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GUIDELINES FOR COMPETENCY BASEDPOST GRADUATE TRAINING PROGRAMME FOR M.D. INPATHOLOGY

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Implementation of Revised Competency Based Post Graduate Training Programme for MD in pathology as per the guidelines prepared by the National Medical Commission through Subject Expert Groups{ Date of Bos 21.07.2022 Ref :SBKSMIRC/Dean/Outward No.1301/2021-22, Date of Academic council :29.07.2022 Ref :SVDU/NOTFN/O370/2021-22 dated 30.07.2022}

Preamble

ThepurposeofPGeducationistocreatespecialistswhowouldprovidehighqualityhealthcare andadvance thecause ofsciencethroughresearch&training.

This programme is meant to standardize Pathology teaching at postgraduate level throughoutthe country in order to achieve uniformity in teaching and create suitable manpower withappropriate expertise. The postgraduate student in pathology should be sufficiently trained,professionally competent and confident in handling, ~~and~~ processing, and diagnosis related tohistopathology (surgical pathology), cytopathology, and hematology with reasonable workingknowledge in blood banking, laboratory medicine, medical statistics, and ancillary techniqueswithunderstandingofgeneralprinciples andmethodology.

The purpose of this document is to provide teachers and learners illustrative guidelines toachieve defined outcomes through learning and assessment. This document was prepared byvarious subject-content specialists. The Reconciliation Board cum Expert groupof NMC hasattemptedtorenderuniformitywithoutcompromisetothepurposeandcontentofthedocument.Compromiseinpurityofsyntaxhasbeenmadeinordertopreservethepurposeandcontent.Thishasnecessitatedretentionof“domainsoflearning”undertheheading“competencies”.

SUBJECTSPECIFICLEARNINGOBJECTIVES

At the end of the MD training programme in Pathology, the student should achieve thefollowinggoals:

1. KnowledgeofPathology

1.1. Makeadiagnosisbasedonhistopathology(surgicalpathology)andcytopathologyspecimens, blood and bone marrow examination and various tests of Laboratory Medicine(clinicalpathology,clinicalbiochemistry)aswellasBloodBanking(TransfusionMedicine).

1.2. Interpret clinical and laboratory data with reasonable accuracy and prepare a succinct andlucidreport

1.3. Composereportsfollowingstandardprotocolsincludingsynopticreporting

1.4. Interpretandcorrelateclinicalandlaboratorydatasothatclinicalmanifestationsofdiseasescanbe explained.

1.5. Adviseontheselectionofappropriatespecimensandtestsnecessarytoarriveatadiagnosisina problematiccaseincludingmoleculartests.

1.6. Correlate clinical and laboratory findings with pathology findings at autopsy, identifymiscorrelations and the causes of death due to diseases (apart from purely metaboliccauses).

1.7. Maintain quality control of all tests by being part of Internal Quality Control Monitoringprogram.

1.8. Make and record observations systematically and maintain accurate records of tests andtheir results for reasonable periods of time. Identify problems in the laboratory, offersolutionsthereofandmaintainahighorderofqualitycontrol.

1.9. Shouldbeawareofsafeandeffectivedisposaloflaboratorywasteandensureminimizationriskofe xposuretoinfectionandaccidentstolaboratorypersonnel.

2. Teaching andtraining

2.1. ShouldbeabletoteachPathologytoundergraduates,postgraduates,nursesandparamedicalstaff includinglaboratorypersonnel.

2.2. The postgraduate student should be able to teach effectively and assess undergraduatemedical and allied health science students so that they become competent healthcareprofessionals.

3. Research

3.1. Plan, execute, analyze, and present research work independently or as part of a team.3.2.ThepostgraduatestudentinPathologyshouldacquireknowledgeandskillstobeableto conductaresearchprojectfromtheplanningtothepublicationstageandbecomealife-longlearner.

4. Professionalism,EthicsandCommunicationskills

4.1. The postgraduate student should learn and apply principles of professionalism, ethics, andeffective communication in conduct of routine pathology services, research, and routinework.

SUBJECTSPECIFICCOMPETENCIES

A. COGNITIVEDOMAIN

A postgraduate student upon successfully qualifying the MD (Pathology) examinationshouldhaveacquiredthefollowingBROAD theoreticalcompetenciesand shouldbe:

- Capable of offering an accurate diagnostic opinion in a given clinical situation with anappropriate and relevant sample of tissue, blood, body fluid, etc. for the purpose ofdiagnosis.
- Conversant with the standard operating procedures of various laboratories includinghistopathology,cytopathology,hematologyandlaboratorymedicine
- Abletoteachandsharehisknowledgeandcompetencewithothers.Thestudentshouldbe imparted training in teaching methods in the subject which may enable the studenttotakeupteachingassignmentsinMedicalColleges/Institutes.
- Capableofpursuingclinicalandlaboratory-basedresearch.He/sheshouldbeintroduced to basic research methodology so that he/she can conduct fundamental andappliedresearch.

At theendofthecourse, **thestudentshouldhaveacquiredthefollowingcompetenciesasadiagnostician:**

Surgicalpathology

- Beconversantinthehistogenesisandpathophysiologicalprocessesassociatedwithvariousdiseases.
- Shouldbeabletoidentifyproblemsinthehistopathologylaboratoryandofferviablesolutions
- PossessthebackgroundknowledgenecessaryfortheevaluationandreportingofSurgicalPathology.
- Conversantwiththevariousequipmentusedinthehistopathologylaboratory.
- Shouldhaveknowledgeofautomationandqualityassuranceinhistopathology.

Cytopathology

- PossessthebackgroundknowledgenecessaryfortheevaluationandreportingofCytopathology.

- Demonstratefamiliaritywith,andguideclinical/radiologyresidentsinkeepingwiththeclinical information on the choice of site, collection, preservation, transport, type ofpreparationandmethodofobtainingvariouscytologicalspecimens.
- Conversantwiththevariousequipmentusedinthecytopathologylaboratory.
- Shouldhaveknowledgeofautomationandqualityassuranceincytopathology.

Hematology

- Demonstrate ability to utilize the principles of the practice of Hematology for theplanning of tests, interpretation, and diagnosis of diseases of the blood and bonemarrow.
- Conversantwiththevariousequipmentusedinthehematologylaboratory.
- Shouldhaveknowledgeofautomationandqualityassuranceinhematology.

Laboratorymedicine

- Demonstrate familiaritywiththenormalrange ofvalues ofthe chemicalcontentofbodyfluids,significance ofalteredvalues,andinterpretationthereof.
- Possess knowledge of the following specialized organ function tests and relativeutilityandlimitations ofeachandsignificance ofalteredvalues:
  (i) Renalfunctiontest
  (ii) Liverfunctiontest
  (iii) Endocrine functiontest
  (iv) Testsformalabsorption
- Principles,advantageanddisadvantages,scope,andlimitationofautomationinlaboratory.
- Learnthe principle andmethodologyofqualitycontrolinthelaboratory.

Transfusionmedicine

- Possess knowledge of basic immunology, ABO and Rh groups, minor blood groupsand their clinical significance, transfusion therapy, pre-transfusion testing, transfusionrelated infections,transfusionreactionsandqualitycontrolinbloodbank.

Autopsypathology

- Conversantwiththe techniqueofautopsy.
- Possesssufficientunderstandingofthevariousdiseaseprocessessothatmeaningfulclinico-pathologicalcorrelationcanbemade.

Immunopathology

- Demonstratefamiliaritywithcurrentconceptsofstructure and functionoftheimmunesystem,itsaberrations,andmechanismsthereof.
- Demonstrate familiarity with the scope, principles, limitations, and interpretations ofthe results of ELISA techniques, HLA typing, immunofluorescence, andimmunoelectrophoresis.

Immunohistochemistryandflowcytometry

- Demonstrate familiarity with the principles and procedures of performingimmunohistochemistryincludingautomationinprocedureandinterp retation.
- Demonstratefamiliaritywiththeprinciplesandproceduresofperformingflowcyto metry.

CytogeneticsandMolecularbiology

- Demonstratefamiliaritywiththeprinciplesofmolecularbiopsyespeciallyrelatedtothe understanding of disease processes and its use in various diagnostic tests at leastincluding but not limited to in-situ hybridization, polymerase chain reaction, SangerSequencingandNextgenerationsequencing.

