PRAVARA INSTITUTE OF MEDICAL SCIENCES
(DEEMED TO BE UNIVERSITY)
Loni, Tal. Rahata, Dist. Ahmednagar 413736
NAAC Re-accrediated with 'A' Grade

SYLLABUS
PG Programme- MD (PATHOLOGY)
(As per MCI Regulations Governing PG Programme 2000 Amended up to May, 2018)

I. PREAMBLE

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

GOAL:

The goal of postgraduate medical education shall be to produce competent specialist.

(i) Who shall recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national health policy;

(ii) Who shall have mastered most of the competencies, pertaining to the speciality that is required to be practiced at the secondary and tertiary levels of the healthcare delivery system.

(iii) Who shall be aware of contemporary advances and developments in the discipline concerned

(iv) Who shall be able to organize and establish clinical laboratory.

(v) Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology.

(vi) Who shall be able to teach and share his knowledge and competence with others. He/She should be imparted training in teaching methods in the subject which may enable them to take up teaching assignments in Medical Colleges/Institutes.

II. SUBJECT SPECIFIC LEARNING OBJECTIVES

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

A. Cognitive Domain

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

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

B. Affective Domain

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

C. Psychomotor Domain

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

III. SUBJECT SPEIFIC COMPETENCIES

A. Cognitive domain

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

1. Capable of offering a high quality diagnostic opinion in a given clinical situation with an appropriate and relevant sample of tissue, blood, body fluid, etc. for the purpose of diagnosis and overall wellbeing of the ill.
2. Able to teach and share his knowledge and competence with others. The student should be imparted training in teaching methods in the subject which may enable the student to take up teaching assignments in Medical Colleges/Institutes.
3. Capable of pursuing clinical and laboratory based research. He/she should be introduced to basic research methodology so that he/she can conduct fundamental and applied research.

B. Affective domain

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

C. Psychomotor domain

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

Surgical pathology

Skills

1. Given the clinical and operative data, the student should be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and be able to correctly diagnose at least 80% of the lesions received on an average day from the surgical service of an average teaching hospital.
2. A student should be able to demonstrate ability to perform a systematic gross examination of the tissues including the taking of appropriate tissue sections and in special cases as in intestinal mucosal biopsies, muscle biopsies and nerve biopsies, demonstrate the orientation of tissues in paraffin blocks.
3. The student should be able to identify and systematically and accurately describe the chief histo-morphological alterations in the tissue received in the surgical pathology service. He/she should also correctly interpret and correlate with the clinical data to diagnose at least 90% of the routine surgical material received on an average day.
4. Be conversant with automatic tissue processing machine and the principles of its running.
5. Process a tissue, make a paraffin block and cut sections of good quality on a rotary microtome.
6. Stain paraffin sections with at least the following:
    a. Haematoxylin and eosin
    b. Stains for collagen, elastic fibers and reticulin
    c. Iron stain
    d. PAS stain
    e. Acid fast stains
    f. Any other stains needed for diagnosis.
7. Demonstrate understanding of the principles of:
    a. Fixation of tissues
    b. Processing of tissues for section cutting
    c. Section cutting and maintenance of related equipment
    d. Differential (special) stains and their utility
8. Cut a frozen section using cryostat, stain and interpret the slide in correlation with the clinical data provided.
9. Demonstrate the understanding of the utility of various immunohistochemical stains especially in the diagnosis of tumour subtypes.

Cytopathology
Skills

1. Independently prepare and stain good quality smears for cytopathologic examination.
2. Be conversant with the techniques for concentration of specimens: i.e. various filters, centrifuge and cytocentrifuge.
3. Independently be able to perform fine needle aspiration of all lumps in patients; make good quality smears, and be able to decide on the types of staining in a given case.
4. Given the relevant clinical data, he/she should be able to independently and correctly: Diagnose at least 75% of the cases received in a routine laboratory and categorize them into negative, inconclusive and positive.
5. Demonstrate ability in the technique of screening and dotting the slides for suspicious cells.
6. Indicate correctly the type of tumour, if present
7. Identify with reasonable accuracy the presence of organisms, fungi and parasites

Haematology
Skills

1. Correctly and independently perform the following special tests, in addition to doing the routine blood counts:
    a. Haemogram including reticulocyte and platelet counts.
    b. Bone marrow staining including stain for iron
    c. Blood smear staining
    d. Cytochemical characterization of leukemia with special stains like Peroxidase, Leukocyte Alkaline Phosphatase
    e. (LAP), PAS, Sudan Black, etc.
2. Hemolytic anemia profile including HPLC, Hb electrophoresis etc.
3. Coagulation profile including PT, APTT, FDP.
4. BM aspiration and BM biopsy
5. Demonstrate familiarity with the principle and interpretation of results and the utility in diagnosis of the following:
    a. Platelet function tests including platelet aggregation and adhesion and PF3 release
    b. Thrombophilia profile:
    c. Lupus anticoagulant (LAC),
    d. Anticardiolipin Antibody (ACA), Activated Protein C
    e. Resistance (APCR), Protein C (Pr C), Protein S (Pr S) and
    f. Antithrombin III (AT III)
    g. Immunophenotyping of leukaemia
    h. Cytogenetics
    i. Molecular diagnostics.
6. Describe accurately the morphologic findings in the peripheral and bone marrow smears, identifying and quantitating the morphologic abnormalities in disease states and arriving at a correct diagnosis in at least 90% of the cases referred to the Haematology clinic, given the relevant clinical data.

