



BLDE

(DEEMED TO BE UNIVERSITY)

Competency Based Medical Education

(CBME)

PG CURRICULUM

2019-20

MD Pathology

Published by

BLDE

(DEEMED TO BE UNIVERSITY)

Declared as Deemed to be University u/s 3 of UGC Act, 1956

The Constituent College

SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.

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BLDE(DU)/REG/PG-Curr/2019-20/268

May 06, 2019

NOTIFICATION

Sub: Competency Based Medical Education (CBME) based Revision of Post Graduate Curriculum

- Ref: 1. Medical Council of India Regulation on Graduate Medical Education, 1997 and subsequent amendments of the same from time to time.
2. Minutes of the 28th meeting Academic Council of the University held on April 26, 2019.
3. Minutes of the 47th meeting Board of Management held on May 04, 2019.

The Board of Management of the University is pleased to approve the CBME based Revised Curriculum for Post Graduate Degree Course at in its 47th meeting held on May 04, 2019.

The Revised Curriculum shall be effective, from the Academic Session 2020-21 onwards, for Post Graduate Degree Course in the Constituent College of the University viz. Shri B. M. Patil Medical College, Hospital and Research Centre, Vijayapura.

REGISTRAR
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BLDE (Deemed to be University)
Vijayapura-586103, Karnataka.

To,

The Dean, Faculty of Medicine and Principal
Shri B. M. Patil Medical College,
Hospital and Research Centre,
Vijayapura

Copy to:

- The Secretary, UGC, New Delhi
- The Secretary, MCI
- The Controller of Examinations
- The Vice Principal
- The Vice Principal (Academics)
- The Prof. & HODs Pre, Para and Clinical Departments
- The Co-ordinator, IQAC
- PS to the Hon'ble Chancellor
- PS to the Hon'ble Vice-Chancellor

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.

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Our Vision

“To be a Leader and be recognized as an Institution striving for maintenance and enhancement of Quality Medical Education and Healthcare”

Our Mission

- To be committed to promote sustainable development of higher education including Health science education, consistent with the statutory and regulatory requirements.
- Reflect the needs of changing technology and make use of the academic autonomy to identify the academic programs that are dynamic.
- Adopt global concepts in education in the healthcare sector.

Section - I

**Goals and General Objectives of Postgraduate
Medical Education Program**

Goal

The goal of postgraduate medical education shall be to produce a competent specialist and / or a medical teacher as stated in the Post Graduate Medical Education Regulations 2000 and its amendments thereof [May2018]

- (i) Who shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy.
- (ii) Who shall have mastered most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system.
- (iii) Who shall be aware of the contemporary advances and developments in the discipline concerned.
- (iv) Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology, and
- (v) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

General Objectives

At the end of the postgraduate training in the discipline concerned the student shall be able to:

- (i) Recognize the importance of the concerned specialty in the context of the health need of the community and the national priorities in the health sector.
- (ii) Practice the specialty concerned ethically and in step with the principles of primary health care.
- (iii) Demonstrate sufficient understanding of the basic sciences relevant to the concerned specialty.
- (iv) Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/strategies.
- (v) Diagnose and manage majority of the conditions in the specialty concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.
- (vi) Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty.
- (vii) Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
- (viii) Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations.

- (ix) Play the assigned role in the implementation of national health programs, effectively and responsibly.
- (x) Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
- (xi) Develop skills as a self-directed learner; recognize continuing educational needs, select and use appropriate learning resources.
- (xii) Demonstrate competence in basic concept of research methodology and epidemiology, and be able to critically analyse relevant published research literature.
- (xiii) Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
- (xiv) Function as an effective leader of a team engaged in health care, research or training.

Statement of the Competencies

Keeping in view the general objectives of postgraduate training, each discipline shall aim at development of specific competencies, which shall be defined and spelt out in clear terms. Each department shall produce a statement and bring it to the notice of the trainees in the beginning of the program so that he or she can direct the efforts towards the attainment of these competencies.

Components of the PG Curriculum

The major components of the PG curriculum shall be:

- Theoretical knowledge
- Practical/clinical Skills
- Training in writing thesis/research articles
- Attitudes, including communication.
- Training in research methodology, medical ethics & medicolegal aspects
- Teaching skills to the undergraduates, juniors and support teams

Source: Medical Council of India, Regulations on Postgraduate Medical Education, 2000. [amended upto May 2018]

Eligibility for Admission:

1. Post graduate degree course:

The candidate seeking admission should have passed MBBS from a college recognized by Medical Council of India.

As per requisites of statutory bodies & as laid out in Post graduate regulations of MCI & its amendments thereof, the minimum percentage of marks obtained in the entrance test

conducted by competent authority shall be as per MCI regulations & its amendments as applicable time to time.

Eligibility for Foreign / PIO / NRI students will be based on qualifying examination marks and MCI amendments as applicable at the time of selection and admission process.

Candidates seeking admission to superspeciality [M.Ch]

The candidate seeking admission to superspeciality course should have passed MS/MD in concerned subjects (As per MCI regulations & its amendments thereof) or passed DNB in concerned broad specialities & should fulfill requirements of MCI regulations.

2. As per requisites of statutory bodies & as laid out in Post graduate regulations of MCI & its amendments thereof, the minimum percentage of marks obtained in the entrance test conducted by competent authority shall be as per MCI regulations & its amendments as applicable time to time.

Eligibility for Foreign / PIO / NRI students will be based on qualifying examination marks and MCI amendments as applicable at the time of selection and admission process.

The MCI norms to qualify for Admissions

Candidates seeking admission to these Post Graduate Degree courses should have passed M.B.B.S. recognized by Medical Council of India or equivalent qualification and should have obtained permanent Registration from the Medical Council of India or any of the State/ Medical council or candidate should register the same within one month from the date of admission, failing which the admission of the candidate shall be cancelled. Provided that in the case of a foreign national, the MCI may on the payment of prescribed fee for the registration, grant temporary registration for the duration of post graduate training restricted to the medical college/ institute to which the applicant is admitted for the time being exclusively for post graduate studies; provided further, that temporary registration to such foreign national shall be subjected to the condition that such person is duly registered with appropriate registering authority in his /her country wherefrom he has obtained his basic medical qualification ,and is duly recognized by the corresponding Medical Council or concerned authority.

If the candidate fails to fulfill the relevant eligibility requirements as mentioned above he/she will not be considered eligible for admission for Medical Postgraduate Degree Courses even if he/she is placed in the merit list of statutory authority and BLDE (Deemed to be University).

Obtaining Eligibility Certificate by the University before making Admission

Candidate shall not be admitted for any postgraduate degree course unless he/she has obtained and produced the eligibility certificate used by the University. The candidate has to make an application to the University with the following documents along with the prescribed fee:

1. MBBS pass/degree certificate issued by the University.
2. Marks cards of all the university examinations passed MBBS course.
3. Attempt Certificate issued by the Principal
4. Certificate regarding the recognition of the Medical College by the Medical Council of India.
5. Completion of internship certificate.
6. In case internship was done in a non-teaching hospital, a certificate from the Medical Council of India that the hospital has been recognized for internship.
7. Registration by any State Medical council and
8. Proof of SC/ST or OBC or physically handicapped status, as the case may be.

In addition to the above mentioned documents, candidate applying for admission to superspeciality courses has to produce degree/pass certificate of MD/MS/DNB degree with prescribed fee.

Intake of Students

The intake of students to each course shall be in accordance with the ordinance in this behalf.

Course Duration

- a. M.D. / M.S. Degree Courses:

The course of study shall be for a period of 3 completed years including examinations. (MCI PG REG 2000 10:1)

- b. D.M/M Ch Degree Courses; (MCI PG REG 2000, 10:2)

The duration of these courses shall be for a period of 3 completed years including examinations.

Training Method

The postgraduate training for degree shall be of residency pattern. The post graduate shall be trained with graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions grand rounds, case

demonstration, clinics, journal review meetings, CPC and clinical meetings. Every candidate should be required to participate in the teaching and training program of undergraduate students. Training should include involvement in laboratory and experimental work, and research studies. Basic medical sciences students should be posted to allied and relevant clinical departments or institutions. Exposure to applied aspects of their learning should be addressed. Similarly, clinical subjects' students should be posted to basic medical sciences and allied specialty departments or institutions.

Training of superspeciality [M.Ch] should follow similar pattern. In addition, they have to be trained in advanced techniques of diagnosis and treatment pertaining to their specialty, participate actively in surgical operations as well.

Attendance, Progress and Conduct

A candidate pursuing degree course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course

Each year shall be taken as a unit for the purpose of calculating attendance. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons. Every Candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. This shall include assignments, assessment of full time responsibilities and participation in all facets of educational process. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year. Leave benefits shall be as per university rules.

A post graduate student pursuing degree course in broad specialties, MD, MS and superspeciality courses DM, M.Ch would be required to present one poster presentation, read one paper in 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/her to be eligible to appear at the university degree examinations. (MCI, PG 2000, 13.9)

Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

Monitoring Progress of Studies

The learning process of students should be monitored through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring is done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment done by using checklists that assess various aspects.

The learning outcomes to be assessed include:

- Personal Attitudes,
- Acquisition of Knowledge,
- Clinical and operative skills, skills of performing necessary tests/experiments
- Teaching skills.
- Documentation skills

Personal Attitudes:

The essential items are:

- Caring attitude, empathy
- Initiative in work and accepting responsibilities
- Organizational ability
- Potential to cope with stressful situations and undertake graded responsibility
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to the acquisition of knowledge

The Methods used mainly consist of observation. Any appropriate methods can be used to assess these. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers. However every attempt should be made to minimize subjectivity.