Electronmicroscopy

- Demonstratefamiliaritywiththeprinciplesand techniquesofelectronmicroscopyandthe workingoftheelectronmicroscope.
- Demonstrate familiarity with the tissue processing and staining methods for electronmicroscopy,includingimmune-labellingtechniquesanduseofsemi-thinsections.

Enzymehistochemistry

- Demonstratefamiliaritywiththeprinciples,useandinterpretationsofcommonenzy mehistochemicalprocedures.

QualityControl

- Demonstratefamiliaritywithvariousqualitycontrolprogrammesrunninginthedepartment, bothinternalandexternalquality.
- Demonstratefamiliaritywithinertandintraassayvariations,batchvariations,validationofc hemicals andinstruments.

LaboratorySafetyandGoodclinicallabpractices

- Demonstrate familiarity with good lab practices and safety, record maintenance ofcapital equipment and consumables, purchase specifications, approximate costs ofreagentsandequipment,maintenanceofstorelogbooks,etc.

BiomedicalWasteManagement

- Demonstratefamiliaritywithdisposalmethodsforeachspecimen,reagents,instruments,autoclavingtechniques,recyclingofproductsande-waste.

Attheendofthecourse,**thestudent shouldhaveacquiredthefollowingcompetenciesasa<u>teacher:</u>**

- Demonstratefamiliaritywithdifferentmodes,methods,andprinciplesofteachingincludingmicroteaching.

Attheendofthecourse,**thestudent shouldhaveacquiredthefollowingcompetenciesasa<u>researcher:</u>**

- Conversant with the principles of basic and applied research methodology, literatureresearch, study design, sample size estimation, selection of controls, and appropriateapplicationofmedicalstatistics.
- Possess knowledge about the methods of writing thesis and/or a research paper withthe prescribedinstructions,as expectedofinternationalstandards.
- Conversantwiththeuseofdigitalslideimaging,algorithmstoevaluatefindingsinimaging,morphometry,andapplicationofartificialintelligence.

B. AFFECTIVE DOMAIN

1. Thestudentwillshowintegrity,accountability,respect,compassionanddedicatedpatientcare. Thestudentwilldemonstrateacommitmenttoexcellenceandcontinuousprofessionaldevelopment.
2. The student should demonstrate a commitment to ethical principles relating to providingpatientcare,confidentialityofpatientinformation andinformedconsent.
3. The student should show sensitivity and responsiveness to patients' culture, age, genderanddisabilities.
4. The student should demonstrate a commitment to ethical principles relating to researchconductandresearchpublication.

C. PSYCHOMOTORDOMAIN

1. Able to perform grossing of biopsy and surgical specimens including gross diagnosis andtaking appropriate sections/ samples necessary for diagnosis, comprehensive staging, andancillarytesting.
2. Conversantinhistopathologytissueprocessingtechniquesandtroubleshooting,cuttingofparaffinandfrozensections,makingimprintsmears,andstaining,andimmunohistochemistry.
3. Able to collect specimens by routinely performing non-invasive out-patient proceduressuch as venipuncture, finger-prick, fine needle aspiration of superficial lumps and bone-marrow aspirates,making smears and staining,and provide appropriate guidance tocolleagues performing procedure such as a biopsy or an imaging guided biopsy includingon-site microscopicassessmentofspecimenadequacy.
4. Performanautopsy, dissectvariousorgancomplexesanddisplaythegrossfindings.
5. Conversant with the function, handling, and routine care of equipment in the laboratoryandqualityassurance.
6. Abletoteachandsharehisknowledgeandcompetencewithothers.ThestudentshouldbeimpartedtraininginteachingmethodsinthesubjectwhichmayenablethestudenttotakeupteachingassignmentsinMedicalColleges/Institutes.
7. Abletopursueclinicalandlaboratory-basedresearch.He/sheshouldbeintroducedtobasicresearch methodology so that he/she can independently conduct fundamental and appliedresearch.

Syllabus

Cour secontents:

It is difficult to give a precise outline of the Course Contents for post graduate training. Apostgraduate is supposed to acquire not only the professional competence of a well-trainedspecialistbutalsoacademicmaturity,acapacitytoreasonandcriticallyanalyzescientificdata as well as to keep himself abreast of the latest developments in the field of Pathology andrelatedsciences.The study of Anatomic Pathology includes all aspects of Pathology asencompassed in the branches of General and Systemic Pathology. Only the broad outlines areprovided.

A. COGNITIVEDOMAIN

A) GeneralPathology:

Normal cellandtissuestructureandfunction:

- Thechangesincellular structureandfunctionindiseases.
- Causesofdisease,itspathogenesis, reactionofcells,tissues,organsystems,andthebodytovarious sublethalandlethalinjuries.
- Cellularadaptation,cellinjury,andcelldeath.
- Mechanism,morphologyandexamplesofcellinjury,necrosis,apoptosis,autophagy,andnewerformsofcelldeathincludingnecroptosisandpyroptosis.
- Subcellular andcellular responsesandadaptationtoinjury.
- Intracellularandintercellularaccumulations,pathologicalcalcification,andcellaging.

Acuteandchronicinflammation:

- Vascularandcellulareventsinacute inflammation,chemicalmediators,outcome,andmorphologicalpatterns ofacuteinflammation.
- Chronicinflammationwithspecialreferencetogranulomatousinflammation.
- Systemiceffectsandeffectsofderangedinflammation.
- Tissuerenewalandrepair:Regenerationhealingandfibrosis.
- Controlofnormalcellproliferationandtissue growth,mechanismoftissueregeneration,repairbyhealingandfibrosis.
- Extracellularmatrixandcellmatrixinteractions.

Hemodynamicdisorders,thromboembolicdisease,andshock:

- Edema,hyperemia,congestion,andhemorrhage.
- NormalHemostasis,thrombosis,DIC,embolism,infarction,andshock.

GeneticDisorders

- Principlesofgenetics,normalkaryotyping.
- Mutations,Mendeliandisorders,disorderswithmultifactorialinheritancecytogeneticdisordersinvolvingautosomesandsexchromosomes.
- Singlegenedisorderswithnonclassicinheritance.
- Diagnosisofgeneticdisordersinvolvingmolecularandgenetictechniques.

Neoplasia

- Definition, nomenclature,andbiologyoftumorgrowth
- Molecularbasisofcancerwithspecialreferencetocarcinogenicagentsandmolecularbasisofmultistepcarcinogenesis.
- Epidemiologyandclinicalfeaturesoftumors.

- Grading,staging andlaboratorydiagnosisofcancer.

InfectiousDiseases

- Pathologyand generalprinciplesofmicrobialpathogenesis,specialtechniquesfordiagnosingbacteria l,fungal,parasitic,andviralinfections.

Environmentalandnutritionalpathology

- Commonenvironmentalandoccupationalexposuresleadingontodiseases.
- Nutritionaldeficienciesandobesityrelateddisorders.

DiseaseofInfancyandChildhood

- Congenitalanomalies,birthinjuries,diseasesofneonates,inbornerrorsofmetabolism,tumor,an dtumorlikelesions ofinfancyandchildhood.

Immunopathology

- Innateimmunity-Roleofphagocyticcells,complement,mastcells&humoralmechanisms.
- Specific Acquired Immunity- Details about antibody production & action, Briefprinciplesaboutmemory,Agspecificity&vaccination.
- CellinvolvedinImmuneresponse-T-Lymphocytes,B-lymphocytes,macrophages,dendritic cells,andnatural-killercells.
- Cytokineswithdetailsabouttheirpropertiesandfunctions.
- Structureandfunctionofhistocompatibilitymoleculesanddiseaseassociation.
- Disordersoftheimmunesystem.
- Allhypersensitivityreactions.
- Autoimmune disorders with special reference to SLE, Rheumatoid arthritis, Sjogren'ssyndrome,systemicsclerosis,polyarteritisnodosaandothervasculitides,Mixedconn ective tissuedisordersandinflammatorydisorders.
- Immunodeficiencysyndrome–AcquiredwithemphasisonAIDS.
- Amyloidosisincludingpathogenesis, specialstains&clinicalcorrelation.
- Transplantrejectionindetail.
- GraftvsHostDisease.

