamic disorders, Neoplasia, Genetics disorder, infectious disease, childhood and environmental disease.	**29**	**29**	**2**
3	Immunopathology	Immunological disorder, Autoimmune disorders, Immunodeficiency disorder and AIDS	**19**	**19**	**1**
4	Cytopathology	Cytology of various organs, Body fluids for malignancy, Various cytotechnique and cytostains. Quality control in cytology	**19**	**19**	**1**

Paper II **Systemic pathology**

Sl.N0	b m	b	fft fft		M : tti m
1	Systemic pathology	Pathogenesis, Morphology of diseases of various systems,	**50%**	**50**	**5**
2	Surgical pathology	Morphology reporting criteria, staging and grading of various diseases, Histopathology techniques, Automation and quality control in histopathology lab.	**50%**	**50**	**5**

Paper III **Hematology, Transfusion Medicine and Laboratory Medicine**

Sl.N0	b m	b	fft fft		M : tti m
1	Hematology	RBC disorders, WBC disorders, Platelet and coagulation disorders, Hematological techniques	**59**	**59**	**5**
2	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	**19**	**19**	**1**

		transmitted in blood, Adverse reactions to transfusion of blood and components and Quality control in blood bank.			
3	Laboratory medicine	Body fluids interpretation, Renal function tests, Liver function test, Pancreatic function test, Endocrine function test, Tests for malabsorption, automation in the laboratory and Quality control in the laboratory.	**19**	**19**	**1**

Paper IV: Recent advance and applied aspects

Sl.NO	b m	b	fft fft		M : ttı m
1.	Recent advances	Recent advances in histopathology, Cytology, Hematology, Transfusion Medicine	**50%**	**50**	**5**
2.	Applied aspects	Applied aspects in Immunopathology, Electron microscopy, Histochemistry, Immunohistochemistry, Cytogenetics, Molecular Biology, Maintenance of records, Information retrieval, use of Computer and Internet in medicine, Quality control, waste disposal.	**50%**	**50**	**5**

11 Model Question Paper

PAPER I : General Pathology, Pathophysiology, Immunopathology and Cytopathology

3 Hours **(10 x 10 = 100 marks)**

ANSWER ALL QUESTIONS

(Draw labelled diagram wherever required)

Q1. Explain role of apoptosis in Health and Disease

Q2. Describe chemokines and their role in inflammation

Q3. Describe Role of Myofibroblast in health and disease

Q4. 35 years old male presented to ICU with 3 days old perforation. Posted for emergency lapratomy. He had fever, tachypneic and tense abdomen with bilateral crypts. His Pulse- 130/mts and Bp is 80/60 mm of Hg. Total WBC count-19000 cells/cu mm.

a. what is the possible diagnosis?

b. Describe the etiopathogenesis of this disease?

Q5. Explain Implications of Genomic imprinting in human disease

Q6. 40 yrs old female presenting with butterfly rash on her face. She does not use any medication. Also presented with arthralgia, alopecia and weakness but there is no fever.

a. what is the possible diagnosis?

b. Describe the lab diagnosis of this disease?

Q7. 35 years old female came with complaints of fever, sweating and dizziness. Also shows nocturnal rise in the temperature. Complete blood count shows thrombocytopenia.

a. what are the possible differential diagnosis?

b. what the various investigation and diagnostic finding for the disease.

Q8. Explain Role of angiogenesis in Neoplasia

Q9. Describe cytofixatives

Q10. Role of squash cytology in CNS tumors.

PAPER II Systemic Pathology

3 Hours **(10X10=100 marks)**

(Draw labelled diagram wherever required)

ANSWER ALL QUESTIONS

Q1. Describe vasculitis syndromes

Q2. Describe Pathology of pneumocystis carinii pneumonia

Q3. Explain role of endoscopic biopsy in diagnosis of gastrointestinal lesions

Q4. Explain Radiological appearances in correlation with pathological changes in various bone tumors

Q5. A 35 year old daily labourer presents with a history of coughing with expectoration for the past 2 months. He has loss of weight and evening rise of temperature. X-ray reveals a cavitary lesion in the upper lobe apex.

a) What is the provisional diagnosis?
b) Describe the morphology and classification of the diseases

Q6 Explain the pathology of neurodegenerative disorders

Q7. Describe Microscopic variants of papillary carcinoma of thyroid.