Acquisition of Knowledge:

Lectures: Lectures/theory classes as necessary may be conducted. It is preferable to have one class per week if possible. They may, be employed for teaching certain topics. Lectures may be didactic or integrated.

The following selected common topics for post graduate students of all specialties to be covered are suggested here. These topics can be addressed in general with appropriate teaching-learning methods centrally or at departmental level.

- History of medicine with special reference to ancient Indian medicine
- Basics of health economics and health insurance
- Medical sociology, Doctor –Patient relationship, role of family in disease
- Professionalism & Medical code of Conduct and Medical Ethics
- Research Methods, Bio-statistics
- Use of library, literature search ,use of various software and databases

- Responsible conduct of research
- How to write an article, publication ethics and Plagiarism
- Journal review and evidence based medicine
- Use of computers & Appropriate use of AV aids
- Rational drug therapy
- National Health and Disease Control Programmes
- Roles of specialist in system based practice
- Communication skills.
- Bio medical waste management
- Patient safety, medical errors and health hazards
- Patient's rights for health information and patient charter.

These topics may preferably taken up in the first few weeks of the 1st year commonly for all new postgraduates and later in 2nd year or 3rd year as required during their progression of the programme. The specialty wise topics can be planned and conducted at departmental level.

- a) Integrated teaching: These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, Diabetes mellitus, thyroid diseases etc. They should be planned well in advance and conducted.

Journal Review Meeting (Journal club):

The ability to do literature search, in depth study, presentation skills, use of audio – visual aids, understanding and applying evidence based medicine are to be focused and assessed. The assessment is made by faculty members and peers attending the meeting using a checklist

Seminars / symposia:

The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio – visual aids are to be assessed using a checklist.

Clinico-Pathological conferences:

This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a check list similar to that used for seminar.

Medical Audit: Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

Clinical Skills: Day to Day Work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills

Clinical Meetings:

Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list.

Group discussions: Group discussions are one of the means to train and assess the student's ability to analyse the given problem or situation, apply the knowledge and make appropriate decisions. This method can be adopted to train and assess the competency of students in analyzing and applying knowledge.

Death review meetings/Mortality meetings: Death review meetings is important method for reflective learning. A well conducted morbidity and mortality meetings bring about significant reduction in complications, improve patient care and hospital services. They also address system related issues. Monthly meetings should be conducted with active participation of faculty and students. Combined death review meetings may be required wherever necessary.

Clinical and Procedural Skills:

The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

Teaching Skills:

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students

Attitude and Communication skills:

Candidates should be trained in proper communication skills towards interaction and communication with patients, attendees and society in general. There should be appropriate training in obtaining proper written informed consent, discussion and documentation of the proceedings. Structured training in various areas like consent, briefing regarding progress and breaking bad news are essential in developing competencies.

Variety of teaching –learning methods like Role play, video based training, standardized patient scenarios, reflective learning and assisting the team leader in all these areas will improve the skills. Assessment can be done using OSCE simulated scenarios and narratives or any appropriate means. Training to work as team member, lead the team whenever situation demands is essential. Mock drills to train and assess the readiness are very helpful.

Work diary / Log Book:

Every candidate shall maintain a Work Diary/Log Book and record his/her participation in the training programs conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, conducted by the candidate. A well written and validated Log Book reflects the competencies attained by the learner and points to the gap which needs address. This Log Book shall be scrutinized by concerned teachers periodically and certified, by the Head of Department and Head of the Institution, and presented during University Practical / Clinical examination.

Periodic tests:

In case of degree courses of three years duration (MD/MS, DM, M.Ch), the concerned departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practical / clinical and viva voce. One of these practical/clinical tests should be conducted by OSPE (objective structured practical examination or OSCE (objective structured clinical examination) method. Records and marks obtained in such tests will be maintained by the Head of Department and sent to the University, when called for,

Assessment

Assessment should be comprehensive & objective. It should address the stated competencies of the course. The assessment needs to be spread over the duration of the course.

FORMATIVE ASSESSMENT, ie., assessment during the training would include:

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

General Principles

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

Quarterly assessment during the Postgraduate training course should be based on following educational activities:

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

Records: Records and marks obtained in tests will be maintained by the Head of the Departments and will be made available to the University or MCI.

Procedure for defaulter:

Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Dissertation: Every candidate pursuing MD/MS degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis and comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

The dissertation shall be written under the following headings:

1. Introduction
2. Aims or Objectives of study
3. Review of Literature
4. Material and Methods
5. Results

6. Discussion
7. Conclusion
8. Summary
9. References
10. Tables
11. Annexure

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

Adequate number of copies as per norms and a soft copy of dissertation thus prepared shall be submitted to the Controller of Examinations six months before final examination or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the university. Acceptance of dissertation work is an essential precondition for a candidate to appear in the University examination.

Guide:

The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work is as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998 and its amendments thereof. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognized as post graduate teachers.

A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching/training by this University / Medical Council of India. The co-guide shall be a recognized post graduate teacher of BLDE (Deemed to be University).

Change of guide:

In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the University.

Schedule of Examination:

The examination for M.D. /M.S and DM/M.Ch courses shall be held at the end of three academic years. The university shall conduct two examinations in a year at an interval of four to six months between the two examinations. Not more than two examinations shall be conducted in an academic year.

Scheme of Examination

M.D. /M.S. Degree

M.D. / M.S. Degree examinations in any subject shall consist of dissertation, written papers (Theory), Practical/Clinical and Viva Voce.

Dissertation:

Every candidate shall carryout work and submit a Dissertation as indicated above. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

Written Examination (Theory):

Written examination shall consist of **four** question papers, each of **three** hours duration. Each paper shall carry 100 marks. Out of the **four** papers, the 1st paper in clinical subjects will be on applied aspects of basic medical sciences and 4th paper on Recent advances, which may be asked in any or all the papers. In basic medical subjects and para-clinical -subjects, questions on applied clinical aspects should also be asked.

Practical / Clinical Examination:

In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases minimum. However additional assessment methods can be adopted which will test the necessary competencies reasonably well.

The total marks for Practical / Clinical examination shall be 300.

Viva Voce:

Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills.

The total marks shall be 100:

- 80 Marks, for examination of all components of syllabus
- 20 Marks for Pedagogy

Examiners:

There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

Criteria for pass & distinction: Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical/clinical and (3) viva voce examination. The candidate should pass independently in practical/clinical examination and Viva Voce: vide MCI pg 2000 Reg no 14(4) (Ciii)

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers for degree examinations. Obtaining of 50% marks in Practical examination shall be mandatory for passing the examination as a whole in the said degree examination as the case may be.[amendment of MCI PG Regulations clause 14 dated 5.4.2018]

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate of marks is 75 percent and above.

Distinction will not be awarded for candidates passing the examination in more than one attempt.

D.M/M.Ch Degree

DM/M.Ch Degree examinations in any subject shall consist of written theory papers (theory), practical/clinical and Viva voce.

Written Examination (Theory):

Written examination shall consist of **four** question papers, each of **three** hours duration. Each paper shall carry 100 marks. Out of the **four** papers, the 1st paper in clinical subjects will be on applied aspects of basic medical sciences. Recent advances may be asked in any or all the papers. In basic medical subjects and para-clinical -subjects, questions on applied clinical aspects should also be asked.

Practical / Clinical Examination:

In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills, competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The total marks for Practical / clinical examination shall be 300.

Viva Voce:

Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills.

The total marks shall be 100:

- 80 Marks, for examination of all components of syllabus
- 20 Marks for Pedagogy

Examiners: There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

Criteria for passing and distinction: Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and (3) viva voce examination. The candidate should pass independently in practical/clinical examination vide: MCI pg 2000 Reg no 144-c (iii).

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers for degree examinations. Obtaining of 50% marks in Practical examination shall be mandatory for passing the examination as a whole in the said degree examination as the case may be.[amendment of MCI PG Regulations clause 14 dated 5.4.2018]

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Distinction will not be awarded for candidates passing the examination in more than one attempt.

Number of candidates per day: The maximum number of candidates for practical / clinical and viva-voce examination shall be as under:

- MD / MS Courses: Maximum of 8 per day
- DM/M.Ch Maximum of 3 per day

Additional annexure to be included in all curricula

Postgraduate Students Appraisal Form
Pre/Para/Clinical Disciplines

Name of Department/Unit :
Name of the PG Student :
Period of Training : FROM..... TO.....

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

Publications Yes/No

Remarks*
.....
.....
.....

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

SIGNATURE OF ASSESSEE

SIGNATURE OF GUIDE

SIGNATURE OF HOD

SIGNATURE OF UNIT CHIEF

SECTION - II

MD- PATHOLOGY

GOAL:

After completing, post graduate medical education in pathology, the student should be capable of directing and managing laboratory services and be able to:

1. Serve as a consultant to physicians on cost-effective test strategies and interpretation of results
2. Select, evaluate, and apply laboratory instruments and procedures appropriate to the screening, diagnostic, and monitoring needs of clinical decision making
3. Plan, organize, staff and direct laboratory resources
4. Use the techniques of medical informatics to acquire and manage data, translate data to clinically useful information, and communicate that information in support of patient care and educational programs
5. Play an influential role in medical staff and health-care delivery activities that reach beyond the confines of the laboratory
6. Recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national health policy.
7. Should master most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and tertiary levels of the healthcare delivery system.
8. Should be aware of contemporary advances and developments in the discipline concerned
9. Should have acquired a spirit of scientific inquiry and oriented to the principles of research methodology and epidemiology.
10. Should have acquired the basic skills in teaching of the medical and paramedical professionals.

A. General Competency Statements:

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 procedure such as a biopsy or an imaging guided biopsy.
3. Perform an autopsy, dissect various organ complexes and display the gross findings.
4. Should be familiar with the function, handling and routine care of equipments in the laboratory.