Laboratory Medicine
Skills

1. Plan a strategy of laboratory investigation of a given case, given the relevant clinical history and physical findings in a logical sequence, with a rational

explanation of each step; be able to correctly interpret the laboratory data of such studies, and discuss their significance with a view to arrive at a diagnosis.

2. Demonstrate familiarity with and successfully perform:
    a. routine urinalysis including physical, chemical and microscopic, examination of the sediment.
    b. Macroscopic and microscopic examination of faeces and identify the ova and cysts of common parasites.
    c. Complete examination: physical, chemical and cell content of Cerebrospinal Fluid (C.S.F), pleural and peritoneal fluid;
    d. Semen analysis.
    e. Examination of peripheral blood for commonly occurring parasites.
    f. Independently and correctly perform at least the following quantitative **e**stimations by manual techniques and/or automated techniques.
        - Blood urea
        - Blood sugar
        - Serum proteins (total and fractional)
        - Serum biIirubin (total and fractional)
    g. Demonstrate familiarity with the following quantitative estimations of blood/ serum by Automated Techniques:
    h. Serum cholesterol, Uric acid, Serum Transaminases (ALT and AST/SGOT and SGPT), etc.
3. Prepare standard solutions and reagents relevant to the above tests, including the preparation of normal solution, molar solution and buffers.
4. Explain the principles of Instrumentation, use and application of the instruments commonly used in the labs eg. Photoelectric colorimeter, Spectrophotometer, pH meter, Centrifuge, Electrophoresis apparatus, ELISA Reader, flow cytometer, PCR, chemiluminiscence.

Transfusion Medicine

Skills

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

1. Selection and bleeding of donors
2. Preparation of blood components i.e. Cryoprecipitates, Platelet concentrate, Fresh Frozen Plasma, Single Donor Plasma, Red Blood Cell concentrates.
3. ABO and Rh grouping.
4. Demonstrate familiarity with Antenatal and Neonatal work up.
    a. Direct antiglobulin test
    b. Antibody screening and titre
    c. Selection of blood for exchange transfusion
5. Demonstrate familiarity with principle and procedures involved in:
    a. Resolving ABO grouping problems.
    b. Identification of RBC antibody.
    c. Investigation of transfusion reaction.
    d. Testing of blood for presence of:
        i. HBV (Hepatitis B Virus Markers).
        ii. HCV (Hepatitis C Virus Markers)
        iii. HIV (Human Immunodeficiency Virus Testing)
        iv. VDRL
        v. Malaria

Immunohistochemistry
Skills (desirable)

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

IV. SYLLABUS

Course contents:

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

A. General Pathology:

a. Normal cell and tissue structure and function.
b. The changes in cellular structure and function in disease.
c. Causes of disease and its pathogenesis.
d. Reaction of cells, tissues, organ systems and the body as a whole to various sublethal and lethal injuries.

B. **Systemic Pathology**:

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

C. Haematology

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

D. Laboratory Medicine (Clinical Biochemistry/Clinical Pathology including Parasitology).

E. **Transfusion Medicine (Blood Banking).**

F. The student is expected to acquire a general acquaintance of techniques and principles and to interpret data in the following fields.

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

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

Surgical Pathology

Knowledge

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

Autopsy Pathology

Knowledge

1. Should be aware of the technique of autopsy.
2. Should have sufficient understanding of various disease processes so that a meaningful clinico-pathological correlation can be made.
3. Demonstrate ability to perform a complete autopsy independently with some physical assistance, correctly following the prescribed instructions. Correctly identify all major lesions which have **caused, or contributed to the patient's death, on macroscopic examination alone and on microscopy in at least 90% of the autopsies in an average teaching hospital.**
4. In places where non-medico-legal autopsies are not available each student should be made to observe at least five medico-legal autopsies.
5. Write correctly and systematically Provisional and Final Anatomic Diagnosis reports.