Q8. 30 years old male with recent consumption of unknown drug, pain in the loin, passing dark colored urine. On withdrawing blood plasma is pink in color. Hb-6gm/dl, reticulocyte count-12%

a) What is the probable diagnosis
b) Describe the renal biopsy findings of the diagnosis

Q9. 30 year old female presented with blister over the face, scalp and upper chest. Lesion also seen in the oral mucous membrane.

a) What is the probable diagnosis?
b) How will you approach for vesiculobullous diseases.

Q10. Discuss the differential diagnosis of spindle cell sarcoma.

PAPER III Hematology, Transfusion Medicine and Laboratory medicine

3 Hours **(10X10=100 marks)**

ANSWER ALL QUESTION

(Draw labelled diagram wherever required)

Q1. Explain Lab diagnosis of cold agglutinin disease

Q2. Explain Immunophenotyping and cytogenetics of acute leukemias

Q3. A 10 years old male child came with complaints of petechiae and purpura. His platelet count is 60000 cells/cu mm.
   a. What is your probable diagnosis?
   b. How will you approach to any bleeding disorder?

Q4. Define quality control and quality assurance. Discuss internal and external quality control programmes with specific reference to haematology

Q5. Explain use of Microwave in histopathology

Q6. Explain Diagnostic application of microscopic examination of urine

Q7. Explain role of enzymes in health and disease

Q8. 50 years old male came with complaints of polyuria and polydipsia. His FBS-200 mg/dl and urine analysis shows positive for microalbumninuria.
   a. what is glycosylated hemoglobin? Expalin its importance?
   b. Describe the morphology of renal lesions in this disease?

Q9. Describe in brief the standard protocol and requirement in establishing modern blood bank

Q10. 35 years old female develops chest pain, palpitation and circulatory shock following blood transfusion in OG ward.
   a. What is your probable diagnosis?
   b. How will you investigate for mismatch transfusion reaction.

Paper IV: Recent advance and Applied aspects

3 Hours **(10X10=100 marks)**

ANSWER ALL QUESTIONS

(Draw labelled diagram wherever required)

Q1. Explain role of matrix metalloproteinases in tumor progression.

Q2. Describe role of microarray analysis in diagnosis of tumors

Q3. Describe in detail principle, technique and clinical application of flow cytometry

Q4. Describe liquid based cytology for cervical screening

Q5. Explain in brief methods of separation of blood components

Q6. Discuss role of immunohistochemistry in diagnosis of round cell tumors

Q7. Describe role of Automation in Histopathology laboratory

Q8. Explain role of karyotyping in haematological malignancies

Q9. Explain principle and application of Polymerase Chain reaction

Q10. Explain role of Telepathology in modern Laboratory practice.

12 Recommended reading

12.1 List of recommended 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 GeethaJayaram
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

12.2 List of recommended journals

S. No	Name of the Journal
1	Acta Cytologica
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	Archives of Pathology and Laboratory Medicine
7	British Journal of Haematology
8	Blood

9	Diagnostic Cytopathology
10	Histopathology
11	Human Pathology
12	Indian Journal of Cytology
13	Indian Journal of Pathology and Microbiology
14	Journal of Pathology
15	Journal of Clinical Pathology
16	Laboratory Investigation
17	Modern Pathology
18	Pathology
19	Seminars in Hematology
20	Seminars in Diagnostic Pathology
21	Virchows Archives
22	Recent Advances Series

13 Annexures - Assessment and Feedback forms

Annexure 1 – Multisource Evaluation sheet

MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE
PILLAIYARKUPPAM, PUDUCHERRY – 607 402

Evaluation sheet for postgraduate clinical work

(To be completed by respective Unit Head/Peers/HCPs/Patient relatives)