Subject Specific 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

- Given the clinical and operative data, the student should be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and be able to correctly diagnose at least 80% of the lesions received on an average day from the surgical service of an average teaching hospital.
- A student should be able to demonstrate ability to perform a systematic gross examination of the tissues including the taking of appropriate tissue sections and in special cases as in intestinal mucosal biopsies, muscle biopsies and nerve biopsies, demonstrate the orientation of tissues in paraffin blocks.
- The student should be able to identify and systematically and accurately describe the chief histo-morphological alterations in the tissue received in the surgical pathology service. He/she should also correctly interpret and correlate with the clinical data to diagnose at least 90% of the routine surgical material received on an average day.
- Be conversant with automatic tissue processing machine and the principles of its running.
- Process a tissue, make a paraffin block and cut sections of good quality on a rotary microtome.
- Stain paraffin sections with at least the following:

- Haematoxylin and eosin
- Stains for collagen, elastic fibers and reticulin
- Iron stain
- PAS stain
- Acid fast stains
- Any other stains needed for diagnosis.
- Demonstrate understanding of the principles of:
 - Fixation of tissues
 - Processing of tissues for section cutting
 - Section cutting and maintenance of related equipment
 - Differential (special) stains and their utility
- Cut a frozen section using cryostat, stain and interpret the slide in correlation with the clinical data provided.
- Demonstrate the understanding of the utility of various immunohistochemical stains especially in the diagnosis of tumour subtypes.

Cytopathology Skills

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

Haematology Skills

- Correctly and independently perform the following special tests, in addition to doing the routine blood counts:
 - Haemogram including reticulocyte and platelet counts.
 - Bone marrow staining including stain for iron
 - Blood smear staining
 - Cytochemical characterization of leukemia with special stains like Peroxidase, Leukocyte Alkaline Phosphatase (LAP), PAS, Sudan Black, etc.
 - Hemolytic anemia profile including HPLC, Hb electrophoresis etc.
 - Coagulation profile including PT, APTT, FDP.
 - BM aspiration and BM biopsy

- Demonstrate familiarity with the principle and interpretation of results and the utility in diagnosis of the following:
 - Platelet function tests including platelet aggregation and adhesion and PF3 release
 - Thrombophilia profile: Lupus anticoagulant (LAC), Anticardiolipin Antibody (ACA), Activated Protein C Resistance (APCR), Protein C (Pr C), Protein S (Pr S) and Antithrombin III (AT III)
 - Immunophenotyping of leukaemia
 - Cytogenetics
 - Molecular diagnostics.
- Describe accurately the morphologic findings in the peripheral and bone marrow smears, identifying and quantitating the morphologic abnormalities in disease states and arriving at a correct diagnosis in at least 90% of the cases referred to the Haematology clinic, given the relevant clinical data.

Laboratory Medicine Skills

- Plan a strategy of laboratory investigation of a given case, given the relevant clinical history and physical findings in a logical sequence, with a rational explanation of each step; be able to correctly interpret the laboratory data of such studies, and discuss their significance with a view to arrive at a diagnosis.
- Demonstrate familiarity with and successfully perform:
 - routine urinalysis including physical, chemical and microscopic, examination of the sediment.
 - macroscopic and microscopic examination of faeces and identify the ova and cysts of common parasites.
 - a complete examination: physical, chemical and cell content of Cerebrospinal Fluid (C.S.F), pleural and peritoneal fluid.
 - semen analysis.
 - examination of peripheral blood for commonly occurring parasites.
- Independently and correctly perform at least the following quantitative estimations by manual techniques and/or automated techniques.
 - Blood urea
 - Blood sugar
 - Serum proteins (total and fractional)
 - Serum bilirubin (total and fractional)
- Demonstrate familiarity with the following quantitative estimations of blood/ serum by Automated Techniques:
Serum cholesterol, Uric acid, Serum Transaminases (ALT and AST/SGOT and SGPT), etc.
- Prepare standard solutions and reagents relevant to the above tests, including the preparation of normal solution, molar solution and buffers.
- Explain the principles of Instrumentation, use and application of the instruments commonly used in the labs eg. Photoelectric colorimeter,

Spectrophotometer, pH meter, Centrifuge, Electrophoresis apparatus,
ELISA Reader, flow cytometer, PCR, chemiluminiscence.

Transfusion Medicine Skills

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

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

Immunohistochemistry Skills (desirable)

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

D. Syllabus

Course contents:

The study of Pathologic Anatomy includes all aspects of Pathology as encompassed in the branches of General and Systemic Pathology.

A. General Pathology:

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

B. Systemic Pathology:

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

C. Haematology

- **Haemopoiesis-** Site of haemopoiesis , Haemopoietic stem and progenitor cells , Bone marrow stroma , The regulation of haemopoiesis , Apoptosis, Haemopoietic growth factors
- **Erythropoiesis and general aspects of anaemia-** Haemoglobin, Red cell metabolism , Red cell membrane , Clinical features of anaemia , Classification and laboratory findings in anaemia , Assessment of erythropoiesis
- **Hypochromic anemias-** Nutritional and metabolic aspects of iron , Iron absorption , Iron deficiency ,Causes of iron deficiency , Laboratory findings , Anaemia of chronic disorders, Sideroblastic anaemia
- **Megaloblastic anaemias & other Macrocytic anaemia-** Megaloblastic anaemias , Vitamin B 12 , Folate , Vitamin B 12 deficiency , Folate deficiency , Clinical features of megaloblastic anaemia , Diagnosis of vitamin B 12 or folate deficiency , Other megaloblastic anaemias , Other macrocytic anaemias
- **Hemolytic Anemia-** Normal red cell destruction ,Introduction to haemolytic anaemias , Intravascular and extravascular haemolysis , Hereditary haemolytic anaemias , Acquired haemolytic anaemias
- **Genetic disorders of Hemoglobin-** Haemoglobin synthesis , Haemoglobin abnormalities , Thalassaemias , α -Thalassaemias , β -Thalassaemias , Thalassaemia intermedia , Sickle cell anaemia , Prenatal diagnosis of genetic haemoglobin disorders
- **The white cells 1:Granulocytes, monocytes and their benign disorders-** Granulocytes , Granulopoiesis ,, Clinical applications of myeloid growth factors , Monocytes , Disorders of neutrophil and monocyte function ,Causes of leucocytosis and monocytosis , Neutropenia , Eosinophilia , Histiocytic disorders , Lysosomal storage diseases
- **The white cells 2:lymphocytes and theirbenign disorders-** Lymphocytes , Natural killer cells ,Immunoglobulins , Antigen–receptor gene rearrangements , Complement , The immune response , Lymphocytosis , Immunodeficiency , Differential diagnosis of lymphadenopathy
- **The spleen-**

The anatomy and circulation of the spleen ,The functions of the spleen , Extramedullary haemopoiesis , Imaging the spleen , Splenomegaly , Hypersplenism , Hyposplenism , Splenectomy , Prevention of infection in hyposplenic patients

- **The aetiology and genetics of haematological malignancies-** The incidence of haematological neoplasms ,The aetiology of haemopoietic malignancy,The genetics of haemopoietic malignancy, Chromosome nomenclature , Specific examples of

genetic abnormalities in haematological malignancies , Diagnostic methods used to study malignant cells , Value of genetic markers in management of haematological malignancy

- **Acute & chronic myeloid leukaemia-** Classification of leukaemia, Diagnosis of acute & chronic leukaemia , Clinical features , Investigations , Treatment , Outcome
- **Myeloproliferative disease-** Polycythaemia vera , Secondary polycythaemia , Differential diagnosis of polycythaemia , Essential thrombocythaemia , Primary myelofibrosis , Mastocytosis
- **Myelodysplasia (myelodysplastic syndromes)** – Classification, Laboratory findings, Treatment, Myelodysplastic/myeloproliferative neoplasms
- **Acute lymphoblastic leukaemia-** Incidence and pathogenesis , Classification , Investigations , Treatment , Minimal residual disease , Specific therapy of ALL in adults
- **The chronic lymphoid leukaemias** –B cell diseases , Chronic lymphocytic leukaemia, Pathogenesis , Clinical features , Laboratory findings , Treatment , Hairy cell leukaemia, T-cell diseases
- **Hodgkin lymphoma-** History and pathogenesis , Clinical features , Haematological and biochemical findings , Diagnosis and histological classification, Clinical staging , Treatment.
- **Non Hodgkin lymphoma** - Introduction to non-Hodgkin lymphoma , Clinical features of non-Hodgkin lymphoma , Laboratory investigation, Specific subtypes of (NHL) , Lymphoplasmacytoid NHL , Marginal zone NHL , Follicular NHL , Mantle cell NHL , Diffuse large B-cell NHL , Burkitt lymphoma , T-cell lymphomas
- **Multiple myeloma and related disorders-** Paraproteinaemia , Multiple myeloma , Other plasma cell tumours , Monoclonal gammopathy of undetermined significance , Amyloidosis , Hyperviscosity syndrome
- **Aplastic anaemia and bone marrow failure-** Pancytopenia , Aplastic anaemia , Paroxysmal nocturnal haemoglobinuria , Red cell aplasia , Schwachman–Diamond syndrome , Congenital dyserythropoietic anaemia , Osteopetrosis
- **Stem cell transplantation** - Principles of stem cell transplantation , Peripheral blood stem cell collection , Bone marrow stem cell collection , Myeloablative and non-myeloablative conditioning , Autologous stem cell transplantation , Allogeneic stem cell transplantation, Human leucocyte antigen (HLA) system , Complications , Graft-versus-leukaemia and donor leucocyte infusions
- **Platelets, blood coagulation and haemostasis-** Platelets , Blood coagulation, Endothelial cells , Haemostatic response , Fibrinolysis , Tests of haemostatic function
- **Bleeding disorders caused by vascular and platelet abnormalities-** Vascular bleeding disorders , Thrombocytopenia , Autoimmune (idiopathic) thrombocytopenic purpura , Thrombotic thrombocytopenic purpura , Disorders of platelet function , Diagnosis of platelet disorders , Platelet transfusions
- **Coagulation disorders** Hereditary coagulation disorders, Haemophilia A , Factor IX deficiency, Von Willebrand disease , Hereditary deficiency of other coagulation

factors , Acquired coagulation disorders, Disseminated intravascular coagulation , Massive transfusion, Thromboelastography: near-patient testing