Cytopathology

Knowledge

1. Should possess the background necessary for the evaluation and reporting of cytopathology specimens.
2. Demonstrate familiarity with the following, keeping in mind the indication for the test.
    a. Choice of site from which smears may be taken
    b. Type of samples
    c. Method of obtaining various specimens (urine sample, gastricsmear, colonic lavage etc.)
    d. Be conversant with the principles and preparation of solutions of stains

Haematology

Knowledge

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

Laboratory Medicine

Knowledge

1. Possess knowledge of the normal range of values of the chemical content of body fluids, significance of the altered values and its interpretation.
2. 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.
    a. Renal function tests
    b. Liver function tests
    c. Pancreatic function tests
    d. Endocrine function tests
    e. Tests for malabsorption

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

Transfusion Medicine (Blood Banking)

Knowledge

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

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

Basic Sciences (in relation to Pathology)

a) Immunopathology

Knowledge

1. Demonstrate familiarity with the current concepts of structure and function of the immune system, its aberrations and mechanisms thereof.
2. 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
    (d) 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)

b) Electron Microscopy

Knowledge

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

c) Enzyme Histochemistry

Knowledge

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

d) Immunohistochemistry

Knowledge

1. 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 polyclonal antibodies.

2. Be aware of the limitations of immuno-histochemistry.

e) Molecular Biology

Knowledge

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

f) Cytogenetics

Knowledge

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

g) Tissue Culture

Knowledge

1. Demonstrate familiarity with methods of tissue culture.

h) Principles of Medical Statistics

Knowledge

1. Demonstrate familiarity with importance of statistical methods inassessing data from patient material and experimental studies.

V. TEACHING AND LEARNING METHODS

Post Graduate Training

Teaching methodology

1. Active learning will form the mainstay of post graduate training;
2. There will be lectures for post graduates (at least 20 per year), along with seminars, symposia, group-discussions and Journal clubs.
3. The post graduate students should regularly do the ward rounds of various clinical departments and learn cases of interest for discussion with the clinical faculty.
4. e-learning activities will be encouraged.

Rotation:

Postings to laboratories/assignments

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

Sr. No.	Section	Duration in month
1	Surgical Pathology and Autopsy & Pathologic techniques	**12**
2	Haematology and Laboratory Medicine	**10**
3	Cytopathology	**08**
4	Transfusion Medicine (Blood Bank)	**02**
5	Museum and record management	**01**
6	Basic Sciences including Immunopathology, Electron microscopy, Molecular Biology, Research Techniques and cytogenetics etc	**02**
Total		**35**

POSTGRADUATE TRAINING/ LEARNING PROGRAMME:

1. The training programme is designed to enable the student to acquire a capacity to learn and investigate, to synthesize and integrate a set of facts and develop a faculty to reason. The curricular programmes and scheduling of postings will provide the student with opportunities to achieve the above broad objectives.
2. Much of the learning is to be accomplished by the student himself / herself.
3. Interactive discussions are preferred over didactic sessions. The student must blend as an integral part of the activities of an academic department that usually revolves around three equally important basic functions of teaching, research and service.
4. The emphasis under a PG training programme is of learning while serving/working.
5. **The following is a rough guideline to various teaching/learning activities :**
    1) Collection of specimens including Fine Needle Aspiration of lumps.
    2) Grossing of specimens.
    3) Performing autopsies.
    4) Discussion during routine activities such as during signing out of cases.
    5) Presentation and work-up of cases including the identification of special stains and ancillary procedures needed.
    6) Clinico-pathological conferences.
    7) Intradepartmental and interdepartmental conferences related to case discussions.
    8) Conferences, Seminars, Continuing Medical Education (CME) Programmes.
    9) Journal Club.
    10) Research Presentation and review of research work.
    11) 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.
    12) Participation in workshops, conferences and presentation of papers etc.
    13) Laboratory work.
    14) Use and maintenance of equipment.
    15) Maintenance of records. Log books should be maintained to record the work done which will be checked and assessed periodically by the faculty members imparting the training.
    16) Postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
    17) Department will encourage e-learning activities.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

VI. ASSESSMENT

FORMATIVE ASSESSMENT, ie., during the training

1. Formative assessment will be continual and will assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.
2. General Principles
    a. Internal Assessment will be frequent, cover all domains of learning and will be used to provide feedback to improve learning;
    b. it wil also cover professionalism and communication skills.
3. The Internal Assessment will be conducted in theory and practical/clinical examination.
4. Quarterly assessment during the MD training should be based on:
    a. Journal based / recent advances learning
    b. Patient based /Laboratory or Skill based learning
    c. Self directed learning and teaching
    d. Departmental and interdepartmental learning activity
    e. External and Outreach Activities / CMEs
5. The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I)

SUMMATIVE ASSESSMENT,

The Post Graduate examination shall be in three parts:-

1. **Thesis (Dissertation):**
2. **Theory**:
3. **Practicals and viva voce Examination:**

A. **Dissertation:**

a. Thesis / Dissertation is compulsory. Every candidate is required to carry out the work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such work shall be submitted in the form of a Dissertation.

b. The Dissertation is aimed at training the candidate in research methods and techniques. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

c. It includes identification of a problem, formulation of a hypothesis, search and review of relevant literature, getting acquaintance with recent advances, designing of research study, collection of data, critical analysis of results and drawing conclusions.

d. The title of the topic along with the plan of work not exceeding 500 words in prescribed Performa should be submitted to the University with the recommendation of guide. Prior approval by the local Ethical Committee is essential.

e. Students should submit a Thesis or Dissertation six months prior to examinations as a partial fulfillment to the award of the degree of MD (Pathology).