B) SystemicPathology:

Thestudyofnormalstructureandfunctionofvariousorgansystemsandtheetiopathogenesis,grossan dmicroscopicalterationsofstructureoftheseorgansystems indiseaseandfunctionalcorrelationwithclinicalfeatures.

Bloodvessels,lymphaticandveins

- Normalmorphology,congenitalanomalies,atherosclerosis,hypertensivevasculardisease.
- Inflammatoryand neoplasticdiseasesofallthevessels.

Heart

- Normalmorphology,itsbloodsupplyandeffectofaging onheart.
- Ischemic,Hypertensive,valvular,congenitalheartdiseases.
- Cardiomyopathies
- Myocardialdisorders
- Pericardialdiseases.
- Tumorsofthe heart.

LungsandMediastinum

- Congenitalanomalies
- Obstructiveandrestrictivepulmonarydiseases
- Diseasesofvascularorigin
- InfectionsofLung
- InfectionsofMediastinum
- Tumorsoflung
- Lungtransplantation
- Diseasesofpleura
- Thymus–Developmental,autoimmune, andinflammatorydisorderandtumors.

HeadandNeck

- Oralcavity: -inflammatorydisease, Preneoplasticlesionsandtumors.
- Diseasesofteethandsupportingstructures.
- Upperairwaysandear–congenitalanomalies,infections, andtumors.
- Salivaryglands –Infectionsautoimmunedisordersand tumors.

GastrointestinalTract

- Congenitalanomalies, infections,inflammatoryandvasculardisordersandtumorsofesophagus,stomach,smalla ndlargeintestines,appendix,andanalcanal.
- Diseasesofthe peritoneum,Omentumand MesenteryRetroperitoneum.
- Inflammatoryandneoplasticlesions.

Liver

- Normalmorphologywithgeneralfeaturesofhepatic diseaseincluding LFTs.
- Infectious, autoimmunedruginducedmetabolicandcirculatorydisordersofliver.

- Hepaticdiseasesassociatedwithpregnancy,neonates,organandbonemarrowtransplantation.
- Livertransplantationpathology.
- Cysts,Nodules,andtumorsofliver.

Biliarytract

- Congenital anomalies, injuries, Infection, inflammation, of Gallstones and tumors of gallbladderandextra hepaticbileducts.Pancreas.
- Congenitalanomalies,pancreatitis,and neoplasmsofpancreas.

Kidney

- Clinicalmanifestationsofrenaldiseases
- Congenitalanomalies
- Diseasesaffectingglomeruli,tubules, interstitiumandbloodvessels.
- Cysticdiseasesofkidney
- Nephrolithiasis
- Tumorsofkidney
- KidneyTransplantpathology

Lowerurinarytractandmalegenitalsystem

- Congenitalanomalies, inflammationandtumorsofbladder,ureter, urethra,penis, testis,epididymis,andScrotum.
- Inflammation, enlargement,andtumorsofprostate.

Femalegenitaltract

- Physiology,cytologyand histologyoffemalegenitaltract,menstrualdisorders,andhormonalabnormalities.
- Congenitalanomalies,inflammation,preneoplasticandneoplasticlesionsofvulva,vagina,cervix,uterus,fallopiantubes,ovariesandmesonephron.
- Gestationalandplacentaldisorders.

Breast

- Inflammations,benignepitheliallesions,and tumorsofthebreast.
- Diseasesofmalebreast.

EndocrineSystem

- Normalhormonallevelsandfunctionsofalltheendocrineglands.
- Hypoandhyperactivityofglandsofendocrinesystemi.e., pituitary, thyroid, parathyroid,pancreas,adrenals,andpinealgland.

- Autoimmunediseases,inflammationsandtumorsaffectingtheseglands,
- Neuroendocrinetumors,

SkinandSubcutaneoustissue

- Disordersofpigmentationandmelanocytes,
- Inflammatory,vesiculobullous,andinfectiousdisease,
- ProliferativelesionsandTumorsoftheepidermis,dermis,andskinappendage.

Musculoskeletalsystem

- Bone Modelling, growth, and development, genetic and acquired abnormalities in bonecells, matrix and structure, factures, necrosis and infections of bones, tumors and tumor-likelesions,
- Joints:Arthritis,tumor,andtumor-like lesions.
- Softtissue:Tumorsandtumor=likelesions.

Peripheralnervesandskeletalmuscles

- Generalreactionsofmotorunits.
- Inflammatory,infectious,hereditary,metabolic,andtraumaticneuropathies.
- Atrophy, dystrophy, myopathiesoftheskeletalmuscles.
- Diseasesofneuromuscularjunction.
- Tumorsofperipheralnervesandskeletalmuscles.

SkullandCentralNervousSystem

- Degenerative,metabolic,toxic,demyelinating,infectious,cerebrovascularmalformations,and traumaticinjuries.
- Tumors.

Eyeand Orbit

- Infections,inflammatory,congenitaldiseasesandneoplasmsoforbit,eyelid,conjunctivascler a,uvea,cornea,retina,andopticnerves.

C) HematologyandTransfusionmedicine

The study of Hematology includes all aspects of the diseases of the blood and bone marrow.Thiswouldinvolvethestudyofthenormal,and thecausesofdiseasesand thechangesthereof.**BiologyofstemcellandHematopoiesis**

- Overviewofstemcellbiologyand cellularbiologyofhematopoiesis.
- Transcriptionfactorsandhumoralregulationinnormalandmalignanthematopoiesis.
- Interactionbetweenhematopoieticstemcells,progenitorcelland stromalcompartmentofbonemarrow.

- Stemcellhoming&mobilization.

Erythroidmaturation, differentiation, ndabnormality

- Pathobiologyofhumanerythrocyte&HemoglobinAnemia.
- Approachto anemiainadultsandchildrenin:Clinicalcorrelation&diagnosticmodalities.
- Classificationofanemias(Morphological,pathophysiological,andbasedonerythropoiesisi.e., proliferativevsnon-proliferative).
- Irondeficiencyanemiaincludingironmetabolismanddifferentialdiagnosisfromothermicrocytic hypochromicanemias.
- Disorderofironmetabolismincludingironoverload.
- Anemiaofchronicdisorderswithspecialreferencetoinfections,collagenvasculardisorders,inflammationetc.
- Megaloblasticanemiaandothercausesofmegaloblastosis.
- Definition,approach, andclassificationofhemolyticanemia.
- LabdiagnosisofHemoglobindisordersandhereditaryanemialikeThalassemiaandrelatedhemoglobinopathies,sicklecellanemia.
- HemoglobinassociatedwithalteredOxygenaffinity.
- Redbloodcellenzymopathy,membranedisorder,autoimmunehemolyticanemia,non-immune hemolytic anemia,paroxysmalnocturnalhemoglobinuria.
- ApproachtoPancytopenia/ Cytopenia.
- Bonemarrowfailuresyndrome.
- Porphyria.

WBCdisorders,complementandimmunoglobinbiology

- Normalgranulopoiesis.
- Acquiredandcongenitaldisordersofphagocytosis(neutrophil,monocyte,eosinophil,andmacrophages.
- Disorderofleukocytenumber,function,and morphology.

Storagedisorder

HematologicalresponsestoInfections

- Viraldisorders- Infectiousmononucleosis, Hepatitis,anddengue.
- Parasiticinfections-Malaria,Kalaazar.

Hematologicalmalignancies

- Conventional&molecularcytogeneticandimmunohistochemicalbasisofhematologicalmalignancies.

- Classification(WHO,ICC).
- Theirbasisanddiagnosticapproachtovarioushematologicalmalignancies.
- Pathophysiology,prognostic factors,cytochemistry,cytogeneticsofvariousleukemias.
- PathophysiologyandclassificationofMDS, MPN/MDS, myeloproliferativedisorders.
- PathophysiologyofNon-Hodgkin'slymphoma, ClinicalstagingofHodgkin'slymphoma.
- Role of molecular cytogenetics and immunohistochemistry in Hodgkin's and Non-Hodgkin'slymphoma andlymphoproliferative disorders.
- AIDSrelatedandTransplantrelatedlymphomas.
- Plasmacelldyscrasiasandgammopathies.
- Mastocytosis.
- Roleofchemotherapyandantineoplasticagentsbasedonmolecularmechanismofhematologicalmalignancies,clinicaluse ofhematopoietic growthfactors.