- **Thrombosis 1: pathogenesis and diagnosis-** Investigation of thrombophilia , Diagnosis of venous thrombosis .
- **Haematological changes in systemic diseases-** Anaemia of chronic disorders , Haematological problems in the elderly , Malignant diseases, Rheumatoid arthritis , Renal failure , Congestive heart failure , Liver disease , Hypothyroidism , Infections , Non-specific monitoring of systemic disease

Clinical Pathology & Laboratory Medicine-

I. General concepts and administrative issues

Quality Systems Management, Human Resource (HR), Management, laboratory design and service models, regulation, accreditation, and legislation, safety, Biological Hazards, Chemical Hazards, Ergonomic Hazards, External & internal quality control procedures in hematology & clinical pathology laboratory

II. **Basic examination of urine-** Components of basic (routine) urinalysis, methods for urinalysis basic & automated, special tests for urine analysis, tests for metabolic disorders

III. **Basic examination of Semen-** Sample collection, macroscopic & microscopic examination analysis of semen (Sperm motility, vitality count), computer aided sperm analysis, sperm preparation techniques. Quality assurance & quality control in semen analysis

IV. **Evaluation of renal function, water, electrolytes, and acid-base balance-** Measurement of Body Fluid Volumes, body Fluid Volumes, Composition of the Body Fluid, *Extracellular Composition, Intracellular Composition*, Measurement of Plasma osmolality, *Effect of Hyperglycemia on Serum Na⁺* Measurement of renal function, biomarkers of acute kidney injury, acid-base disorders.

V. **Introduction to molecular pathology-** Application of Molecular Pathology to Detection of Cancer, Use of Molecular Biology in the treatment of Disease, Data Analysis & quality assurance in Molecular Pathology Student is guided to update his/her knowledge with regards to the recent advances in the above-mentioned topics.

Surgical Pathology

Skin: Normal anatomy, Approach to various skin lesions such as epidermal, skin adnexal tumors, dermatoses, melanocytic tumors, vesiculobullous lesions, neuroendocrine cell tumors, dermal lesions, in Skin lesions.

Oral cavity, oropharynx including Mandible & Maxilla:

Normal anatomy, Approach to Congenital abnormalities, Inflammatory diseases, Other non-neoplastic lesions, Tumors and tumorlike conditions of surface epithelium, Tumors and other lesions of minor salivary Glands, Tumors of odontogenic epithelium, Tumors of melanocytes, Tumors and tumorlike conditions of lymphoid tissue, Other tumors and tumorlike conditions,

Simple bone cyst, Central giant cell granuloma and other giant Cell-containing lesions
Benign fibro-osseous lesions Epithelial cysts & diseases of the temporomandibular joint

Mediastinum: Inflammatory diseases, Cysts (other than thymic), Thyroid and parathyroid lesions, Approach to lesions of thymus, Germ cell tumors, Malignant lymphoma, Neurogenic tumors, Tumors of paraganglia, Mesenchymal tumors, Metastatic tumors

Thyroid gland: Normal anatomy, Congenital abnormalities, Thyroiditis, Hyperplasia, Tumors,

Epithelial tumors-specific types, Medullary carcinoma and related, Neuroendocrine lesions, Epithelial tumors-general features, Lymphoid tumors and tumorlike conditions, Mesenchymal tumors, Other primary tumors and tumorlike Conditions, Metastatic tumors

Parathyroid glands: Normal gross anatomy and embryology, Normal histology, Normal physiology Adenoma, Chief cell hyperplasia, Water clear cell hyperplasia, Carcinoma Other lesions, Hyperparathyroidism, Frozen section .

Gastrointestinal tract:

Esophagus: Normal anatomy, Atresia and related anomalies, Heterotopia, Diverticula, Cysts, Rings and webs, Achalasia and related motor disorders, Lye strictures, Reflux esophagitis, Other types of esophagitis, Squamous cell carcinoma, Other types of carcinoma, Smooth muscle tumors and GIST- type stromal Tumors, Other tumors and tumorlike conditions

Stomach: Normal anatomy, Heterotopic tissues, Hypertrophic pyloric stenosis, Chronic gastritis Other types of gastritis, Peptic and other benign ulcers, Other non-neoplastic lesions, Polyps Menetriers disease and Zollinger-Ellison Syndrome, Dysplasia, Carcinoma, Well-differentiated neuroendocrine tumors, (carcinoid tumors), Stromal tumors (GIST and related lesions), Lymphoid tumors and tumorlike conditions & Other tumors

Small bowel: Normal anatomy, Congenital defects, Malabsorption, Ulcers, Vascular diseases, Crohns disease, AIDS-related inflammatory diseases, Other inflammatory diseases, Irradiation effect, Intussusception, Other non-neoplastic diseases & Tumors

Appendix: Normal anatomy, Acute appendicitis, Chronic appendicitis, Other inflammatory processes Tumors & Other lesions

Large bowel: Normal anatomy, Hirschsprungs disease and related, Disorders, Diverticulosis, Colitis Other non-neoplastic lesions & Tumors

Anus: Normal anatomy, Embryologic defects, Inflammatory diseases, Hypertrophied papillae, Hemorrhoids, Tumors

Salivary glands: Normal anatomy, Heterotopia, Sialolithiasis, Sialadenitis, Benign lymphoepithelial cysts and HIV-related lesions, Mikulicz's disease and Sjogren's syndrome,

Irradiation effect, Other non-neoplastic lesions, Epithelial tumors, Malignant lymphoma, Other primary neoplasms, Metastatic tumors, General features of salivary gland tumors.

Recent advances

Liver: Normal anatomy, Biopsy, Viral hepatitis, Viral hepatitis caused by hepatotropic Viruses, Hepatitis caused by nonhepatitis viruses cirrhosis, Drug-induced and toxic liver injury, Steatosis and steatohepatitis, Cholestasis and biliary diseases, Childhood disorders and disorders of Metabolism Disorders of copper and iron metabolism, Fibropolycystic diseases (ductal plate Malformation), Vascular disorders, Nodular regeneration, Liver disease in pregnancy, Liver involvement in other organ and systemic Diseases, Liver pathology in organ transplantation, Echinococcus cyst (hydatid cyst), Abscess, Heterotopia, Liver cell tumors and tumorlike conditions, Bile duct tumors and tumorlike, Conditions, Mesenchymal tumors and tumorlike conditions, Malignant lymphoma and related lesions other primary tumors and tumorlike conditions, Metastatic tumors & Recent advances Gall bladder and extrahepatic bile ducts: Normal anatomy, Congenital abnormalities, Non- neoplastic lesions, Tumors, Benign tumors and tumor like conditions, Carcinoma of gall bladder, Carcinoma of extrahepatic bile ducts & Other malignant tumors

Pancreas and periampullary region:

Pancreas: Normal anatomy, Congenital abnormalities, Pancreatitis, Pancreatic transplantation, Abscess, Pseudocysts, True cysts, Tumors, Ampullary carcinoma and precursor lesions, Other lesions

Adrenal gland and paraganglia: Normal anatomy, Biopsy and cytology, Lesions of adrenal cortex, Lesions of adrenal medulla, Other adrenal lesions, Tumors and tumorlike lesions of other Paraganglia.

Urinary tract: Kidney, renal pelvis & ureter: Non-neoplastic diseases, Renal biopsy, Normal structure of the glomerulus, Classification of glomerular disease, Glomerular lesions associated with Nephrotic syndrome, Glomerular lesions associated with Syndrome of acute nephritis, Glomerular lesions associated with vascular diseases. Renal diseases of pregnancy, Hereditary glomerular diseases, Renal transplant rejection, Tubulointerstitial nephritis, Renal vascular disease, Radiation nephropathy, Cystic diseases of the kidney, Wilms tumor, Mesoblastic nephroma.

Bladder: Normal anatomy, Congenital abnormalities, Diverticulosis, Lithiasis, Endometriosis and related mullerian-type Changes, Amyloidosis, Cystitis, Metaplastic conditions, Tumorlike conditions, Benign tumors, Transitional cell (urothelial) carcinoma, Other primary carcinomas, Other malignant tumors.

Male reproductive system: Prostate and seminal vesicles

Prostate: Normal anatomy, Ectopia, Nodular hyperplasia, Infarct, Prostatitis, Calculi, Tumor like conditions of prostate and Prostatic urethra, Carcinoma & Other tumors Seminal vesicles and cowpers glands

Testis: Normal embryology and anatomy, Cryptorchidism, Atrophy and infertility, Other non-neoplastic lesions & Tumors Testicular adnexa- lesions

Penis and scrotum: Normal anatomy, Non-neoplastic lesions & Tumors.