B. EXAMINATION PATTERN:

THEORY: **TOTAL: 400 marks.**

Four Papers 100 marks each:

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

Each Paper will be:

Full Questions: 3X20 Marks each – 60
Short Notes : 4X10 Marks Each -- 40

Practicals and viva voce Examination:

Two Days Practical Examination

Sr No	Practical			Marks
1	**Clinical Pathology & Laboratory Medicine**			**60**
	Discuss the given case and Plan Relevant investigations & interpret the biochemical results		25	
	Complete Urine Analysis		25	
	Biochemistry exercise or fluid analysis (CSF / Pleural fluid/ Ascitic fluid		10	
2	**Haematology**			**90**
	Clinical test discussion along with Routine Haemogram & Two special test (at least one coagulation test)		40	
	Identify electrophoresis strips / osmotic fragility charts etc. or Interpretation of data from autoanalysers/ HPLC / flow cytometry.		10	
	Haematology Slides (10 slides) - blood smears and /or bone marrow aspirate smears and bone marrow biopsy		40	
3	**Transfusion medicine**			**20**
	a	Perform blood grouping / Perform Coomb's test / Perform cross matching		
	b	Gel cards interpretation.		
4	**Histopathology**			**90**
	Histopathology (12 – 15 Histopathology Slides)		80	
	Cytopathology (5 - 8 Cytology slides)			
	Histotechniques		10	
5	**Autopsy**			**30**
6	**Gross Pathology (Grossing)**			**30**
7	**Basic Sciences**			**30**
	a.	Spots on Immuno-histochemistry / immuno-fluroscence/ FISH/ PCR/ Electronmicrophotograph / immunological tests / gels etc.	20	
	b	Teaching exercise	10	
11	**Grand Viva** (a) Viva on dissertation and research methodology (b) General Viva –Voce			**50**
	TOTAL			**400**

VII. MANDATORY COMPLIANCE

1	The Model Weekly Time Table for Teaching learning activities is enclosed as	**:**	**Annexure – I**
2	Mandatory compliance of a PG student in T.L. process and CIA during the three year of study are given in	**:**	**Annexure – II**
3	The units for Quarterly assessment for CIA is given in	**:**	**Annexure – III**
4	Post Graduate student Quarterly Appraisal form for CIA is enclosed as	**:**	**Annexure – IV**
5	Mandatory Requirements to be eligible to appear for the University Summative Evaluation Examination is given in	**:**	**Annexure – V**
6	The Proforma of the Certificate on Attendance, Training Completion, Publication and Presentation Research / Poster / oral submission of Dissertation and present of all theory practical fee to be duly filled in and duly signed by PG Guide HOD, Finance Officer, Dean of faculty an HOI to be submitted to university COE before the issue of Hall Ticket for final exam is given us	**:**	**Annexure – VI**
7	The model QP pattern of paper I/II/III/IV, each of 100 marks and of 3 hours duration is enclosed as	**:**	**Annexure – VII**
8	The model Blue print for setting of Question papers and proper verbs/ phrases to be used in QP setting is given in	**:**	**Annexure – VIII**
9	The model marks list for practical and Vivavoce for PG medical MD/MS/ examination is enclosed as**.**	**:**	**Annexure – IX**

VIII. RECOMMENDED TEXT BOOKS; REFERENCE BOOK AND JOURNALS :

1. Cotran, Kumar, Collins. Robin's Pathologic Basis of Disease
2. Ivan Damjanov, James Linder. Anderson's Pathology,
3. Juan Rosai, Ackerman's Surgical Pathology
4. Christopher D.M.Fletcher. Diagnostic Histopathology of tumours
5. Jurgen Ludwig, Hand book of Autopsy Practice;
6. Theory & practice of Histological Techniques edited by John. D.Bancroft
7. Gradwohl's Clinical laboratory methods and diagnosis
8. Henry J.B Clinical Diagnostics and Management by Laboratory Methods, 22nd edition, 2012 published by W.B. Saunders & Company.
9. Lewis S.M, Bain D.J, Bates I, Dacie & Lewis Practical Haematology
10. Atlas and Text of Haematology by Tejinder Singh
11. Hoffbrand A.V, Catovsky D, Tuddenham G.D, Postgraduate Haematology .
12. Firkin F , Chesterman C, Penington D, de Gruchy's Clinical Haematology in Medical Practice
13. Greer J.P, Foerster J, Jukens J et. Al, Wintrobe's Clinical Haematology,

