MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

## Super Specialty Courses

# SYLLABUS
# DM – ONCO-PATHOLOGY (DM14)

NO CHANGE FOR 2023-24

**Edition 2022-23**

Principal & Controller
Mahatma Gandhi Medical College & Hospital
Sitapura, JAIPUR

Abha Mathur

Dr. Abha Mathur
Professor & Head
Dept.of Onco-Pathology
MGMC&H, Sitapura, Jaipur-302022
RMC-8749

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**Notice**

1. Amendment made by the National Medical Commission (NMC) in Rules/Regulations of Post Graduate Medical Courses shall automatically apply to the Rules/Regulations of the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST), Jaipur.
2. The University reserves the right to make changes in the syllabus/books/guidelines, fees-structure or any other information at any time without prior notice. The decision of the University shall be binding on all.
3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.



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## Syllabus of DM / M.Ch. Courses

## DM IN ONCO - PATHOLOGY

### SELECTION OF CANDIDATES:

There shall be a uniform entrance examination to all medical educational institutions at the Postgraduate level namely 'National Eligibility-cum-Entrance Test' for admission to postgraduate courses in each academic year and shall be conducted under the overall supervision of the Ministry of Health & Family Welfare, Government of India.

In order to be eligible for admission to Postgraduate Course for an academic year, it shall be necessary for a candidate to obtain minimum of marks at 50$^{th}$ percentile in the 'National Eligibility-Cum-Entrance Test for Postgraduate courses' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, and Other Backward Classes, the minimum marks shall be at 40$^{th}$ percentile. In respect of candidates with benchmark disabilities specified under the Rights of Persons with Disabilities Act, 2016, the minimum marks shall be at 45$^{th}$ percentile for General Category and 40$^{th}$ percentile for SC/ST/OBC.

The percentile shall be determined on the basis of highest marks secured in the All India Common merit list in National Eligibility-cum-Entrance Test for Postgraduate courses.

Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to Postgraduate Courses, the Central Government in consultation with Medical council of India may at its discretion lower the minimum marks required for admission to Post Graduate Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the academic year only.

The reservation of seats in Medical Colleges/institutions for respective categories shall be as per applicable laws prevailing in States/Union Territories. An all India merit list as well as State-wise merit list of the eligible candidates shall be prepared on the basis of the marks obtained in National Eligibility-cum-Entrance Test and candidates shall be admitted to Postgraduate Courses from the said merit lists only.

There shall be no admission of students in respect of any academic session beyond 31$^{st}$ August



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under any circumstances. The Universities shall not register any student admitted beyond the said date.

**ELIGIBILITY:**

Candidates must meet the eligibility criteria required to get admission to DM courses through NEET-SS.

**Common Counseling:**

There shall be a common counseling for admission to all Postgraduate Super specialty Courses (DM/ M.Ch.) in all Medical Educational Institutions on the basis of merit list of the National Eligibility-cum-Entrance Test.

**Period of Training:**

The period of training for obtaining DM/M.Ch Degrees shall be three completed years including the examination period.

**Migration:**

Under no circumstance, Migration/transfer of student undergoing any Super Specialty course shall be permitted by any University/ Authority.

**Staff - Faculty:**

Only those teachers who possess 6 years teaching experience out of which at least 2 years teaching experience as Assistant Professor gained after obtaining the higher specialty degree shall be recognized post graduate teacher.

No teacher shall be considered as a postgraduate teacher in any other institution during the period till the postgraduate course at the institute which has been granted permission considering him as a postgraduate teacher is recognized u/s 11(2) of the Indian Medical Council Act, 1956.

**Minimum staff required (Super-specialty):**

1- Professor

1- Associate Professor

1- Assistant Professor

1- Senior Resident

**DM ONCO –PATHOLOGY**



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2- Junior Resident

**Training Programme:**

All the candidates joining the Post Graduate training programme shall work as 'Full Time Residents' during the period of training and shall attend not less than 80% (Eighty percent) of the imparted training during each academic year (Academic Term of 6 months) including assignments, assessed full time responsibilities and participation in all facets of the educational process.