Female reproductive system:

Vulva: Normal anatomy, Congenital abnormalities, Inflammatory diseases, So-called chronic vulvar dystrophies, Human papilloma virus and vulvar pathology, Condyloma and seborrheic keratosis, Squamous intraepithelial lesions, Invasive squamous cell carcinoma, Paget's disease, Other epithelial tumors, Melanocytic tumors, Aggressive angiomyxoma and related lesions, Other tumors and tumorlike conditions, Lesions of Bartholin glands and related structures, Lesions of the female urethra

Vagina:

Uterus – cervix: Normal anatomy, Remnants and ectopias, Squamous and other metaplasias, Inflammatory lesions, Non-neoplastic glandular lesions, Non-neoplastic stromal lesions (including Endometriosis and related processes), Human papilloma virus (HPV) and the lower Female genital tract tumors & Other tumors and tumor like conditions

Uterine – corpus: Normal anatomy, Curettage and biopsy, Effects of hormone administration, Endometritis, Metaplasia, Adenomyosis and endometriosis, Dysfunctional uterine bleeding and Hyperplasia & Tumors.

Fallopian tube: non-neoplastic & neoplastic lesions

Ovary: Normal anatomy, Gonadal dysgenesis, Cysts, stromal hyperplasia, and other Non neoplastic lesions, Inflammation, Endometriosis, Ovarian biopsy & Tumors.

Placenta: Normal anatomy, Abortion, Gestational trophoblastic disease, Non-neoplastic lesions of term placenta, Tumors and tumor like conditions of term, Placenta.

BREAST: Normal anatomy, Non neoplastic lesions, Premalignant lesions, Carcinoma Microscopic types, In situ carcinoma, Hormone receptors, Sentinel lymph node, Staging and grading, Therapy Effects of therapy on tumor and on normal breast, Prognosis, Other tumors, Breast diseases in children and adolescents, Breast diseases in males, Gynaecomastia, Needle core biopsy, Open biopsy and frozen section.

Spleen: Normal anatomy, Biopsy and fine needle aspiration, Rupture and splenectomy, Congenital anomalies, Cysts, Inflammation, Hypersplenism, Other non-neoplastic disorders, Hematolymphoid tumors and tumorlike Conditions, Vascular tumors, Other primary tumors and tumorlike Conditions Metastatic tumors .

Bone and joints: Bone forming tumors, Cartilage forming tumors, Giant cell tumor, Marrow tumors, Tumor like lesions, Joints and related structures, Tumors and tumor like conditions & Recent advances.

Soft tissue: Normal anatomy, Infections and hematomas, Tumor like conditions, Tumors
Peritoneum and related:

Peritoneum: Normal anatomy, Inflammation, Adhesions, Reaction to foreign materials, Cysts and loose bodies, Hyperplasia, metaplasia & Tumors.

Retroperitoneum: Normal anatomy developmental anomalies, Non-neoplastic conditions – tumors, Germ cell tumors, Pilonidal disease, Other tumors

Cardiovascular system:

Heart: Cardiac tumors

Arteries: Normal anatomy, Arteriosclerosis, Cystic adventitial degeneration, Fibromuscular dysplasia, Mesenteric vascular occlusion, Traumatic and iatrogenic injuries, Thromboangiitis obliterans, Arteritis & Tumors.

Veins: lesions, Lymph vessels, Lymphedema, Tumors

Neuromuscular system: Normal anatomy, Muscular dystrophies & myopathies

Central nervous system: Normal anatomy, Congenital abnormalities, Cerebrovascular disorders, Inflammatory diseases, Infectious diseases, Primary tumors & Secondary tumors

Peripheral nerves: Normal anatomy, Basic pathologic mechanisms, Neuropathies, Other neuropathies.

Pituitary glands: Normal anatomy, Pituitary adenoma, Other lesions
Eye and ocular adnexa: Normal anatomy, Eyelids, Lacrimal passages, Lesions of lacrimal gland, Lesions of orbit, Lesions of conjunctiva, Lesions of cornea, Intraocular tissues

Ear: Introduction, Diseases of external ear, Diseases of middle and inner ear.

Student is guided to update his/her knowledge with regards to the recent advances in the above-mentioned topics.

AUTOPSY PATHOLOGY:

Trainees should begin to understand the level of certainty with which macroscopic features can be interpreted at autopsy and when histological examination of autopsy tissues is important. They should begin to recognise histological changes that occur due to post-mortem artefact.

General: Methods for identification of the patient.
External examination including breast examination.

Removal of organs. Organ weights. Procedures for obtaining consent for autopsy. Workings of the coroner's (or procurator fiscal's) system. Full details of current practice for retention of organs and tissues. Familiarity with current College. Knowledge of normal organ weights.

Cardiovascular: Excision of heart. Master one technique for the dissection of the heart.

Anatomy of the coronary arteries, their ostia and branches.

Dissection of aorta and major abdominal branches. Normal, age-related and pathological abnormalities of cardiac valves. Identification of acute and healed myocardial infarcts, macroscopically and histologically. Assessment of ventricular thickness and atrial and ventricular dilatation.

Respiratory: Pulmonary embolism. System Removal of lungs from mediastinum.

Dissection of pulmonary vessels and major bronchi. Dissection of individual lobes. Identification of respiratory tract infection and pneumonia. Assessment of chronic bronchitis and emphysema. Appearances of primary and secondary lung tumours.

Upper gastrointestinal tract: Removal and dissection of oesophagus, stomach and duodenum in continuity. Identification of ampulla of Vater. Range of appearances due to autolysis in stomach. Identification of oesophageal varices, gastric erosions and peptic ulcers. Assessment of pyloric stenosis.

Lower gastrointestinal tract: Identification and dissection of superior mesenteric artery.

Examination of intestinal mucosal surface. Identification of colonic diverticula.

Identification of bowel necrosis and distinction from autolysis or post-mortem change

Hepatobiliary System: Removal of liver and its dissection. Identification of portal and hepatic veins. Dissection of gallbladder, common bile duct and pancreatic ducts. Assessment of hepatic congestion and dilatation of hepatic veins. Appearances of intra- and extrahepatic ducts. Identification of secondary tumours. Identification of hepatic cirrhosis.

Nervous System: Removal of brain. Dissection of Circle of Willis and venous sinuses.

One method for sectioning of cerebral and cerebellar hemispheres and brain stem. Sites of berry aneurysms. Identification of old and recent cerebral infarcts. Assessment of cerebral and cerebellar atrophy. Taking of 'key' blocks for histological examination.

Urogenital System: Dissection of renal arteries and veins and ureters. Removal of kidneys and examination of cut surfaces and renal pelvices. Examination of bladder mucosa and identification of ureteric orifices. Examination of the prostate gland. Examination of the testes and female genital system. Estimation of degree of cortical atrophy. Identification and assessment of cortical scarring and cyst formation. Hydronephrosis and ureteric dilatation. Prostatic disease.

Endocrine System: Removal of pituitary. Identification of parathyroid glands and dissection of thyroid. Removal of adrenal glands. Size and overall appearance of thyroid gland. Size of parathyroid glands. Adrenal cortical hyperplasia or adrenal atrophy.

Lymphoreticular System: Examine all lymph node groups (e.g. mediastinal or para-aortic) for evidence of lymphadenopathy. Examination of the spleen. Exposure of vertebral bone marrow. Significance of lymphadenopathy in different anatomical sites. Clinical explanation for splenic enlargement or atrophy. Identification of secondary deposits in vertebral bone marrow.

Musculoskeletal System: Identify fractures. Explore sites of recent internal fracture fixation. Osteoporosis. Report Preparation of report according to consultant's protocol and with reference to College's Guidelines on Autopsy Practice, Include the cause of death in the Office of National Statistics (ONS) format and a clear clinicopathological summary. Detailed list of all macroscopic abnormalities. Summary relating abnormalities to aspects of clinical history (wherever possible). Appropriate tissue blocks for histology (with appropriate consent).

The paediatric Autopsy: Examination of the heart and vascular connections in situ. Removal of the brain; dissection of the thymus. Organ weights and measurements with reference to normal range. Features of maceration and dysmorphism. Assessment of growth and development.

Cytology Syllabus:

I. General Cytology

- 1) Diagnostic Cytology- Its Origins and Principles
- 2) The Basic Structure of the Mammalian Cell
- 3) How Cells Function: Fundamental Concepts of Molecular Biology
- 4) Principles of Cytogenetics
- 5) Recognizing and Classifying Cells
- 6) Morphologic Response of Cells to Injury
- 7) Fundamental Concepts of Neoplasia: Benign Tumors and Cancer

II. Diagnostic Cytology of Organs.

- 1) The Normal Female Genital Tract
- 2) Cytologic Evaluation of Menstrual Disorders and Hormonal Abnormalities
- 3) Benign Disorders of the Uterine Cervix and Vagina
- 4) Squamous Carcinoma of the Uterine Cervix and Its Precursor
- 5) Adenocarcinoma and Related Tumors of the Uterine Cervix
- 6) Proliferative Disorders and Carcinoma of the Endometrium
- 7) Diseases of the Vagina, Vulva, Perineum, and Anus
- 8) Tumors of the Ovary and Fallopian Tube
- 9) Peritoneal Washings or Lavage in Cancers of the Female Genital Tract
- 10) Rare and Unusual Disorders of the Female Genital Tract