14. Mollison P.L, Blood transfusion in clinical medicine
15. Orell, Sterrett- Walters and Whittaker, Fine Needle Aspiration Cytology (Manual & Atlas)
16. Leopold G Koss, Diagnostic cytology and its histopathologic basis
17. Marluce Bibbo, Comprehensive cytopathology
18. Winnifred Grey,Grace T Mckee, Diagnostic cytopathology
19. Sudha R.Kini , Colour Atlas of differential diagnosis in exfoliative and aspiration cytopathology
20. Praful B. Godkar ,Clinical Biochemistry – Principles & practice, published by Bhalani Publishing House, Bombay
21. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics Edited by Carl Burt Edward R. Ashwood David E. Bruns,
22. Varley's Practical Clinical Biochemistry edited by Alan H. Gowen lock with assistance of Janet R Mc Mullay and Donald M. Mclauchlan
23. Parasitology (Protozoology & Helminthology.) in relation to clinical medicine – K.D.Chatterje published by Chatterjee Medical Publication.
24. Bailey & Scott Diagnostic Microbiology
25. WHO Classifications of tumours & tumour like lesions, published by IARC Press
26. Recent advances in Histopathology, Haematology etc.
27. Lever's Dermatopathology
28. Novak's Gynecologic and Obstetric Pathology with Clinical and Endocrine
29. Relations by Edmund R. Novak
30. Bone Pathology by H. Jaffe
31. MacSween's Pathology of the liver
32. Iochim's Lymph Node Pathology
33. Text Book on Breast Pathology by Tavasoli
34. Text Book on Thyroid Pathology by Geetha Jayaram
35. Heptinstall's Pathology of the Kidney
36. Enzinger's Soft Tissue Tumours

JOURNALS:

1. Acta Cytologica
2. The American Journal of Pathology
3. American Journal of Surgical Pathology, published by Lippincott & Raven
4. The American Journal of Hematology
5. The American Journal of Clinical Pathology
6. Archives of Pathology and Laboratory Medicine
7. Blood
8. British Journal of Haematology, published by Blackwell Sciences.
9. CANCER, International journal of American Cancer Society, published by John Wile & sons Inc.
10. Diagnostic Cytopathology published by Wiley Liss, inc, publication
11. Histopathology
12. Human Pathology
13. Haematology/Oncology Clinics of North America, published by W.B. Saunders &Company.
14. Journal of Cytology, published by I.AC.
15. I.C.M.R. Bulletin, published by ICMR
16. Indian Journal of Pathology & Microbiology, published by IAPM.
17. Indian Journal of Pathology and Microbiology

18. Indian Journal of Cancer, published by Indian Cancer Society.
19. Journal of Pathology
20. Journal of Clinical Pathology, published by B.M.J.
21. Laboratory Investigation
22. LANCET, published by Elsevier
23. Modern Pathology
24. Pathology
25. Seminars in Hematology
26. Seminars in Diagnostic Pathology
27. Virchows Archives
28. Year Book Series
29. Recent Advances Series

Annexure - I

P.G. Teaching Time Table – Model

Clinical postings (OPD – IPD Duties Ward Rounds, Casualty posting, ICU posting, posting to support Departments like Radiology, Anaesthesia CCL , Pathology, FMT, Postings to field work and PHCs Camps and other postings as per provisions of MCI, are mandatory on all week Day as per posting.

Day of the week	Time 03 to 5 PM
Monday	Journal Club
Tuesday	Case presentation / Micro Clinic- Patient based Training
Wednesday	Seminar / GD / Panel Discussion
Thursday	Lecture by Faculty on select Topics
Friday	Clinical Meet / CPC / CME
Saturday	Guest Lecture by Experts / Skill Lab or Simulation Lab
Sunday (Select ones)	Medical Camps / Blood Donation Camp / Other types of Camps

Note

1. The Dept may select suitable days for a particular task assigned. But all of 7 tasks per week are a must
2. All the PG Teachers, PG students must attend these PG TLE Activities.
3. Attendance for these activities shall be maintained at the Department and Institutions. Implementation of the MCI Regulations, Syllabus and Time Table is the responsibility of HOD / HOI.

HOD HOI DEAN OF FACULTY REGISTRAR

Annexure – II

Mandatory Compliance of a PG student in Teaching – Learning Activities
As per MCI Regulations Syllabus and Advisory

Sr. No.		Activities to be carried at by a PG student	Number per Ist year (Minimum)	Number Per IInd Year (Minimum)	Number per IIIrd year (Minimum)	Total Number (Minimum) For 3 years
1		Presentation of Journal Articles in Journal club	12	12	6	30
2	a	Case Presentation / Clinic	4	8	8	20
	b	Skill Lab & Simulation	4	4	4	12
3	a	Presentation of Seminars	4	4	4	12
	b	Leading a Group Discussion on a select Topic	4	4	4	12
	c	Assignment submission	4	4	4	12
4	a	Lectures / Tutorials to UG students /panel Discussion	4	4	4	12
	b	Clinical meeting CMC/ CPC	12	12	12	36
	c	BLS	1	--	--	1
	d	ACLS	1	--	--	1
5		Medical Camps Health Checkup at Villages / Schools/ Blood Donation / etc.	6	6	6	18
6	a	Orientation Programme	1	1	1	3
	b	Research Methodology Workshop	1	--	--	1
	C	Presentation of synopsis of the Thesis / Dissertation	1	--	--	1
	d	Presentation of Mid Term work of Thesis / Dissertation	--	1	--	1
	e	Presentation of final Draft of Dissertation / Thesis	--	--	1	1
	f	Presentation of Research Article	--	0 or 1	0 or 1	1
	g	Publication of an Article	--	0 or 1	0 or 1	1 or 2
7		LOG Book	1 (a)	1 (b)	1 (c)	1 a+b+c
8		CIA	4	4	4	12
9		Any other Activity Specified by Dept.				