Hematopoieticstemcelltransplantation

- RoleandindicationsofHST,immunodeficiencystate,hematologicalMalignanciesandNon-hematologicaldisorders.
- Practicalaspectofumbilicalcordstemcellstransplantation.
- Peripheralstemcellcollection.
- Role ofstemcellintissue repair.
- Complications ofHematopoieticstemcelltransplant.
- Genetherapyand geneticengineering.

PrenataldiagnosisofgenetichematologicaldiseasesHemostasis&Thrombosis

- Megakaryocyteandplateletstructure.
- Molecularbasisofplateletfunction,activation.
- Roleofbloodvessel, coagulationsystemandfibrinolyticsysteminhemostasis.
- Clinicalandlabevaluationofbleedingandcoagulationdisorders.
- Clinical&diagnosticaspectsoffactordeficienciesincluding hemophilia,vonWillebranddisease,DIC,VitaminKdeficiency.
- Thromboticandnon-thromboticpurpura.
- Hereditaryandacquiredplateletdisordersanditsmanagement.
- Thrombophilia(Inherited&acquired).
- Labevaluationandmanagementofhypercoagulablestates.

HumanbloodgroupantigenandantibodyandImmuno-hematology

- Selectionofdonorand screening..
- Principle,indicationandstorageofredbloodcells, WBC,platelet,andplasmatransfusion.
- VariousmethodsofcomponentseparationandplasmaderivativeswithspecialreferencetoFresh frozenplasma,cryo-precipitates,plateletconcentrate,singledonor plasma,albumin,andImmunoglobulin.
- GraftRejection,GVHdiseases,TransfusionReactions,Bloodgrouping&crossmatc hing.
- Bloodbankaudit.
- Apheresis

Hematologicalmanifestationsofsystemicdiseases

- Liverdisorders,renaldisorders,infections,cancers,parasiticdiseases,AIDS,pregnancy,ands urgicalpatients.

Spleenanditsdisorders

D) LaboratoryMedicine(ClinicalPathologyincludingParasitology)

- Principlesoftesting,indications,valueswithrangesinnormalanddiseasedstatesinrelationto:
    - Liverfunctiontests
    - Renalfunctiontests
    - Endocrinefunctiontests
    - Bodyfluidanalysisincludingstool,urine,semen,CSF,etc.
- Principlesoflaboratoryautomation,troubleshooting,and qualityassurance.

D) Specialtechniques

Thestudentisexpectedtoacquireageneral acquaintanceoftechniquesandprinciplesandtointerpretdatainthefollowingfields:

- Immunopathology,
- Electronmicroscopy,
- Histochemistry,
- Immunohistochemistry,
- Cytogeneticsandin-situhybridization,
- MolecularBiology,
- DigitalPathologyandimageanalysis,

- Maintenance ofrecords,
- Informationretrieval, useofComputer andInternetinmedicine.

E) Instrumentationandautomation

- Principles, indications,working,maintenance,andtroubleshootingofequipmentusedinvariouslaboratories:
    - Histopathology laboratory – Histopathology tissue processor, microtome, waterbatch,embedding station,Stainer,IHCStainer,ultramicrotome,etc.
    - Microscopes–Immunofluorescence,FISH,Confocal,Electron,etc.
    - Cytopathology Laboratory – Centrifuge, Cytocentrifuge, Cytospin apparatus,liquid-basedcytology,etc.
    - Hematology Laboratory – automated cell counter, flow cytometer, coagulometer,HPLC,Electrophoresisapparatus,immunoblot,etc.
    - ClinicalPathology–Photoelectriccolorimeter, Spectrophotometer, pH meter,Centrifuge,Electrophoresisapparatus,ELISAReader, chemiluminescence,etc.
    - Digitalpathology–Wholeslide scanners
    - Molecularpathology–PCR, Sangersequencer, NGSsequencers, etc.
- AutomationinPathology.
- Good lab practices and safety, record maintenance of capital equipment and consumables,purchasespecifications,approximatecostsofreagentsandequipment,maintenanceofstorelogbooks,etc.

F) Qualityassuranceprogram

- Internalandexternalqualityassurancemethods.
- Intraassayvariations, batchvariations,validationofchemicalsandinstruments.

G) EstablishmentActandRulesandregulationsformedbyGovt.orregulatorybodies

H) BiomedicalWastemanagement

- Disposalmethodsforeachspecimen,reagents,instruments,autoclavingtechniques,recyclingofproducts ande-waste.

I) Biostatistics,ResearchMethodologyandClinicalEpidemiology

J) EthicsandMedicolegalaspects relevanttoPathology

K) Currenttopicsandrecentadvancesinpathology

B. PSYCHOMOTORDOMAIN

DemonstratefollowingpredominantPsychomotordomaincompetencies		
Sr.No.	Competency	Perform under supervision/performindependently/ Observationonly
I.	HISTOPATHOLOGY(SURGICALPATHOLOGY)	
1.	Given the clinical and operative data, identify and systematically andaccuratelydescribethechiefgrossanatomicalterationsinthesurgically removedspecimensandbeabletocorrectlydiagnosecommonlesionsreceivedonanaveragedayfromthesurgicalservice ofanaverage teachinghospital	Independently
2.	Perform a systematic gross examination of the tissues including thetakingofappropriatetissuesectionsandinspecialcasesasinintestinalmucosalbiopsies,muscle biopsiesand nervebiopsies,demonstratethe orientationoftissuesinparaffinblocks.	Independently
3.	Identify and systematically and accurately describe the chief histo-morphologicalalterationsinthetissuereceivedinthesurgicalpathology service. He/she should also correctly interpret and correlatewiththeclinicaldatatodiagnoseroutinesurgical materialreceived on anaverageday.	Independently
4.	Identify common problems in histopathology processing techniques(poorfixation,delayedfixation,poorstaining,etc.,)includingautomatedtissueprocessingmachinetroubleshootingandrectify commonproblems	Independently
5.	Operateandmaintaincommonequipmentinthehistopathology laboratorysuchasmicrotome,waterbath,cryostat,tissueprocessor,autoStainer,etc.	Perform under supervision
6.	Processatissue, makeaparaffinblockandcutsectionsofgoodquality ona rotarymicrotome	Perform under supervision
7.	Stainparaffinsectionswithhematoxylinandeosinstainandcommon specialstainsneeded fordiagnosis	Independently

8.	Cutafrozensection,stainandinterpretthesslideincorrelationwiththe clinicaldataprovided	Independently

9.	Standardizeandvalidatenewantibodiesforimmunohistochemistry withunderstandingofcontrols,clones,anddilutions	Independently
10.	Performimmunohistochemistryonparaffinsectionsusingmanual method	Independently
11.	Identifycommonproblemsinimmunohistochemistryprocedure(artifacts,inadequateretrieval,sectionfloating,IHCfailure,etc.,)and rectifysuchproblems	Independently
12.	Decide on the appropriate immunohistochemical panels for diagnosis,prognosisandpredictivepurposesincommondiseaseconditionsbased onstandardrecommendationsandinterprettheirresults	Independently
13.	Write histopathology reports, including synopticreports, whereverneeded, following protocols and international standards. The reportsshouldbesuccinctandlucid,withclinicalnotesandadvice,as necessary.	Independently
II	CYTOPATHOLOGY	
1.	Performfineneedleaspirationofsuperficiallumpsandmakegoodqualitysmearsincludingcollectionofmaterialforcellblock preparationanddecideonthetypeoffixativeandstaininagivencase	Independently
2.	Prepare and stain good quality smears for cytopathological examination	Independently
3.	Provideappropriateguidancetocolleaguesperformingproceduresuch asabiopsyoranimagingguidedbiopsyincludingon-sitemicroscopicassessmentofspecimenadequacy.	Independently
4.	Decideonthetechniqueofcollection,preservation,transportand concentrationofvariousexfoliativecytologyspecimens(suchasfilters,centrifuge,liquid-based cytology,cytospin,etc.)	Independently
5.	Performon-siteadequacyassessmentinimageguidedsamplingprocedures and decide on sample triage for routine diagnosis (type ofpreparation,stain,etc.)andancillarytestsincludingmicrobiological andmoleculartests	Independently
6.	Diagnose common cases received in a routine cytopathology laboratoryandcategorizethemintonegative,inconclusiveandpositive,usingthecorrecttechniqueofscreeninganddottingtheslides	Independently