- 11) Effects of Therapeutic Procedures on the Epithelia of the Female Genital Tract
- 12) The Lower Respiratory Tract in the Absence of Cancer: Conventional and Aspiration Cytology
- 13) Tumors of the Lung: Conventional Cytology and Aspiration Biopsy
- 14) Epithelial Lesions of the Oral Cavity, Larynx, Trachea, Nasopharynx, and Paranasal Sinuses
- 15) The Lower Urinary Tract in the Absence of Cancer
- 16) Tumors of the Urinary Tract in Urine and Brushings
- 17) The Gastrointestinal Tract
- 18) Effusions in the Absence of Cancer
- 19) Effusions in the Presence of Cancer
- 20) Cerebrospinal and Miscellaneous Fluids
- 21) Techniques of Fine-Needle Aspiration, Smear Preparation, and Principles of Interpretation
- 22) The Breast .
- 23) The Thyroid, Parathyroid, and Neck Masses Other Than Lymph Nodes.
- 24) Lymph Nodes
- 25) Salivary Glands
- 26) The Prostate and the Testis
- 27) The Skin .
- 28) Soft Tissue Lesions.
- 29) Bone Tumors.
- 30) The Mediastinum
- 31) The Liver and Spleen
- 32) The Pancreas
- 33) The Kidneys, Adrenals, and Retroperitoneum
- 34) The Eyelids, Orbit, and Eye
- 35) The Central Nervous System
- 36) Circulating Cancer Cells

III. Techniques in Diagnostic Cytology

1. Laboratory Techniques
2. Immunochemistry and Molecular Biology in Cytological Diagnosis
3. Digital Analysis of Cells and Tissues
4. Flow Cytometry

Transfusion Medicine (Blood Banking)

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

- Basic immunology
- ABO and Rh groups
- Clinical significance of other blood groups
- Transfusion therapy including the use of whole blood and RBC concentrates
- Blood component therapy

- Rationale of pre-transfusion testing.
- Infections transmitted in blood.
- Adverse reactions to transfusion of blood and components
- Quality control in blood bank

Basic Sciences (in relation to Pathology)

a) Immunopathology

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

b) Electron Microscopy

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

c) Enzyme Histochemistry

- 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

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

e) Molecular Biology

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

f) Cytogenetics

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

g) Tissue Culture

- Demonstrate familiarity with methods of tissue culture.

h) Principles of Medical Statistics

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

MICROBIOLOGY SKILLS:

Basic Microbiology	1. Sterilization 2. Disinfection
Handling of specimens,	1. routine culture and sensitivity tests (Gram's stain, ZN stain).
Serology	1. Immunology techniques like VDRL, Widal and Rheumatoid factor, 2. ELISA-for HIV, HBsAg, and HCV

BIOCHEMISTRY:

Basic Biochemistry applied to biochemical investigations.

Handling of photocolometer.

Spectrophotometer

PH-meter

Flame photometer

Blood gas analysers

Autoanalyser

Electrophoresis.

Analytic Techniques and Instrumentation

II. Organ-Based Biochemical Pathophysiology

1. Assessment of Pulmonary Function: Blood Gases and Oxygen Saturation

2. Acid-Base Chemistry, Electrolytes, and Relevant Disorders
3. Assessment of Renal Function
4. . Cardiac Biomarkers for the Assessment of Coronary Artery Diseases
5. Assessment of Liver and Biliary Tract Status
6. Assessment of Thyroid Function
7. Assessment of Pituitary Function
8. Assessment of Adrenal Function
9. Assessment of Reproductive Function, Pregnancy, and Prenatal Testing
10. Assessment of Gastric, Pancreatic, and Intestinal Function
11. Assessment of Glucose and Evaluation of Diabetes Mellitus
12. Assessment of Mineral and Bone Metabolism
13. Assessment of Porphyrins and Disorders of Porphyrin Metabolism
14. Tumor Biomarkers
15. Assessment of Fetal Lung Maturity
16. Trace Element Assessment
17. Vitamin Assessment
18. Cholesterol and Lipid Assessment
19. Serum and Fluid Protein and Amino Acid Assessment

E. TEACHING AND LEARNING METHODS

Post Graduate Training

Teaching methodology

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

Rotation:

Postings to laboratories/assignments

The three-year training programme for the MD degree may be arranged in the form of postings to different assignments/laboratories for specified periods as outlined below.

The period of such assignments/postings is recommended for 35 months. Posting schedules may be modified depending on needs, feasibility and exigencies. For facilities not available in the parent institution as well as for additional knowledge and skill, extramural postings may be undertaken.

Section/Subject Duration in months

1. Surgical Pathology and Autopsy and Pathology Techniques 12

2. Haematology and Laboratory Medicine 10
3. Cytopathology 08
4. Transfusion Medicine/Blood Bank 02
5. Museum techniques and record management 01
6. Basic Sciences including Immunopathology,
7. Electron microscopy, Molecular Biology,
8. Research Techniques and cytogenetics etc 02

Total 35 months

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

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

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

- Postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

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

SUGGESTED TOPICS FOR INTEGRATED TEACHING (POST GRADUATE)

Time limit for integrated teaching 2-4 hours

S.NO	Topic	Subtopic	Integrated disciplines
1	Wound healing	<ul style="list-style-type: none"> • Pathophysiology of wound healing • Clinical features complications management and recent advances in healing of surgical wound • Healing of fracture • Healing of wound & OBGY perspectives 	Pathology Surgery Orthopedics OBGY
2	Cancer of breast	<ul style="list-style-type: none"> • Pathogenesis, Pathology of breast carcinoma • Imaging findings in breast carcinoma • Clinical features ,staging and management of cancer of breast 	Pathology Radiology Surgery
3	Inflammatory bowel disease	<ul style="list-style-type: none"> • Pathogenesis and Pathology of IBD • Clinical features diagnosis surgical management of IBD 	Pathology Surgery
4	Mal absorption syndrome	<ul style="list-style-type: none"> • Physiology of digestion and absorption • Pathology and Pathogenesis of MAS • Biochemical investigations in diagnosis of MAS • Medical management of MAS • Surgical management of MAS 	Physiology Pathology Biochemistry Medicine Surgery
5	Carcinoma of	<ul style="list-style-type: none"> • Aetiopathogenesis of cancer colon 	Pathology Surgery

	colon	<ul style="list-style-type: none"> • Clinical features diagnosis and management of cancer colon 	
6	Periampullary carcinoma	<ul style="list-style-type: none"> • Etiopathogenesis of Periampullary carcinoma • Imaging diagnosis of Periampullary carcinoma • Clinical features diagnosis and management of Periampullary carcinoma 	Pathology Radiology Surgery
7	Diabetes mellitus	<ul style="list-style-type: none"> • Physiology of carbohydrate metabolism • Pathogenesis of DM & its complications • Lab diagnosis of DM • Clinical features diagnosis and management & complications of DM 	Physiology Pathology Biochemistry Medicine
8	Lymphoma / Leukemia	<ul style="list-style-type: none"> • Normal hematopoiesis and lymph node architecture • Classification of lymphoma / Leukemia • Medical management of adult lymphoma / Leukemia • Management of Pediatric lymphoma/Leukemia • Surgical management of lymphoma / Leukemia 	Physiology Pathology Medicine Pediatric Surgery
9	Alcoholic Liver disease	<ul style="list-style-type: none"> • Pathogenesis of Alcoholic liver disease • Clinical features ,laboratory diagnosis &management of Alcoholic liver disease 	Pathology Medicine
10	Viral hepatitis	<ul style="list-style-type: none"> • Pathology of hepatitis etiology & Pathogenesis of infect liver disease • Serological diagnosis of viral hepatitis • Clinical features diagnosis ,complication & management of infective liver disease 	Pathology Microbiology Medicine
11	Hemolytic Anaemia	<ul style="list-style-type: none"> • RBC morphology • Classification & pathology of various hemolytic Anemia • Clinical features diagnosis and management of hemolytic anemia 	Physiology Pathology Pediatrics
12	Endometrial	<ul style="list-style-type: none"> • Physiology of menstrual 	Physiology

	biopsy	<p>cycle</p> <ul style="list-style-type: none"> • Endometrial biopsy interpretation • Causes ,clinical features & management of Abnormal uterine bleeding 	Pathology OBGY
13	Endometriosis	<ul style="list-style-type: none"> • Definition ,etiopathology of endometriosis • Clinical features ,diagnosis & management of endometriosis 	Pathology OBGY
14	Infertility	<ul style="list-style-type: none"> • Physiology of ovulation & spermatogenesis • Causes of male & female infertility • Evaluation & management of a case of female infertility • Evaluation & management of case of male infertility 	Physiology Pathology OBGY Urology
15	Cancer Cervix	<ul style="list-style-type: none"> • Etiopathogenesis & cytological & histological diagnosis of carcinoma of cervix • Clinical features ,diagnosis & management of cancer cervix 	Pathology OBGY
16	Ovarian tumor	<ul style="list-style-type: none"> • Classification & Pathological features of ovarian carcinoma • Clinical features ,diagnosis & management of ovarian cancer 	Pathology OBGY
17	Bone tumors	<ul style="list-style-type: none"> • Classification of bone tumors • Imaging diagnosis of bone tumors • Clinical features diagnosis & management of bone tumors 	Pathology Radiology Orthopaedics
18	Head & Neck Tumors	<ul style="list-style-type: none"> • Classification, etiology & pathogenesis of head & neck Tumors • Clinical features diagnosis & management of head neck tumors 	Pathology ENT
19	Renal function tests	<ul style="list-style-type: none"> • Diagnostic biochemical parameters of renal diseases • Interpretation of clinical pathology tests for renal diseases 	Biochemistry Pathology
20	Liver function test	<ul style="list-style-type: none"> • Interpretation & biochemical workup in liver disorders 	Biochemistry