Note :- 1. The Department may conduct periodic preparatory tests in Theory / Practical/Clinicals and Vivavoce. Quiz and MCQ test may to be adopted

2. The 12th CIA may also include a preparation examination on the model of university examination as a training cum assessment

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Annexure – III

Units of Quarterly Assessment of Every student (Internal)
Formative Assessment – Quarterly Assessment (Total 12 CIAs)

As per Annexure III.

1. **Journal Based / Recent Advances learning**
   (Bases on Journal Clubs / Select Article Presentation , Review Article preparation and presentation)

2. **Patient Based and Laboratory Based and skill Based learning**
   (Based on clinical Posting – OPD / IPD Ward Rounds/ casualty/ Case Examination/ presentation /Diagnosis / Interpretation /of Clinical Diagnostics/ Differential Diagnosis, Prognosis/ Morbidity/ Mortality/ Community Medicine/ Promotion/ prevention/ Control/ Prophylaxis/ Epidemiology/ Simulation Studies/ Skill Based Studies and so on)

3. **Self Directed Learning and Teaching**
   (Seminars Panel Discussion Group Discussion, Assignments, Case studies, Preparation of Charts and Models etc. , Role Play, Debates, Moot courts, etc)

4. **Departmental and Inter Departmental Learning Activities.**
   (Participation in UG/PG teaching / Horizontal and Vertical Integrated Lectures, Clinical meeting / CPC / CME)

5. **External and out research Activities**
   (Participation in Camps, Posting and Visit to PHCs, Satellite clinics, Mobile Clinics, Health checkup Camps, Blood Donation Camps, Immunization Camps school Visits. Crisis / Disaster Management, Celebration of Commemorative Days and soon)

6. Thesis / Dissertation Research Work related to selected Topic
7. a) Log Book maintenance/ Portfolio management - To maintain LOG Book or portfolio management of all the TL Activities
   b) Presentation / Publications of Research Article

No.		Particulars	Minimum for 3 months
1		Journal based Recent Advance Learning- Presentation of select Article in Journal clubs	3
2	a	Patient Based laboratory or Skill based learning- Case presentation / Clinic	1 (1st year) 2 (2nd & 3rd year)
	b	Skill Lab / Simulation Lab Work	1
3	a	Self Directed Learning & Teaching- Presentation of Seminar	1
	b	Leading a Group Discussion on select Topic in GD	1

	c	Assignment Submission	1
4	a	Lecture / Tutorials / Panel Discussions with UG students	1
	b	Clinical Meetings (CME's) CPC/Dept. meeting	3
5		Medical Camps	1
6		Dissertation Work Research methodology workshop	Yes / No
7		Log Book & Attendance	Yes / No
8		Any other Activity Prescribed (T/P/Viva)	Yes / No

HOD HOI DEAN OF FACULTY REGISTRAR

Annexure IV

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines – MD/MS Degree

Name of the Department/Unit : **Roll No.:**
Name of the PG Student :
Period of Training : FROM……TO……

Quarterly Assessment (1/2/3/4/5/6/7/8/9/10/11/12)

Sr. No.	PARTICULARS	Not Satisfactory			Satisfactory			More Than Satisfactory			Remarks
		1	2	3	4	5	6	7	8	9	
1.	Journal based / Recent advances learning										
2.	Patient based/Laboratory or Skill based learning										
3.	Self-directed learning and teaching										
4.	Departmental and interdepartmental learning activity										
5.	External and Outreach Activities / CMEs										
6.	Thesis / Research work										
7.	Log Book Maintenance										
8.	Performance in Theory/Practical/Viva voce Tests										
	Overall Assessment										

- **Publications of Research Article** **Yes/ No**
- **Presentation of Research Article**
- **The student has complied with mandatory requirement for quarterly assessment & presentation of Research Profile** **Yes/No**

Remarks* _____
_____
_____

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

SIGNATURE OF ASSESSEE **SIGNATURE OF HOD**

HEAD OF THE INSTITUTION

Annexure - V

Mandatory Requirements to be eligible to eligible to appear for university Summative Examination / Evaluation – As per MCI Regulations. (As per MCI Medical Education Regulation 2000, amended from time to time till date)