	forsuspiciouscells,correctlyidentifythetypeoftumor,ifpresent,and thepresenceoforganisms,fungiandparasites,ifpresent	
7.	Performpreparations(cytospinsmears,liquid-basedcytology,cellblocks,etc.)ofcommoncytologicalsamplesusingequipmentsuchas centrifuge,cytocentrifugeandliquidbasedcytologyapparatus	Observationonly
III	HEMATOLOGY	
1.	Performvenipunctureforperipheralbloodcollectionanddecideon appropriatecollectiontubes,storage,andanticoagulantbasedonindication	Independently
2.	Preparegoodqualityperipheralbloodsmears,stainandreport peripheralbloodcountsandotherfindingsincludingreticulocyteandplatelet countsoncellcounterandmanually	Independently
3.	Performbonemarrowaspirates andbiopsy,preparegoodquality smearsandimprints	Perform under supervision
4.	Performbonemarrowaspiratestainingincludingstainforiron	Independently
5.	Performcytochemicalcharacterizationofleukemia withspecialstains onbonemarrowaspirates	Perform under supervision
6.	PerformandinterpretcoagulationprofileincludingPT,APTTand FDP	Independently
7.	Performandinterpretsicklingtestandosmoticfragilitytest	Independently
8.	Describe accurately the morphologic findings in the peripheral andbone marrow smears, identifying and quantitating the morphologicabnormalities in disease states and arriving at a correct diagnosis in atleastcommoncasesreferredtotheHematologyclinic,giventhe relevantclinicaldata	Independently
9.	Giventheclinicaldata,interpret theresultsof i. Redcellindices ii. Plasmahemoglobin iii. Hemosiderininurine iv. HemolyticanemiaprofileincludingHPLC,Hbelectrophoresisetc. v. Hemoglobinandserumproteinelectrophoresis vi. Clottingtimeandother pointofcaretestsfor bleeding	Independently

	vii. G6PDenzymeestimation viii. PlateletfunctiontestsincludingplateletaggregationandadhesionandPF3release ix. Russell's vipervenomtime(RVVT) x. CoagulationFactorassays xi. SerumFibrinogen xii. Screeningforcoagulationfactorinhibitor,BethesdaAssay, xiii. FibrinDegradationProducts(FDP),D-Dimers xiv. Monitoringofanti-coagulanttherapy xv. Thrombophiliaprofile(Lupusanticoagulant(LAC),AnticardiolipinAntibody(ACA),ActivatedProteinCResistance (APCR), Protein C (Pr C), Protein S (Pr S) andAntithrombinIII(ATIII)) xvi. Serumferritin,Serumironand totaliron bindingcapacity	
10.	Interpretflowcytometryfindingsintheimmunophenotypingofleukemia,CD34enumeration,CD3/CD19enumeration,PNHworkup,etc.	Independently
11.	Interpretresultsofcytogeneticsandmoleculardiagnosticsinthework upofhematologicaldiseases	Independently
12.	Preparesamplesasappropriatefortheindication,andoperate equipment such as automated cell counter, flow cytometry,coagulometers,HPLCandelectrophoresis apparatus	Observationonly
IV	LABORATORYMEDICINE	
1.	Plan a strategy of laboratory investigation of a given case, given therelevant clinical history and physical findings in a logical sequence,with arational explanation of each step; be able to correctly interpretthelaboratorydataofsuchstudies,anddiscusstheirsignificancewith aviewtoarriveatadiagnosis.	Independently
2.	Performurineanalysisincludingphysical,chemicalandmicroscopic, examinationofthesedimentaswellasbyDipstickmethods.	Independently
3.	Performmacroscopicandmicroscopicexaminationoffecesand identifytheovaand cystsofcommonparasites.	Independently

4.	Performacompleteexamination:physical,chemicalandcellcontent ofCerebrospinalFluid(C.S.F),pleuralandperitonealfluid	Independently
5.	Performsemenanalysisandinterpretresultsinthecontextofclinical andhormonefindings	Independently
6.	Perform quantitative estimationof blood/serum by automated techniques for commonbiochemicaltests	Independently
7.	Prepare standard solutions and reagents relevant to common biochemicaltestsincludingthepreparationofnormalsolution,molarsolutio nandbuffers	Independently
8.	Interpretandreportcommonlaboratorybiochemicaltests(LFT, KFT, endocrinefunctiontests)withunderstandingofclinicalimplications	Independently
9.	Operate, maintain and troubleshoot common equipment used such asphotoelectric colorimeter, Spectrophotometer, pH meter, Centrifuge,Electrophoresisapparatus,ELISAReader,PCR,chemilumin escence, etc.	Perform under supervision
V	TRANSFUSIONMEDICINE	
1.	Performselectionandbleedingofdonors,ABOandRhgroupingand crossmatch,antibodyscreeningandtiter,selectionofbloodforexchange transfusion	Independently
2.	Resolve ABO grouping problems and outline measures for investigationoftransfusionmedicine	Independently
3.	Performandinterpretanti-globulintestinantenatalandneonatalwork up	Independently
4.	Preparebloodcomponentssuchascryoprecipitates,plateletconcentrates, fresh frozen plasma, single donor plasma, red blood cellconcentrates,etc.andtestbloodforpresenceofpathogensincluding HBV,HCV,HIV,VDRL,Malaria,etc.	Observationonly
VI	AUTOPSY	
1.	Perform an autopsy, dissect various organ complexes, and display thegross findings (Note: An improvised autopsy may also be arranged inplaces where full autopsy is not possible. Relevant organs from wetspecimensinthemuseumwithappropriateclinicalhistorymaybe arrangedforadetaileddescriptionanddiagnosis.Atleasttensuch	Independently (see Note)

	improvisedautopsiesmaybediscussedbyeachcandidateduringthe entire durationofthe course)	
2.	ProvideProvisionalandFinalAnatomicDiagnosisreport,majorfindingscorrectlyandsystematicallyatautopsy,andtheAutopsy Protocolasperprescribedinstructions.	Independently
VII	MOLECULARBIOLOGY	
1.	Interpretresults ofPolymeraseChainReaction(PCR),realtimePCR, SangerSequencinginagivenclinicalcontext.	Independently
2.	Interpretresultsofin-situhybridization(fluorescentandchromogenic) in a givenclinicalcontext	Independently
3.	PreparesamplebyappropriatemethodsandperformPolymeraseChainReaction(PCR),realtimePCR,SangerSequencing,andin-situ hybridizationincludingtroubleshooting	Observationonly
VIII	IMMUNOPATHOLOGY	
1.	Interpretdirect/indirectimmunofluorescenceresultsinthecontextofcommon diseasesoftheskin,medicalrenaldiseasesandautoimmune diseases	Independently
2.	Preparesample byappropriate methods and perform indirect immunofluorescenceonafrozensectionfromskin/ renalbiopsy	Perform under supervision
IX	ELECTRONMICROSCOPY	
1.	Interprettransmissionelectronmicroscopyresultsincommonnon-neoplasticandneoplasticdiseases	Independently
2.	Preparespecimenbyappropriatemethodsandprocesstissuefor electronmicroscopy,interpretsemi-thinsectionsandviewultra-thinsectionsunderelectronmicroscope	Observationonly
X.	DIGITALPATHOLOGY	
1.	Navigateandannotatewholeslidescannedimages	Independently
2.	Selectandscanslidesfordigitalizationandperformbasicimage analysisfunctionssuchaslengthmeasurements,enumeration,etc.	Observationonly
XI.	TEACHING	
1.	Demonstratedifferentmethodsofteaching-learningandassessments	Independently
2.	Engage andteachundergraduates andparamedicalstaffintheformof smallgroupteachinganddemonstrations	Independently

3.	Engageinpeerteachingintheformofpresentingseminarsandjournalclubsandbeabletousedifferentmodesofteachingincluding PowerPointprojectionsandcharts	Independently
XII.	RESEARCH	
1.	Writethethesis(and/orascientificpaper)inaccordancewiththe prescribedinstructions,asexpectedofinternationalstandards	Independently

TEACHINGANDLEARNINGMETHODS

Generalprinciples

Acquisition of competencies being the keystone of doctoral medical education, such trainingshould be skills oriented. Learning in the program, essentially autonomous and self-directed,and emanating from academic and clinical work, shall also include assisted learning. Theformalsessionsaremeanttosupplementthis coreeffort.