		<ul style="list-style-type: none"> • Serological tests for liver disorders • Interpretation , correlation of biochemistry & serological tests for diagnosis of liver disorders 	Microbiology Pathology
21	Thyroid function test	<ul style="list-style-type: none"> • Physiology of thyroid hormone secretion • Biochemical test for diagnosis of thyroid diseases • Interpretation , correlation of biochemical tests for diagnosis of thyroid disorders 	Physiology Biochemistry Pathology
22	HIV & AIDS	<ul style="list-style-type: none"> • Biology of HIV virion • Epidemiology of HIV infection • Pathogenesis & Pathology of HIV infection • Clinical feature diagnosis & management of AIDS 	Microbiology Community Medicine Pathology Medicine
23	Malaria	<ul style="list-style-type: none"> • Life cycle of malarial parasite • Pathogenesis & Pathology of malarial infection • Clinical features ,diagnosis & management of malaria 	Microbiology Pathology Medicine
24	Hospital Acquired infection	<ul style="list-style-type: none"> • Aetiology of Hospital acquired infections • Pathology & Pathogenesis Hospital acquired infections • Management hospital acquired infections 	Microbiology Pathology Community Medicine
25	Drug toxicity	<ul style="list-style-type: none"> • Pathogenesis of drug (injury) toxicity • Lab tests and diagnosis of drug injury 	Pharmacology Pathology
26	Metabolic Syndromes	<ul style="list-style-type: none"> • Physiology of fat metabolism • Pathology of obesity • Biochemical diagnostic tests for obesity • Clinical features,diagnosis & management of childhood obesity • Clinical features,diagnosis & management of adult obesity 	Physiology Pathology Biochemistry Pediatrics Medicine
27	Brain Lesions	Pathogenesis ,classification of brain lesions	<ul style="list-style-type: none"> • Pathology (-

		Clinical features & diagnosis	Squash cytology, frozen & HPR correlation) Neurosurgery
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F. Monitoring & Assessment Methodology:

FORMATIVE ASSESSMENT, ie., during the training

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

General Principles

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

Quarterly assessment during the MD training should be based on:

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

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

Log books should be maintained to record the work done which shall be checked and assessed periodically by the faculty members imparting the training.

G. SUMMATIVE ASSESSMENT / University Examination

ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in Postgraduate medical education regulations, 2000.

Post Graduate Examination

The Post Graduate examination shall be in three parts:-

1. Thesis:

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and

submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. THEORY :

There shall be four question papers, each of three hours duration. Each paper shall consist of TWO questions each carrying 20 marks & SIX questions of 10 marks each.

Total marks for each paper will be 100.

Paper I – General Pathology - 100 Marks

Paper II – Haematology/Clinical Pathology/Cytology - 100 Marks

Paper III – Systemic Pathology - 100 Marks

Paper IV – Recent advances in pathology - 100 Marks

3. PRACTICAL: (2 DAYS)

DAY 1:

- a. Haematology and clinical pathology
 - (i) Clinical case/History/clinical data discussion - 20 Marks
 - (ii) Haematology exercise including Blood Banking - 30 Marks
- b. Autopsy/Reconstructed autopsy (organ systems) - 40 Marks
- c. Gross/morbid Anatomy - 10specimens - 30Marks
- d. Haematology & Cytology slides – 7+8 slides - 60 Marks
- e. Lecture topic allotment

DAY 2:

- 1.Histopathological Techniques: - 20 Marks
 - 1. Staining - H & E
 - 2. Special stain (1 out of panel of 8 special stains)
 - 3. Cytology stain 1 out of panel of 4 special stains)
- 2. Histopathology slides - 20 slides -80 Marks
(Autopsy final report)
- 3.Basic sciences: Ten spots -20Marks

A. VIVA VOCE

1. Viva-Voce examination - 80 Marks
(Students will be examined by all the examiners together about students comprehension, analytical approach, expression and interpretation of data. Student shall also be given case reports, charts for interpretation. It includes discussion on dissertation)
2. Pedagogy Exercise (presentation for 10 minutes) - 20 Marks

Maximum marks for M.D. (Pathology)	Theory	Practical	Viva	Total	
	400	300	100	800	

Final marking scheme for MD examination in Pathology

Heads of Passing	'Maximum Marks'	Minimum marks for passing
Theory	400	200
Practical	300	150
Viva	100	50
Total marks	800	400

I. Clinical Pathology:

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

II. Haematology:

- Discuss haematology cases given the relevant history. Plan relevant investigations
- Perform complete hemogram and at least two tests preferably including one coagulation exercise
- Identify electrophoresis strips, osmotic fragility charts etc. Interpretation of data from autoanalysers, HPLC and flow cytometry. Examine, report and discuss around seven cases given the history and relevant blood smears and/or bone marrow aspirate smears and bone marrow biopsy interpretation.

III. Transfusion Medicine:

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

IV. Histopathology:

- Examine, report and discuss 20 cases histopathology and 8 cytopathology cases, given the relevant history and slides.
- Perform a Haematoxylin and Eosin stain and any special stain on a paraffin section. Should be conversant with histopathology techniques including cryostat.

V. Autopsy:

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

VI. Gross Pathology

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

VII. Basic Sciences:

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

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

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

- a) Viva on dissertation and research methodology
- b) General Viva-Voce

RECOMMENDED TEXT BOOKS AND JOURNALS:

BOOKS (Latest edition)

1. Cotran, Kumar, Robbins. **Pathologic Basis of Disease**, Published by W.B. Saunders & Company. Also available in PRISM Indian Edition.
2. John. M. Kissane Edited, **Anderson's Pathology**, Published by C.V. Mosby Company.
3. J.B. Walter, M.S. Israel. **General Pathology**, Published by Churchill Livingstone.
4. Edited by Jaun Rosai. **Ackerman's Surgical Pathology**, Published by C.V. Mosby company.
5. Walter F Coalson. **Surgical Pathology**, Published by Lippincott.

6. Enzinger and Weiss. **Soft Tissue Tumours**, Published by B.I. Publications (India) C.V. Mosby company.
7. Stacey .E. Millis. **Sternbergs Diagnostic pathology**.Published by Jaypee brothers medical publishers.
8. WF Lever – GS Lever.**Histopathology of the skin**, Published J.B. Lippincott Company.
9. Robert j. Kurman. **Blausteins pathology of female genital tract**.Published by Spinger-verley. Newyork Inc.
10. Leopold G Koss. **Diagnostic Cytology And Its Histopathologic Basis**, Published by JG. Lippincott Company.
11. Marluce Bibbo. **Comprehensive Cytopathology** Published by W.B Saunders and Company.
12. Winnifred Grey Edited, **Diagnostic Cytopathology**, Published Churchill Livingstone.
13. Orell, Sterrett, Walters & Whittaker. **Fine Needle Aspiration Cytology (Manual & Atlas)**, Published by Churchill Livingstone.
14. Daniel M Knowles Edited. **Neoplastic Haematopathology**, Published by Williams & Wilkins.
15. Maxwell M Wintrobe. **Clinical Haematology**, Published by K.M. Varghese & Company.
16. Shirlyn B. Mekenzie. **Clinical Laboratory Haematology**. Published by Julie Levin alekander IARC press.
17. A Victor Hoffbrands , John E.Petit. **Clinical Haematology**. Published by Churchill Living stone.
18. De Gruchy's, Edited by Firkin, Chesterman, Penington & Rush. **Clinical Haematology In Medical Practice**, Published by Oxford University Press.
19. Todd, Sanford, Davidson Edited. **Clinical Diagnostis and Management By Laboratory Methods**, Published by W.B. Saunders and Company.
20. Jacques Wallach M.D. **Interpretation of Diagnostic tests**.Published by Walters Kumar(Ind) Pvt. Limited.
21. Dr. Shameem Sharif Edited. **Surgical Pathology and Laboratory Techniques**, Published by Prism publications.
22. Christopher D.M. Fletcher Edited. **Diagnostic Histopathology of Tumors Vol.1 & 2**, Published by Churchill Livingstone.
23. Blue book series. **WHO Classification of tumors**. Published by WHO press, Geneva.
24. Pattern recognition series. **Practical breast pathology**. Published by Elsevier Saunders
25. A volume in the series Foundations in diagnostic pathology. **Gastrointestinal and liver pathology**. Published by Elsevier Saunders.
26. Susan C. Lester. **Manual of surgical pathogy**. Published by Elsevier Saunders
27. Dabbs. **Diagnostic immunohistochemistry**
28. Guy orchard & Brian Nation. **Histopathology**. Published by Oxford university press.
29. Richard L. Kradin. **Diagnostic Pathology of infectious diseases**. Published by Elsevier Saunders.

30. Crum. Nucci. Lee. Diagnostic Gynecologic and Obstetric Pathology. Published by Elsevier Saunders
31. Enid Gilbert-Barness. **Potters Pathology of fetus, infant and child.** Published by Elsevier.
32. Harrison's, **Principles and practice of internal medicine**
33. Koss **Diagnostic Cytology Its Histopathologic Bases**
34. Marluce bibbo- **Comprehensive cytopathology**
35. Orell and sterrett's **Fine needle aspiration cytology**
36. Pranab dey **Diagnostic cytology**
37. Edmund S.Cibas – **Cytology diagnostic principles and clinical correlates**
38. Ritu Nair- **Bethesda system for reporting cervical cytology**

JOURNALS:

1. **Haematology/Oncology Clinics of North America.** Published by W.B. Saunders and company.
2. **Histopathology.** Journal of the British division of the international academy of pathology published by Blackwell Science.
3. **The American Journal of Surgical Pathology.** Published by Lippincott –Raven.
4. **American journal of clinical pathology.**Published by Pool Press Inc.
5. **Acta Cytologica.** The journal of Clinical cytology and cytopathology.
6. **Archives of Pathology and Laboratory medicine.** Published by the American Medical Association.
7. **The Indian Journal of Cancer.** Published by Indian Cancer Society.
8. **Indian journal of pathology and microbiology.** Published by Medknow.Ghatkopar Mumbai.
9. **Indian Journal of Cytology.** Published by Medknow. Ghatkopar Mumbai.
10. **Human Pathology.** Published by W.B. Saunders Company.