Name of the Resident: …….. UIN No.: ……

Name of the Faculty/Peers/HCPs/Patient relatives: ……

Date: ……

Sl. No.	Criteria to be assessed	Score		
		Below par (0)	At par (1)	Above par (2)
	INTERPERSONAL COMMUNCATION SKILLS(IPCS)			
1.	Ability to gather the needed information during History taking and physical examination in a respectful manner.			
2.	Ability to give the necessary information regarding choice of management and guide the patient/attenders to make appropriate decisions.			
3.	Ability to communicate the risks involved for patient care, in an understandable language without making the patient/attenders apprehensive, allowing 2 way communication.			
4.	Ability to be caring and respectful with patients during any procedure.			
5.	Ability to convey the required information clearly to the consultants, peers and other health care workers.			
	PROFESSIONALISM(P)			
1.	Ability to be regular and punctual			
2.	Demonstrate respectfulness and obedience to consultants, peers and other health care workers.			
3.	Ability to accept and follow constructive feedback from consultants, peers and other health care workers.			
4.	Ability to maintain emotional balance during triggering situations, people and environment.			
5.	Makes their presence respectful, with their physical appearance and wearing appropriate attire.			
	IPCS Total score: IPCS Final score= IPCS Total score*10			
	Milestone Level: IPCS=1 0 - 20%, IPCS=2 20 - 40%,.IPCS=3 40 - 60%, IPCS=4 60 - 80%, IPCS=5 80 - 100%,			
	P Total score: P Final score= P Total score*10			
	Milestone Level: 0 - 20%, P=1. 20 - 40%, P=2. 40 - 60%, P=3. 60 - 80%, P=4. 80 - 100%, P=5			
	Signature:			

Annexure 2–Seminar

MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE
PILLAIYARKUPPAM, PUDUCHERRY – 607 402

Evaluation sheet for postgraduate seminar

(To be marked individually by each faculty)

Name of the Resident: UIN No

Name of the Faculty: Date:

S. No.	Criteria to be assessed	*Score (1 – 10)
1	Introduction of subject and its importance / Objectives	
2	Completeness of presentation	
3	Cogency of presentation	
4	Consulted all relevant literature	
5	Use of audio - visual aids	
6	Understanding of subject	
7	Summary and take home message	
8	Cites appropriate references / suggests further reading	
9	Time management	
10	Overall performance – relevant answers to questions, attitude during presentation and confidence	

***Score interpretation – 1-3->Needs improvement; 4-6->Meets expectations; 7-9->Exceeds expectation; 10->Outstanding.**

General Comments:
Highlights in performance (strengths)
Possible suggested areas for improvement (weakness)
Signature

Annexure 3 – Journal Club

MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE
PILLAIYARKUPPAM, PUDUCHERRY – 607 402
Evaluation sheet for postgraduate journal club
(To be marked individually by each faculty)

Name of the Resident: UIN No

Name of the Faculty: Date:

S. No.	Criteria to be assessed	*Score(1-10)
1	Relevance of article chosen	
2	Identifies the problem addressed in the paper	
3	Completeness of presentation	
4	Analyses and gives comments on methodology and statistics	
5	Brief summary of results	
6	Comparison of work with other published work	
7	Merits and demerits of the paper	
8	Summary and take home message	
9	Time management	
10	Overall performance – relevant answers to questions, attitude during presentation and confidence	

***Score interpretation – 1-3->Needs improvement; 4-6->Meets expectations; 7-9->Exceeds expectation; 10->Outstanding.**

General Comments:
Highlights in performance (strengths)
Possible suggested areas for improvement (weakness)
Signature:

Annexure 4 - Case Presentation

MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE
PILLAIYARKUPPAM, PUDUCHERRY – 607 402
Evaluation sheet for postgraduate case presentation
(To be marked individually by each faculty)

Name of the Resident: UIN No

Name of the Faculty: Date:

S. No.	Criteria to be assessed	*Score (1-10)
1	Logical order in presentation (History taking)	
2	Cogency of presentation	
3	Accuracy and completeness of general and local physical examination	
4	Description of Gross and microscopic findings	
5	Summarizes the case and analyses the appropriate differential diagnoses	
6	Whether the diagnosis follows logically from history and findings	
7	Investigations required : Completeness of list, relevant order, interpretation of investigations	
8	Management principles and details	
9	Time management	
10	Overall performance – relevant answers to questions, attitude during presentation and confidence	

***Score interpretation – 1-3->Needs improvement; 4-6->Meets expectations; 7-9->Exceeds expectation; 10->Outstanding.**

General Comments:
Highlights in performance (strengths)
Possible suggested areas for improvement (weakness)
Signature:

Annexure 5 - EPA Assessment Form

MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE

DEPARTMENT OF PATHOLOGY

Entrustable professional activity assessment form

STUDENT NAME: UIN No:
PGY: ASSESSMENT No:
FACULTY: DATE:

EPA No.	**Entrustable Professional Activity**										
1.	Perform gross examination of surgical pathology specimens and Interpretation of Microscopic findings in tissue.	PS 1 3	PS2 3	PS3 3	ICS 1 2	ICS2 2	SBP 1 2	PBLI 1 1	P 1 1	MK 1 2	MK 4& 5 2
2	Perform histotechniques (Tissue processing, embedding, microtomy, Staining and special stainning)	PS 4 3	ICS 2 2	SBP 1 2	PBLI 1	P1 1	MK 5 2				
3.	Perform And Interpretation of FNAC and other Cytological smears (Sputum, Bronchial washings, Serous effusions, etc.	PS5 2	ICS 1 2	ICS 2 2	PC1 2	SBP1 2	PBLI1 1	P 1 1	M K 3 2		
4.	Interpretation of Frozen sections	PS 6 2	ICS 1 2	PC 1 2	SBP 1 2	PBLI 1 1	P 1 1	MK 5 2			
5.	Selection, performance and interpretation of appropriate Immunohistochemical markers.	PS 7 2	ICS 1 2	ICS 2 2	SBP 1 2	PBLI 1 1	P1 1	MK 5 2			
6.	Interpretation of Bone Marrow Smears	PS 8 2	ICS 1 2	ICS 2 2	PC 1 2	SBP 1 2	PBLI 1 1	P1 1	M K 7 2		

7.	Perform and Interpretation of routine haematological investigations like haemoglobin, TLC, DLC, ESR PCV, Blood indices and peripheral smear.	PS 9 3	ICS 2 2	SBP 1 2	PBLI 1	P1 1	MK7 2				
8.	Perform and Interpretation of special investigations like Reticulocyte count, Sickling test, Osmotic Fragility Test, Haemoglobin Electrophoresis, Fetal Haemoglobin, etc.	PS10 2	ICS 2 2	SBP1 2	PBLI1 1	P1 1	MK 7 2				
9.	Planning investigations for a Clinical case	PS 11 2	ICS 2 2	PC 1 2	SBP 1 2	PBLI 1 1	P1 1	MK 9 2			
10.	Perform and Interpret Urine Examination, Body fluids and semen analysis.	PS 12 3	ICS 1 2	ICS 2 2	PC 1 2	SBP 1 2	PBLI 1 1	P 1 1	M K9 2		
11	Interpretation of ancillary techniques like Immunoflourescence, Karyotyping, FISH, PCR and ElectronMicroscopy.	PS 13 2	ICS 2 2	SBP 1 2	PBLI 1 1	P1 1	MK 10 2				
12	Demonstration of familiarity within laboratory investigations in Microbiology and Biochemistry	PS 14 2	ICS 2 2	SBP 1 2	PBLI 1 1	P 1 1	MK 9 2				
13	Perform and interpret Blood banking tehniques (Bloodgrouping , Rh typing, Cross-matching and Coomb's test, ELISA for infectious disease like HIV, HbsAg).	PS 15 2	ICS 1 2	ICS 2 2	SBP 1 2	PBLI 1 1	P1 1	MK8 2			
14	Selection of blood donors and Management of adverse donor	PS 16 2	PS17 2	ICS 1 2	ICS 2 2	PC 1 2	SBP 1 2	PBLI 1 1	P1 1	MK8 3	

	reactions. Perform investigation for a case of mismatched blood transfusion.										
15	Participation and Presentation in multidisciplinary meetings like tumor boards, CPCs, Dermato-Pathological conferences. Teaching pathology to undergraduates (MBBS), and allied health sciences like BDS, BSc (Nursing), BSc (MLT), BSc (Radiology), etc.	PS 18 2	PS19 2	ICS 2 2	ICS 3 2	PC 1 2	SBP 1 2	PBLI 1 1	P1 1	MK1 2	MK 5 3

Key for assigning Grade of entrustability

EPA	Grade of Entrustability
EPA1.	
EPA2.	
EPA3.	
EPA4.	
EPA5.	
EPA6.	
EPA7.	
EPA8.	
EPA9.	
EPA10.	
EPA11.	
EPA12.	
EPA13.	
EPA14.	
EPA15.	