Allstudentsjoiningthepostgraduate(PG)coursesshallworkasfull-time(junior)residents/demonstrators during the period of training, attending notless than 80% of thetrainingactivityduringthecalendar year,andparticipatinginallassignmentsandfacetsoftheeducational process. They shall maintain alogbook for recording the training they haveundergone, and details of the procedures done during laboratory and clinical postings in realtime.Maintenanceofe-recordsofsuchprocedures is encouraged.

Thethree-yeartrainingprogrammefortheMDdegreemaybearrangedintheformofpostingsto different assignments/laboratories for specified periods as outlined below.The period ofsuch assignments/postings is recommended for 36 months with breaks only for examinationsand mandatory postings. Posting schedules may be modified depending on needs, feasibilityand exigencies. For facilities not available in the parent institution as well as for additionalknowledge and skill, extramural postings may be undertaken. Departmentsmay vary thepostingsslightlybasedontheclinicalprofileofthehospital,withinthetimeperiodbandsgivenbelow, however at least the lower limit for each of the four main components of the coursemustbecoveredduringpostings.

Postingschedule isgivenbelow:

S.No	Section/Subject	Duration in months
(i)	SurgicalPathology,Autopsy,Immunohistochemistry	11-16
(ii)	Hematology,LaboratoryMedicine, andBloodbank	8-10
(iii)	Cytopathology	6-9
(iv)	BasicSciences,Immunopathology,Cytogenetics,Electronmicroscopy,MolecularBiologyetc.and ResearchTechniquesincludingThesis	2-6
	Total	**36(includingexam)**

Teaching-Learningmethods

This should include a judicious mix of demonstrations, symposia, journal clubs, clinicalmeetings, seminars, small group discussion, case-based learning, simulation-based teaching,self-directedlearning,integratedlearning,interdepartmentalmeetings,andanyothercollaborativeactivitywiththeallieddepartments.Methodswithexposuretotheappliedaspectsofthesubjectrelevanttobasic/clinicalsciencesshouldalsobeused.**Thesuggestedexamplesofteaching-learningmethodsaregivenbelowbutarenotlimitedtothese.Thefrequencyof various below mentioned teaching-learning methods can vary based on the subject'srequirements, competencies, workload and overall working schedule in the concernedsubject. The Pathology resident is expected to sit in reporting every day, having seen theslides the previous day with written descriptions, which should be evaluated daily by thereporting faculty.Thisisthemainstayoftraining inalldisciplinesofPathology.**

A. Lectures:Didacticlecturesshouldbeusedsparingly. Aminimumof10lecturesperyearinthe concerned PG department is suggested. Topics to be selected as per subject requirementsAll postgraduate trainees will be required to attend these lectures. Lectures can cover topicssuchas:

1. Subjectrelatedimportanttopicsasperspecialtyrequirement
2. Recentadvances
3. Researchmethodologyandbiostatistics
4. SalientfeaturesofUndergraduate/Postgraduatemedicalcurriculum
5. Teachingandassessmentmethodology.

Topic numbers 3, 4, 5 can be done during research methodology/biostatistics and medicaleducationworkshopsintheinstitute.

B. Journalclub:Minimumofoncein1-2weeksissuggested.

Topics will include presentation and critical appraisal of original research papers published inpeer reviewed indexed journals. The presenter(s) shall be assessed by faculty and gradesrecordedinthelogbook.

C. StudentSeminar: Minimumofonceevery1-2 weeksissuggested.

Importanttopicsshouldbeselectedaspersubjectrequirementsandallottedfor in-depthstudybyapostgraduatestudent.Ateachershouldbeallocatedforeachseminarasfacultymoderatorto help the student prepare the topic well. It should aim at comprehensive evidence-basedreview ofthe topic.The studentshouldbegradedbythefacultyandpeers.

D. StudentSymposium:Minimumofonceevery3months.

Abroadtopicofsignificanceshouldbeselected,andeachpartshallbedealtby onepostgraduate student. A teachermoderator shouldbe allocatedforeach symposium andmoderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by thefacultyandpeers.

E. Laboratorywork/Interactiveslideandgrosssessions:Minimum-onceevery1-2weeks.Laboratorywork,slideandgrossspecimenteachingsessionsshouldbecoordinatedandguidedby faculty from the department. Various methods like case-based discussions, oral or writtenquiz, etc. are to be used. Faculty from the department should participate in moderating theteaching-learningsessions.

F. Interdepartmentalcolloquium

Faculty and students must attend monthly meetings between the main Department and otherdepartment/sontopicsofcurrent/commoninterestorclinicalcases. Thisincludes institutionalactivitiessuchasclinicalcombinedrounds(CCR),clinic-pathologicalcorrelationconferences(CPC),anddepartmentalactivitieslike autopsyconferences.

G. a.Rotationalclinical/community/institutionalpostings

Depending on local institutional policy and the subject specialty needs, postgraduate traineesmay be posted in relevant departments/ units/ institutions. The aim would be to acquire morein-depthknowledgeasapplicabletotheconcernedspecialty.Postingswouldberotated

betweenvariousunits/departmentsanddetailstobeincludedinthespecialty-basedGuidelines.Few examples arelistedbelow:

- Laboratory-basedspecialtyunits/departmentse.g.Biochemistry/Microbiology/Infection control unit/Laboratory Medicine, Hematology, Blood bank, TransplantationImmunology,Forensic Medicine,Proteomics,etc.
- MedicalEducationUnit(MEU)orDepartmentofMedicalEducation(DOME):optional

G. b. Postingunder"DistrictResidencyProgramme"(DRP):

AllpostgraduatestudentspursuingMS/MSinbroadspecialtiesinallMedicalColleges/Institutionsshallundergoacompulsoryrotationofthreemonthsin DistrictHospitals/District Health System as a part of the course curriculum, as per the PostgraduateMedicalEducation(Amendment)Regulations(2020).Suchrotationshalltakeplaceinthe3rd or 4th, or 5th semester of the Postgraduate programme and the rotation shall be termed as"District Residency Programme" and the PG medical student undergoing training shall betermedas"DistrictResident".

Every posting should haveits definedlearning objectives. It is recommended that thedepartmentsdrawupobjectivesandguidelinesforeverypostingoffered inconjunctionwiththe collaborating department/s or unit/s. This will ensure that students acquire expectedcompetencies and are not considered as an additional helping hand for the department / unitin which they are posted. The PG student must be tagged along with those of other relevantdepartmentsforbedsidecasediscussion/basicscienceexercisesasneeded,underthe guidance ofanassignedfaculty.

Opportunitiestopresentanddiscussinfectiousdiseasecasesthroughbedsidediscussion and ward/grand rounds with specialists / clinicians in different hospital settings mustbescheduledtoaddressantimicrobial resistanceissuesandstrategiesto dealwithit.

To consider and approve the tmpte Students admitted in the 2021-22 batch as per the NMC notifications vide letter F.No. NMC23(1)(25)12021/PG/053909 dated 2211212022 and Clarification issued by NMC vide tetter F. N o. N M C/23 (1) (25) 12021 I Med. I 00 1 866 d ated 1 9 I Ot t 2023 Resolution ' with reference to the NMC notifications vide letter F.No. NMC-23(1)(25)t2o21tpcto53g0g dated 2211212022 and Clarification issued by NMC vide letter F.No.NMC/23(1)(25)t2021/Med./001g66 dated 1910112023. the District Residency Program (DRP) shall be implemented for the students admitted in 2021-22 batch onwards. The said notification and clarification from NMC were considered and passed unanimously.

The communication from National Medical Commission vide no. NMC-23 (1) (25) / 2021 / PG / 053909, dated 22.12.2022 regarding Implementation of District Residency Programme, and National Medical Commission vide no. NMC-23(1)(25)/2021/Med./001866, dated 19.01.2023 regarding Clarification on implementation of District Residency Programme, is adopted for execution.