BLDE (Deemed to be University)

Shri B M Patil Medical college Hospital & Research Center, Vijayapura

FORMATS

MODEL CHECK-LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl. No.	Items for observation during presentation	Poor 1	Average 2	Good 3	Excellent 4
1.	Article Chosen was				
2.	Extent of understanding of scope & objectives of the paper by the candidate				
3.	Whether cross references have been consulted				
4.	Whether other relevant publications consulted				
5.	Ability to respond to questions on the paper / subject				
6.	Audio-Visual aids used				
7.	Ability to defend the paper				
8.	Clarity of presentation				
9.	Any other observation				
	Total Score				



BLDE (Deemed to be University)

**Shri B M Patil Medical college Hospital & Research Center, Vijayapura
Check List – II**

**MODEL CHECK-LIST FOR EVALUATION OF SEMINAR
PRESENTATIONS**

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl. No	Items for observation during presentation	Below Average 1	Average 2	Good 3	Very Good 4
1.	Whether other relevant publications consulted				
2.	Whether cross references have been consulted				
3.	Completeness of Preparation				
4.	Clarity of Presentation				
5.	Understanding of subject				
6.	Ability to answer questions				
7.	Time scheduling				
8.	Appropriate use of Audio-visual aids				
9.	Any other observation				
	Total Score				



Check List – III

MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACTICE

Sl. No.		Strong Point	Weak Point
1.	Communication of the purpose of the talk		
2.	Evokes audience interest in the subject		
3.	The introduction		
4.	The sequences of ideas		
5.	The use of practical examples and/or illustrations		
6.	Speaking style (enjoyable, monotonous, etc., specify)		
7.	Attempts audience participation		
8.	Summary of the main points at the end		
9.	Asks questions		
10.	Answers questions asked by the audience		
11.	Rapport of speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses AV aids appropriately		



Check List – IV

MODEL CHECK LIST FOR DISSERTATION SYNOPSIS PRESENTATION

Name of the Student:

Name of the Faculty:

Date:

Sl. No	Points to be considered	Poor	Below Average 1	Average 2	Good 3	Very Good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide & Other faculty					
4.	Quality of Protocol					
5.	Preparation of proforma					
	Total Score					



Check List - V

CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO-GUIDE

Name of the Student:

Name of the Faculty:

Date:

Sl. No	Items for observation during presentation	Below Average 1	Average 2	Good 3	Very Good 4
1.	Periodic consultation with guide/co-guide				
2.	Regular collection of case material				
3.	Depth of analysis / discussion				
4.	Departmental presentation of findings				
5.	Quality of final output				
6.	Others				
	Total Score				



Check List – VI

Postgraduate Students Appraisal Form

Name of the Department/Unit:

Name of the PG Student:

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

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

Publications Yes/ No

Remarks* _____

*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned.

For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE of ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATURE OF HOD



LOGBOOK

LOGBOOK: Table 1: Academic activities attended

Name:

Admission year:

College:

Date	Type of Activity Specify Seminar, Journal Club, Presentation, UG teaching	Particulars



LOG BOOK: Table 2: Academic presentations made by the student

Name:

Admission Year:

College:

Date	Topic	Type of Presentation Specify Seminar, Journal Club, Presentation, UG teaching Etc.



LOG BOOK: Table 3: Diagnostic procedures performed

Name:

Academic Year:

College:

Date	Name	ID No.	Procedure	Category O, A, PA, PI*

- * **Key:**
- O –observed
 - A – Assisted a senior faculty
 - PA – Performed procedure under the direct supervision of a Senior faculty
 - PI – Performed independently



Model Overall Assessment Sheet

Name of the College:

Academic Year:

Sl. No.	Faculty Member & Others	Name of Student and Mean Score									
		A	B	C	D	E	F	G	H	I	J
1.											
2.											
3.											
4.											
5.											
Total Score											

Note: Use separate sheet for each year.

SECTION - IV**MEDICAL ETHICS & MEDICAL EDUCATION****Sensitization and Practice****Introduction**

There is now a shift from the traditional individual patient, doctor relationship, and medical care. With the advances in science and technology and the needs of patient, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal (i), General Objectives (ii) stated in Chapter II (pages 2.1 to 2.3), and develop human values it is urged that **ethical sensitization** be achieved by lectures or discussion on ethical issues, clinical case discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentations, bedside rounds and academic postgraduate programs.

Course Contents

1. Introduction to Medical Ethics

What is Ethics?

What are values and norms?

Relationship between being ethical and human fulfillment

How to form a value system in one's personal and professional life

Heteronomous Ethics and Autonomous Ethics

Freedom and personal Responsibility

2. Definition of Medical Ethics

Difference between medical ethics and bio-ethics

Major Principles of Medical Ethics 0

Beneficence = fraternity

Justice = equality

Self determination (autonomy) = liberty

3. Perspective of Medical Ethics

The Hippocratic Oath

The Declaration of Helsinki

The WHO Declaration of Geneva

International code of Medical Ethics (1993)

Medical Council of India Code of Ethics

4. Ethics of the Individual
 - The patient as a person
 - The Right to be respected
 - Truth and confidentiality
 - The autonomy of decision
 - The concept of disease, health and healing
 - The Right to health
 - Ethics of Behavior modification
 - The Physician – Patient relationship
 - Organ donation

5. The Ethics of Human life
 - What is human life?
 - Criteria for distinguishing the human and the non-human
 - Reasons for respecting human life
 - The beginning of human life
 - Conception, contraception
 - Abortion
 - Prenatal sex-determination
 - In vitro fertilization (IVF), Artificial Insemination by Husband (AIH)
 - Artificial Insemination by Donor (AID)
 - Surrogate motherhood, Semen Intra fallopian Transfer (SIFT),
 - Gamete Intra fallopian Transfer (GIFT), Zygote Intra fallopian Transfer (ZIFT),
 - Genetic Engineering

6. The family and society in Medical Ethics
 - The Ethics of human sexuality
 - Family Planning perspectives
 - Prolongation of life
 - Advanced life directives – The Living Will
 - Euthanasia
 - Cancer and Terminal Care

7. Profession Ethics
 - Code of conduct
 - Contract and confidentiality
 - Charging of fees, Fee-splitting
 - Prescription of drugs
 - Over-investigating the patient
 - Low – Cost drugs, vitamins and tonics
 - Allocation of resources in health cares
 - Malpractice and Negligence

8. Research Ethics
 - Animal and experimental research / humanness
 - Human experimentation
 - Human volunteer research – Informed Consent
 - Drug trials\
 - ICMR Guidelines for Ethical Conduct of Research – Human and Animal
 - ICH / GCP Guidelines
 - Schedule Y of the Drugs and Cosmetics Act.

9. Ethical work -up of cases
 - Gathering all scientific factors
 - Gathering all human factors
 - Gathering value factors
 - Identifying areas of value – conflict, setting of priorities,
 - Working our criteria towards decisions

Recommended Reading

1. Francis C. M., **Medical Ethics**, 2nd Ed, 2004 Jaypee Brothers, Bangalore/-
2. Ethical guidelines for biomedical research on human participants, ICMR publication 2017
3. Santosh Kumar: the elements of research, writing and editing 1994, Dept of Urology, JIPMER, Pondicherry
4. Srinivas D.K et al, Medical Education Principles and Practice, 1995, National Teacher Training Centre, JIPMER, Pondicherry
5. Indian National Science Academy, Guidelines for care and use of animals in scientific Research, New Delhi, 1994
6. International committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991
7. Kirkwood B.R, Essentials of Medical Statistics, 1st Ed., Oxford: Blackwell Scientific Publications 1998
8. Mahajan B.K. Methods in bio statistics for medical students, 5th Ed, New Delhi, Jaypee, Brothers Medical Publishers, 1989
9. Raveendran, B. Gitanjali: A Practical approach to PG dissertation, New Delhi, Jaypee Publications, 1998.
10. John A Dent. Ronald M Harden, A Practical guide for medical teacher, 4th Edition, Churchill Livingstone, 2009.
11. Tejinder Singh Anshu, Principles of Assessment in Medical Education, Jaypee brothers
12. Dr. K.Lakshman, A Hand Book on Patient Safety, RGUHS & Association of Medical Consultants, 2012

13. Bernard Mogs, Communication skills in health & social care, 3rd Edition, (S) SAGE, 2015
14. Manoj Sharma, R. Lingyak Petosa, Measurement and Evaluation for Health Educators, Jones & Bartlett Learning.
15. David E. Kern, Patricia A, Thomas Mark T, Hughes, Curriculum Development for Medical Education. A six-step approach, The Johns Hopkins University press/Baltimore.
16. Tejinder Singh Piyush Gupta Daljit Singh, Principles of Medical Education (Indian Academy of Paediatrics), 4th Edition, Jaypee Brothers, 2013.
17. Robert Reid, Torri Ortiz Linenemann, Jessica L.Hagaman, Strategy Instruction for Students with learning disabilities, 2nd Edition, The Guilford Press London.
18. Lucinda Becker Pan Demicolo, Teaching in higher education, (S) SAGE, 2013.
19. C.N. Prabhakara, Essential Medical Education (Teachers Training), Mehta publishers.
20. Tejinder Singh Piyush Gupta, Principles of Evaluation & Research for health care programmes, 4th Edition, IAP National Publication House (Jaypee Brothers).
21. R.L.Bijlani, Medical Research, Jaypee Brothers, 2008
22. Stephen Polgar Shane A Thomas, Introduction to Research in the Health Sciences, Churchill Livingstone Elsevier, 2013.
23. Amar A,Sholapurkar. Publish & Flourish -A practical guide for effective scientific writing, Jaypee Brothers, 2011
24. Charles R.K.Hind, Communication Skills in Medicine, BMJ, 1997.