No candidate shall be permitted to run a clinic/work in clinic/laboratory/nursing home while studying postgraduate super specialty course. No candidate shall join any other course or appear for any other examination conducted by this university or any other university in India or abroad during the period of registration.

Every institution undertaking Post Graduate training programme shall set up an Academic cell or a curriculum committee, under the chairmanship of a senior faculty member, which shall work out the details of the training programme in each specialty in consultation with other department faculty staff and also coordinate and monitor the implementation of these training Programmes.

The training programmes shall be updated as and when required. The structured training programme shall be written up and strictly followed, to enable the examiners to determine the training undergone by the candidates and the Medical Council of India inspectors to assess the same at the time of inspection.

Students shall maintain a record (log) book of the work carried out by them and the training programme undergone during the period of training.

The Record (Log) Books shall be checked and assessed periodically by the faculty members imparting the training.

During the training for award of Degree / Super specialty in clinical disciplines, there shall be proper training in Basic medical sciences related to the disciplines concerned; so also in the applied aspects of the subject; and allied subjects related to the disciplines concerned. In the Post Graduate training programmes including both Clinical and Basic medical sciences, emphasis has to be laid on Preventive and Social aspects. Emergency services, facilities for Autopsies, Biopsies, Cytology,



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Endoscopy and Imaging etc. shall also be made available for training purposes.

The Post Graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

Training in Medical Audit, Management, Health Economics, Health Information System, basics of statistics, exposure to human behavior studies, knowledge of pharmaco – economics and introduction to nonlinear mathematics shall be imparted to the Post Graduate students.

The teaching and training of the students shall include graded responsibility in the management of patients entrusted to their care; participation in Seminars, Journal Clubs, Group Discussions, Clinical Meetings, Grand Rounds, and Clinico-Pathological Conferences; practical training in Diagnosis and Medical and Surgical treatment; training in the Basic Medical Sciences, as well as in allied clinical specialties.

The training programme shall be on the same pattern as for M.D. / M.S. in clinical disciplines; with practical training including advanced Diagnostic, Therapeutic and Laboratory techniques, relevant to the subject of specialization. Postgraduate Super specialty Residents in Surgical Specialties shall participate in surgical operations as well.

A postgraduate student of a postgraduate degree course in super specialties 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.

**ENROLLMENT AND REGISTRATION:**

Every candidate who is admitted to DM/MCh. course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled and registered with the Mahatma Gandhi University of Medical Sciences & Technology (**MGUMST**) after paying the prescribed eligibility and enrolment fees.

The candidate shall have to submit an application to the MGUMST through Principal of College for the enrolment/eligibility along with the following original documents and the prescribed fees within two months of the last date of admission to the respective program without late fees. Then after,



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students will have to pay applicable late fees as per prevailing University Rules.

(a) MD/MS pass Marks sheet/Degree certificate issued by the University.

(b) Migration certificate issued by the concerned University (in case the University is other than the MGUMST).

(c) Date of Birth Certificate

(d) Certificate regarding registration with Rajasthan Medical Council / Medical Council of India / Other State Medical Council.

No candidate shall be allowed to appear in University examination without his/her enrolment with the University

**SCHEME OF EXAMINATIONS:**

The examination shall be held at the end of three academic years (six academic terms). The academic term shall mean six months training period. The examination shall consist of: Theory and Clinical/Practical and Oral.

The examinations shall be organized on the basis of 'Marking system' to evaluate and to certify candidate's level of knowledge, skill and competence.

For passing DM/M.Ch. examination as a whole, a candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Clinical / Practical and Oral examination.

(1) **Theory:**

There shall be four theory papers of 3 hours duration and 100 marks each. The theory examination shall be held in advance before the Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination.

Paper I and II will be set by one external examiner from outside of the state and paper III and IV by another external examiner from outside of the state. The external examiner, who is paper setter for paper I & II shall evaluate the answer books of paper II. The external examiner, who is paper setter for paper III & IV shall evaluate the answer books of paper III. The answer books of paper I & IV shall be evaluated by internal examiners. The answer books of paper IV shall be evaluated by the Head of the Department and the answer books of paper I shall be evaluated by



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the second Internal Examiner.