(BOS-Ref :SBKSMIRC/Dean/Outward No.1158/2022-23, Date of Academic council : 11/02/2023)

(BOM-Ref. No.: SVDU/R/2431-A/2022-23, Date of Academic council : 29/05/2023)

- (Board of Studies letter no.:SBKS/DEAN/1576/2020,dated 0/10/2021 and Vide Notification of Board of Management Resolution : Ref no. SVDU/R/1271-1/2020-21, dated - 30th December 2020)

- To introduce Basic life support (BLS) and Advanced Cardiac Life Support (ACLS) trainingforalltheFirstyearPostgraduateResidentDoctorsfromacademicyear2017-18

- To introduce New chapter / topic 'Intellectual Property Rights (IPR) foralltheFirstyearPostgraduateResidentDoctorsfromacademicyear2020-2021 of duration of 4hrs (Board of Studies letter no.: SBKS/DEAN/742/2021,dated 05/06/2021 and Vide Notification of Board of Management Resolution Ref no.:SVDU/R/3051-1/2020-21, dated - 29" July 2021)

  List of topics :

1. Introduction-ConceptofIntellectualProperty,Historicalviewof
   Intellectual Property system in India and International Scenario, Evolution of Intellectual Property Laws in India, Legal basis of Intellectual Property Protection, Need for Protecting Intellectual Property, Theories on concept of property - Major IP Laws in India.
2. Types of IPR: Patents, Copyright, Trademark Industrial Designs, TradeSecrets.
3. Patents: Concept of Patent, Criteria of Patentability, Inventions NOT patentable, Process of Obtaining a Patent, Duration of Patents, Rights of Patentee, Limitation of rights, Infringement andEnforcement.
4. Copyrights: Meaning of Copyright, Copyright Vs. Moral rights, Copyrighteligibility,TermofCopyright,RegistrationofCopyright, Infringement andRemedies
5. Trademark: Meaning of Trademark, Criteria for trademark, Procedure for Trademark Registration, Term of protection, Infringement andRemedies.
6. Industrial Designs: Meaning of Industrial Designs, Rights in Industrial Designs: Nature, Acquisition and duration ofrights.
7. Trade Secrets: Meaning of Trade Secrets, Need to protectTrade secrets, Criteria of Protection, Procedure for registration, Infringement.
8. Commercialization of IPR: Traditional IP and Evolving IP, Assignment, Licensing, Cross License, Patent Pool, Negotiations, Defensive Publications, TechnicalDisclosures,

Patent Pooling, Patent Trolling, Brand Management, Brand and Pricing Strategies.

H. Teachingresearchskills

Writingathesisshouldbeusedforinculcatingresearchknowledgeandskills.Allpostgraduate students shall conduct a research project of sufficient depth to be presented

totheUniversityasapostgraduatethesisunderthesupervisionofaneligiblefacultymember

of the department as guide and one or more co-guides who may be from the same or otherdepartments.

In addition to the thesis project, every postgraduate trainee shall participate in at least oneadditional research project that may be started or already ongoing in the department. It ispreferablethatthisprojectwillbeinanareadifferentfromthethesiswork.Forinstance,ifaclinical research project is taken up as thesis work, the additional project may deal withcommunity/field/laboratorywork.Diversityofknowledgeandskillscantherebybereinforce d.

I. Traininginteachingskills

MEU/DOMEshouldtrainPGstudentsineducationmethodologiesandassessmenttechniques. The PG students shall conduct UG classes in various courses and a faculty shallobserve andprovidefeedbackontheteachingskills ofthestudent.

J. Logbook

During the training period, the postgraduate student should maintain a Logbook indicatingthe duration of the postings/work done in Wards, OPDs, Casualty and other areas ofposting. This should indicate the procedures assisted and performed and the teachingsessions attended. The logbook entries must be done in real time. The logbook is thus arecordofvariousactivitiesbythe studentlike:(1)Overallparticipation&performance,(2)attendance, (3) participation in sessions, (4) record of completion of pre-determinedactivities,and(5)acquisitionofselectedcompetencies.

The purposeofthe Logbookis to:

a) helpmaintainarecordofthework doneduringtraining,
b) enableFaculty/Consultantstohavedirectinformationabouttheworkdoneandinterv ene,ifnecessary,
c) provide feedback and assess the progress of learning with experience gainedperiodically.

TheLogbookshouldbeusedintheinternalassessmentofthestudent,shouldbecheckedandassessed periodicallybythefacultymembersimpartingthetraining.ThePGstudentswillberequiredtoprod ucecompletedlogbookinoriginalatthetimeoffinalpracticalexamination.Itshouldbesignedbythe

HeadoftheDepartment.A proficiency certificatefromtheHead

of Department regarding the clinical competence and skillful performance of procedures bythe studentwillbe submittedbythe PG studentatthe time ofthe examination.

ThePGstudentsshallbetrainedtoreflectandrecordtheirreflectionsinlogbookparticularlyof the critical incidents. Components of good teaching practices must be assessed in allacademic activity conducted by the PG student and at least two sessions dedicated forassessmentofteachingskillsmustbeconductedeveryyearofthePGprogram.Theteachingfaculty are referredtothe MCILogbookGuidelinesuploadedonthe Website.

K. CourseinResearchMethodology

All postgraduate students shall complete an online course in Research Methodology withinsixmonthsofthecommencementofthebatchandgeneratetheonlinecertificateonsuccessful completionofthecourse.

Otheraspects

- ThePostgraduatetraineesmustparticipateintheteachingandtrainingprogramofundergraduate students andinterns attendingthedepartment.
- Traineesshallattendaccreditedscientificmeetings(CME,symposia,andconferences)atleast onceayear.
- Departmentshallencouragee-learningactivities.
- ThePostgraduatetraineesshouldundergotraininginBasicCardiacLifeSupport(BCLS)andAdvancedCardiac LifeSupport(ACLS).
- ThePostgraduatetraineesmustundergotraininginformationtechnologyanduseofcomputers.

During the training program, patient safety is of paramount importance; therefore,relevantclinicalskillsaretobelearntinitiallyonthemodels,latertobeperformedundersupervision followed by independent performance. For this purpose, provision of skillslaboratoriesinmedicalcollegesis mandatory.

ASSESSMENT

FORMATIVEASSESSMENT,i.e.,assessmenttoimprovelearning

Formativeassessmentshouldbecontinualandshouldassessmedicalknowledge,patientcare, procedural & academic skills, interpersonal skills, professionalism, self-directedlearningandabilitytopractice inthesystem.

GeneralPrinciples

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

QuarterlyassessmentduringtheMDtrainingshouldbebasedon:

- Casepresentation,caseworkup, casehandling/management :once a week
- Laboratoryperformance :twice aweek
- Journalclub :once a week
- Seminar :onceafortnight
- Casediscussions :onceafortnight/month
- Interdepartmentalcase orseminar :onceamonth

Note: Thesesessionsmaybeorganizedandrecordedasaninstitutionalactivityforallpostgraduates.

- AttendanceatScientificmeetings,CMEprogrammes(atleast02each)

The student to be assessed periodically as per categories listed in appropriate (non-clinical/clinical)postgraduate studentappraisalform(Annexure I).

SUMMATIVE ASSESSMENT, i.e., assessment at the end of

trainingEssentialpre-requisitesforappearing forexaminationinclude:

1. **Logbook**ofworkdoneduringthetrainingperiodincludingrotationpostings,departmentalpresentations, andinternalassessmentreportsshouldbesubmitted.

2. At least **two presentations** at state/national level conference. One paper (thesis ornon-thesis related work) should be published /accepted/publication draftin anindexedjournal.

The summative examination would be carried out as per the Rules given in the latestPOSTGRADUATEMEDICALEDUCATIONREGULATIONS.Thetheory examination shall be held in advance before the Clinical and Practical examination, sothat the answer books can be assessed and evaluated before the commencement of theclinical/PracticalandOralexamination**.**

Thepostgraduateexaminationshallbeinthreeparts**:**

1. **Thesis**

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

2. **Theoryexamination**

   The examinations shall be organized based on 'Grading 'or 'Marking system' to evaluateand to certify post graduate student's level of knowledge, skill, and competence at the endof thetraining,asgiveninthelatestPOSTGRADUATEMEDICALEDUCATIONREGULATIONS. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical'separately shall be mandatory for passing examination. The examination for M.D./ M.Sshallbeheldattheendof3rd academicyear.