1. Minimum percent of Attence as per MCI Regulations.
2. Satisfactory performance in 12 CIA conducted and certified by HOD HOI and PG Guide.
3. Certificate from F.O. stating that all the fees due from the student are paid and credited to PIMS-DU A/.c
4. Presentation of a Research Article / Poster in a national / state level conference /Seminar / Workshop.
5. Publication of a Research Articles as first – author in (indexed in supus or web of science or as fixe by MCI Regulations and visited by UGC (ARE list).
6. a) Thesis – Finalisation of Topic and Title – submission of Synopsis following IEC clearance within 6 months of Adm. Topics
   b) After II year of a Admission or 3 terms Midterm Review .
   c) Thesis to be submitted at least 6 months before final examination.
   d)Thesis to be examined by 3 Examiners. (1 Internal and 2 External PG Examiners)
   e) Its Acceptance is a must for appearing for University T & P Exam

Note :- HOD & HOI shall ensure provisions of 1,2,3,4,5,6 a,b,c. The COE shall ensure provisions of 1,2,3,4,5,6 a,b,c ,d,e & e as per MCI Regulations

HEAD OF DEPARTMENT HEAD OF INSTITUTION DEAN OF FACULTY REGISTRAR

Annexure - VI

Ref. No. Date: _____

Complaince to MCI's Regulations Governing Post Graduate Programme in Medical Faculty

Department of _____ PG Programme: MD/ MS in _____
Name of Candidate: _____, JR-III
PRN No. _____ Date of Admission _____

Certification on
Attendance and Training Completion
Publication & Presentation of Research Articles (Poster/ Oral)
Submission of Dissertation & Payment of All types of prescribed fees

It is hereby certified that the said candidate JR-III in the Dept. of _____ at Rural Medical College has completed 6 academic terms/ 3 academic years and fulfilled the prevailing provisions of the MCI Regulations governing MD/MS PG programmes and the rules of PMT, PIMS-DU. Details are as under.

1.	**Attendance Fulfillment ***	**% Attendance**	**Remark – Eligibility**
	I Academic Term		
	II Academic Term		
	III Academic Term		
	IV Academic Term		
	V Academic Term		
	VI Academic Term		
	Overall fulfillment		Fulfilled / Not Fulfilled
	* Fulfillment of a minimum of 80% of attendance/ academic term, for 6 terms/ 3 years including imparted training, assignment, fulltime responsibilities and participation in all facets of PG education process including periodic assessment and so on as per MCI Regulations.		
2.	Log Book maintained as per MCI Regulations & Fulfilled the graded responsibilities in the management and treatment of patients entrusted for their care Verified by Dr. _____ Certified by Dr. _____		Yes/ No
3.	Successful participation in teaching and training programmes organized by the department for UG and Interns		
4.	Presented and Participated in Seminars, Journal Clubs, Case Presentations, Group Discussions, Clinical Meetings, CME Ward Round, CPC, Practicals organized by the Department as per the timetable.		
5.	Participated in training sessions in diagnostics, medical/ surgical training, in basic/ applied medical and allied clinical specialties and Medical Camps as per the timetable		
6.	The Performance of the PG students in 12 CIAs (Conducted quarterly) are satisfactory as per appraisal proforma as per MCI Regulations.		
7.	Presented one research poster and one research article (oral) in a Seminar/ Symposia/ Workshop/ Conference (National/State). The certificates for presentation of paper/ poster are enclosed.		
8.	Published one research article in a scientific journal as per norms. The copy of the published research article is enclosed.		
9.	Submitted a Dissertation entitled _____		

	_____ under the guidance of Dr. _____	
10.	Paid all the fees (tution fees and other fees) vide receipt No._____ for all 3 years.	
11.	Produced NOC from all the sections of PMT PIMS-DU concerned about "NO DUES"	
12.	Paid Examination fees of Rs. _____ vide Challan/ Receipt No. _____ dated _____ issued by Finance Officer PIMS-DU.	

It is hereby declared that the all the duly certified and verified documents, related to the aspects mentioned above, are in the custody of department concerned and student section of Rural Medical College with due authentication and signature of concerned HOD/ Dean/ Principal/ Dean of Faculty) and will be made available for any MCI inspection as per norms and Regulations.
Accordingly He/She is eligible/ not eligible for appearing in final year PG examination as per the MCI Regulations governing PG Programmes.

PG Guide
Dr. _____

Seal

Head of the Department
Dr. _____

Verified and certified that all types of prescribed fees and fines PMT, PIMS-DU, College, Hostel & Others mentioned at sl.no. 10, 11, 12 are paid by the student and credited to the accounts of PMT & PIMS-DU.

Seal

Finance Officer
PIMS-DU

Verified the relevant documents and certify that the candidate is eligible to appear for final year PG Examination as per MCI Regulations and rules of PIMS-DU.