Comments

Signatures	
Resident	
Faculty	
Head of the Department	

Grade	1	2	3	4	5
Entrustability	Can observe and assist	Can perform with strict supervision	Can perform with loose supervision	Can perform independently	Expert

Annexure 6 – EPA Progress sheet

EPA	GRADE OF ENTRUSTABILITY					
	PG Y1		PG Y2		PG Y3	
	6 MONTHS	12 MONTHS	6 MONTHS	12 MONTHS	6 MONTHS	12 MONTHS
Date assessed						
EPA1.						
EPA2.						
EPA3.						
EPA4.						
EPA5.						
EPA6.						
EPA7.						
EPA8.						
EPA9.						
EPA10.						
EPA11.						
EPA12.						
EPA13.						
EPA14.						
EPA15.						
Candidates sign						
HOD Sign						

Annexure 7 – Dissertation evaluation form

MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE
PILLAIYARKUPPAM, PUDUCHERRY – 607 402
Proforma for evaluation of Dissertation

UIN: ……..

Topic of the study :

_____

_____

DISSERTATION COMPONENTS	Grade		
TITLE			
Title appropriate and clear	A	B	C
INTRODUCTION			
Purpose of the Study	A	B	C
Hypothesis/Research Question	A	B	C
Aims & Objectives	A	B	C
REVIEW OF LITERATURE			
Appropriate	A	B	C
Complete and current	A	B	C
METHODS			
Study subjects, controls, Inclusion and Exclusion criteria	A	B	C
Materials/Apparatus/Cases	A	B	C
Methodology used	A	B	C
Procedure for data collection	A	B	C
Appropriate statistical methods employed	A	B	C
Handling of ethical issues	A	B	C
RESULTS			
Logical organization of data	A	B	C
Appropriate use of charts, tables, Graphs, figures, etc.	A	B	C
Statistical/Clinical interpretation	A	B	C
DISCUSSION			
Appropriate to data	A	B	C
Discussion and implication of results	A	B	C
Comparison with other studies	A	B	C
Satisfactory explanation of deviations if any	A	B	C
Limitations of the study	A	B	C
Recommendation for future studies	A	B	C
CONCLUSION			
Relevance, are they in line with aims	A	B	C
SUMMARY			
Clear and Concise	A	B	C
REFERENCES			
Vancouver Format and appropriately cited in text.	A	B	C

Key for grading – A – Exceeds expectation, B – Meets expectation, C – Needs Improvement

Overall Impression

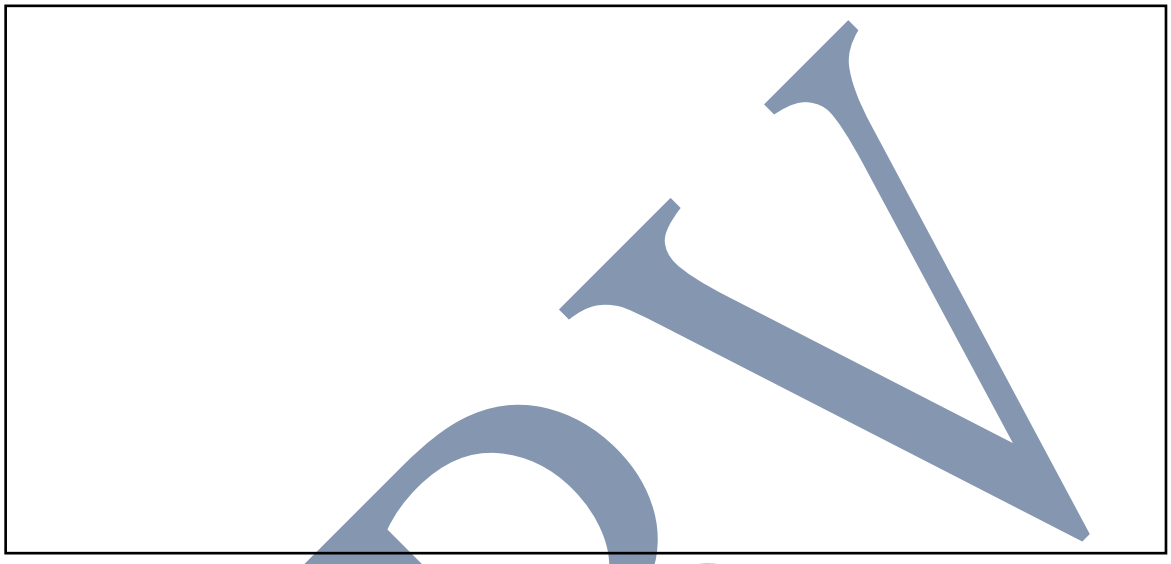
(Please Check the appropriate box)

☐ Accepted as submitted

☐ Accepted pending modification as suggested below

☐ Not Accepted for reasons specified below

Remarks:



Signature of the examiner with date