   Thereshallbefourtheorypapers(asper PGRegulations).

   PaperI: Basic sciences as applied to the subject (general pathology,pathophysiology,immunopathology,andmolecular biology).

   PaperII:(Systemicpathology– surgicaland cytopathology).

   PaperIII:(Hematology,transfusionmedicineandlaboratorymedicineincludinginstrumentationandqualitycontrol).

   PaperIV: Recentadvancesinthesubject.

Thepapersshouldhave ideallyone(01)structuredlonganswerquestionwhichwillevaluatecomprehensivein-depthknowledgeand6-8 shortanswerquestions.

3. Practical/clinical and Oral/viva voce examinationPracticalexamination

Practicalexaminationshouldbespreadatleastover**two**daysforeachstudentandincludevarious major componentsofthesyllabus focusingmainlyonthepsychomotordomain.

Oral/Viva voce examination on defined areas should be conducted by each examinerseparately. Oral examination shall be comprehensive enough to test the post graduatestudent'soverallknowledgeofthesubjectfocusingonpsychomotorandaffectivedomain.

Thefinalclinicalexamination inbroadspecialty clinicalsubjectsshould include:

- Casespertainingtomajorsystems(e.g.,onelongcaseandthreeshortcases),
- Stationsforlaboratory,proceduralandcommunicationskills,
- LogbookRecords andreportsofday-to-dayobservationduringthetraining,
- ItisemphasizedthatOral/vivavoceexaminationshallbecomprehensiveenoughtotestthepostgraduate student'soverallknowledgeofthe subject.

ThepracticalexaminationinPathologyshouldfollowgeneralguidelinesoutlinedbelowwhichmay be modified according to local university guidelines and should be spread over at leasttwodays.Thefollowingmarksdistributionis suggested:

Practical500marks(including100marksforinternalassessment)

SectionI:Histopathology:150marks

- Slides(12-15)
- Grossing/autopsy
- Long case (write a full description with clinical information provided) and/or 2 biopsycaseswithancillarytestsreporting(writtenworkonly,noviva)

SectionII:Cytopathologyandhisto/cytotechniques:80marks

- Slides(5-8)
- Histo/Cytotechniques

- Specialstainexercise

- Immunopathology, OSPE,EM

SectionIII:Hematology,transfusionmedicineandclinicalpathology:120marks

- Slides
- Exercises
- Case study
- Bloodbank
- Clinicalpathologyexercisesand OSPE

SectionIV:Viva,basicsciences,andcommunicationskills:50marks

- Pedagogy/thesispresentation
- Oralviva
- BasicSciences

Detailsofexercisesinindividualsectionsaregivenbelow:

I. ClinicalPathology:

- Discussionofaclinicalcasehistory.
- Planrelevantinvestigationsoftheabovecaseandinterpretthebiochemistryfindings.
- Twoinvestigationsshouldbeperformedincludingatleastoneclinicalpathologyexerciselike CSF,pleuraltap etc.analysisandcomplete urinalysis.

II. Haematology:

- Discusshematologycasesgiventherelevanthistory.Planrelevantinvestigations.
- Performcompletehemogramandatleasttwotestspreferablyincludingonecoagulationexercise.
- Identifyelectrophoresisstrips,osmoticfragilitychartsetc.,interpretationofdatafromautoanalyzers,HPLC andflowcytometry.
- Examine,report,anddiscussaroundtencasesgiventhehistoryandrelevantbloodsmearsand/orbonemarrowaspiratesmearsandbonemarrowbiopsyinterpretation.

III. TransfusionMedicine:

- Performbloodgrouping
- Performthenecessaryexerciselikecrossmatching.
- Coomb'stest,gelcardsinterpretation.

IV. Histopathologyandcytopathology:

- Examine, report, and discuss 12-15 cases histopathology and 5-8 cytopathology cases,giventherelevanthistoryandslides.
- Perform a Hematoxylin and Eosin stain and any special stain on a paraffin section.Should be conversantwithhistopathologytechniquesincludingcryostat.
- Long case (write a full description with clinical information provided) and/or 2 biopsycaseswithancillarytests reporting

V. Autopsy:

- Given a case history and relevantorgans (with or withoutslides),give a listofanatomicaldiagnosisinanautopsycase.

VI. GrossPathology

- Describe findings of gross specimens, give diagnosis, and identify the sections to beprocessed.Thepostgraduatestudentshouldperformgrossinginfrontoftheexaminersforevaluation.

VII. BasicSciences:

- 10-15spotsbasedonbasicsciencesbeincluded
- Identifyelectronmicrographs
- Identifygels, results ofPCR, immunologicaltests including interpretationofImmunofluorescencepictures,etc.
- Identifyhistochemicalandimmuno-histochemistrystains

VIII. Teachingexercise

- Teachonasmalltopicfor about10minor present dissertationandresearch
- GeneralViva-Voce(GrandViva)– structuredvivamaybedoneseparatelyorcombinedwithaboveexercises

RecommendedReading:

Books(latestedition)

1. HistologyforPathologists. StephenS. Sternberg(Ed),RavenPress, NewYork.
2. Robbin's PathologicBasisofDiseaseRamziS.Cotran,VinayKumar,StanleyLRobbinsWB SaundersCo.,Philadelphia.
3. Ackerman'sSurgicalPathology. JuanRosaiMosby. St.Louis.
4. DiagnosticSurgicalPathology.StephenSSternberg.Lippincott,WilliamWilkins.Philadelphia.

5. DiagnosticHistopathologyofTumours.ChristopherDMFletcher(Ed).ChurchillLivingstone.Edinburgh.
6. Manual&AtlasofFineNeedleAspirationCytology.SvanteROrell,etalLondon.
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8. DiagnosticCytologyanditsHistopathologicBasis,KossLG,J.B.Lippincott,Philadelphia.
9. ComprehensiveCytopathology,Bibbo M,W.B.SaundersCo.,Philadelphia.
10. Wintrobe'sClinicalHematology,LeeGR,FoersterJ,LupeusJ,ParaskevasF,GveerJP,RodgersGN,Williams&Wilkins,Baltimore.
11. AtlasandTextofHematology4th edition.SinghT.AvichalPublishingCompany.
12. DacieandLewisPracticalHematology,BainBJ,BatesI,LaffanMA.Elsevier.
13. BoneMarrowPathology,BainBJ,ClarkDM,LampertIA,BlackwellScience,Oxford.
14. Henry'sclinicaldiagnosisandmanagementbylaboratorymethods.
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Journals

03-05 internationalJournalsand02national(allindexed)journals.

AnnexureI

Studentappraisalformforbroadspecialty non-clinicaldisciplines

	Elements	LessthanSatisfactory			Satisfactory			More thansatisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholasticaptitude andlearning**										
1.1	Has knowledgeappropriateforleveloftraining										
1.2	Participation andcontributiontolearning activity(e.g.,JournalClub, Seminars, CMEetc)										
1.3	Conductofresearchandotherscholarlyactivity assigned(e.gPosters, publicationsetc)										
1.4	Documentation ofacquisitionofcompetence (egLogbook)										
1.5	Performance in workbasedassessments										
1.6	Self-directed Learning										
2	**Work related totraining**										
2.1	Practicalskillsthat are appropriate forthelevel oftraining										
2.2	Respectforprocesses andproceduresinthe workspace										
2.3	Ability to work withothermembersofthe team										

2.4	Participationandcompliance with thequality improvementprocess atthework environment										

2.5	Ability to record anddocumentworkaccurately andappropriateforlevel oftraining										
3	**Professional attributes**										
3.1	Responsibility andaccountability										
3.2	Contributiontogrowthoflearningofthetea m										
3.3	Conduct that isethically appropriateand respectful at alltimes										
4	**Spaceforadditionalcomments**										
5	**Disposition**										
	Has this assessmentpatternbeendiscussed withthe trainee?	Yes	No								
	Ifnotexplain.										
	NameandSignature oftheassesse										
	NameandSignature oftheassessor										
	Date										

SubjectExpertGroupmembersforpreparationofREVISEDGuidelinesforcompetencybasedpostgraduatetraining programmeforMDinPathology

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