Dean
Faculty of Medicine

Seal

Dean
Rural Medical College

Ref_____ **For Officer Use Only** Date:
_____

The HOD, HOI and Dean have certified that the

a. Candidate is eligible to appear for PG Theory and Practical/ Clinical Examination as per MCI Regulations. F.O. has certified that all the fees has been credited to PMT, PIMS-DU Accounts.
b. The Dissertation submitted has been evaluated by external examiners and then have approved the same for acceptance as per MCI Regulations.
c. Hence the candidate be permitted to appear for the PG examinations (Theory & Practical/ Clinical) scheduled in the month of _____ year _____.

Controller of Examinations

<u>Submitted for perusal and approval</u>

Seal

Vice Chancellor

Annexure – VII

PRAVARA INSTITUTE OF MEDICAL SCIENCES
(Deemed to be University)

Post Graduate Degree in Pathology (MD)
Examination _____ 20__
Paper – I/ II/ II/ IV

Paper Title : _____ **Date: / /20**

Marks : 100 **Time:**

Instructions to candidate:

1) All questions are compulsory
2) Answer written in illegible handwriting will not be assessed.
3) Write answers on both sides of answer paper.
4) Neat diagrams must be drawn wherever necessary.
5) Write prescription where indicated, and in the use of drugs their doses should be given.

Que. 1		Marks 20
Que. 2		Marks 20
Que. 3		Marks 20
Que. 4	Write Short notes on	Marks 40 (10x4)
	a	
	b	
	c	
	d	

Annexure – VIII

Table 1: Showing BLUEPRINTING for theory paper setting

The number of Questions & their distribution of marks shall be as per MCI model Question Paper [only Illustration]

LAQ/ SAQ and their Marks

LEVEL	Q	Q	Q	Q	Q	Q	Q	Total
	Mark	Mark	Mark	Mark	Mark	Mark	Mark	
Knowledge								
Comprehension								
Application								
Analysis								
synthesis								
Evaluation								
TOTAL								**1000**

The Questions (Whether LAQ or SAQ) Must aim at assessing all the 6 domains

Note: This is only an illustration. Actual Number of Questions and their distribution of marks shall be as per model Question Paper of MCI. (i.e. regarding the number of LAQ / SAQ and their marks distribution)

Table 2: Showing appropriate verbs suitable to level of knowledge for theory paper setting

Level	Suggested Verbs
Knowledge	Define, Describe, Draw, Find, Enumerate, Cite, Name, Identify, List, label, Match, Sequence, Write, State
Comprehension	Discuss, Conclude, Articulate, Associate, Estimate, Rearrange, Demonstrate understanding, Explain, Generalize, Identify, Illustrate, Interpret, Review, Summarize
Application	Apply, Choose, Compute, Modify, Solve, Prepare, Produce, Select, Show, Transfer, Use
Analysis	Analyze, Characterize, Classify, Compare, Contrast, Debate, Diagram, Differentiate, Distinguish, Relate, Categorize
Synthesis	Compose, Construct, Create, Verify, Determine, Design, Develop, Integrate, Organize, Plan, Produce, Propose, rewrite
Evaluation	Appraise, Assess, Conclude, Critic, Decide, Evaluate, judge, Justify, Predict, Prioritize, Prove, Rank

Table 3: Showing examples of theory questions

Sr. No.	Type	Explanation	Examples
1	**Long essay question**	✓ Question should pose clinical problem that will require student to apply knowledge along with integration with disciplines ✓ Avoid one liner as question ✓ Question stem should be structured ✓ Marking distribution should be provided ✓ Use of proper verbs from higher domains as given in this document ✓ Avoid recall based questions	
2	**Short notes**	✓ Sample a wider content ✓ Questions should be task oriented ✓ Reasoning questions provide opportunity for testing integration, clinical reasoning and analytical ability of the student	

Table 4: Showing Objective structured clinical examination [OSCE] typical station

Sr. No.	Type of station	Time allotted	Example	Evaluation
1	Procedure			
2	Response			

Annexure – IX

University Examination
Model Marks Sheet
For Practical / Clinical Examination and Viva voce

Duration _____ **Max Mark – 400**

Illustration only

No.	Type of Examination	Marks Allotted	Scored
1	**Long Cases**		
2	**a) Short cases (No. of small cases and Marks for each cases) 1/2/3/4-------- b) Ward Round c) Any other**		
3	**Spotter / OSPE/ Oral / Vivavoce Sub Divisions i) iv) ii) v) iii) vi)**		
	Ground Total	**400**	

PG Examiners		Name	Signature
1	**Chairman Name**		
2	**Internal Examiner**		
3	**External Examiner**		
4	**External Examiner**		

Date:-
Place :-

Note:- 1) The Number of cases, type of cases and type of practical and orals / vivavoce and their distributions of marks shall be as per MCI Regulations / Syllabi.

2) The HOD / Chairman / Co Chairman BOS shall ensure at this proforma is prepared as per the MCI Regulations / Syllabi.