Candidates will be required to attempt all the questions in every question paper. In Paper I, Paper II and Paper III there will be 10 questions. Each question shall carry 10 marks. In Paper IV there will be 5 questions of 20 marks each.

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers shall be compulsory to pass the examination.

The paper wise distribution of the Theory Examination shall be as follows:

| | |
|---|---|
| **Paper I:** | Basic Sciences and Principles of Laboratory Techniques |
| **Paper II:** | Systemic Onco-Pathology I |
| **Paper III:** | Systemic Onco-Pathology II |
| **Paper IV:** | Recent advances in Onco-Pathology |

(2) **Practical and Oral:**

Practical/viva examination shall be conducted to test / aimed at assessing the knowledge and competence of the candidate for undertaking independent work as a specialist / teacher. Practical examination shall consist of gross examination of surgical specimen, reporting of histopathology, hematopathology and Cytopathology slides, synoptic pathology reporting and interpretation of molecular pathology. Oral/viva examination may be comprehensive enough to test the candidate's overall knowledge and competence about the subject, investigative procedures, and other aspects of the specialty, which shall form a part of the examination.

Obtaining of 50% marks in Clinical / Practical and Oral examination shall be mandatory for passing the Clinical / Practical and Oral examination

Maximum Marks: 400.

**Result:**

For passing DM/M.Ch. Examination, a candidate will be required to obtain at least 40% marks in each theory paper, 50% marks in the aggregate of all the four theory papers and 50% marks in the aggregate of Clinical / Practical and Oral examination separately. A candidate failing in any theory



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paper or in the aggregate of all four theory papers or Clinical / Practical and Oral examination shall have to repeat the whole DM/M.Ch. examination.

**Grace Marks:**

No grace marks will be provided in DM/M.Ch. examinations.

**Re-Evaluation / Scrutiny:**

No Re-evaluation shall be permitted in the DM/M.Ch. examinations. However, the student can apply for scrutiny of the answer books as per University Rules

**Examiners:**

As per the Amendment Notification of the MCI dated June 5, 2017, no person shall be appointed as an internal examiner in any subject unless he/she has three years experience as recognized PG teacher in the concerned subject. For external examiners, he/she should have minimum six years of experience as recognized PG teacher in the concerned subject.

For all Post Graduate Super specialties examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be External Examiners, who shall be invited from other recognized universities from outside the State.

**Number of Candidates:**

The maximum number of candidates to be examined in Clinical / Practical and Oral on any day shall not exceed three for D.M./M.Ch. Examinations.

**Number of Examinations:**

The university shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.



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## GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR DM ONCO-PATHOLOGY

**Preamble**

Cancer is the major cause of morbidity and mortality worldwide. The super specialty course in Onco-Pathology is intended to produce a well informed and trained specialist who can diagnose and categorize malignancy.

Oncopathologist has the definitive role in cancer diagnosis. No matter how high the index of clinical suspicion, the diagnosis of cancer is not conclusively established nor safely assumed in the absence of tissue diagnosis. With few exceptions definitive therapy for cancer is not undertaken in the absence of tissue diagnosis. Apart from surgical specimens oncopathologist also deals with other types of samples such as blood, bone marrow and various cytological specimens to detect malignancy.

It is the task of oncopathologist to provide an accurate, specific and sufficiently comprehensive diagnosis to enable the clinician to develop an optimal plan of treatment and to some extent possible estimate prognosis. Cancer is not a single disease. There are hundreds of distinct varieties of cancer, each with a characteristic biology. The tremendous advancement in all fields of oncology require a great deal of additional information, and nearly every case in fact requires a fuller understanding of patient's particular tumor to allow the most appropriate classification for therapeutic intervention, prognosis and for research. Details of the type and origin of tumor, its differentiation, and level of invasion, the number of lymph nodes with or without metastasis, presence or absence of hormone receptors, ploidy, mitosis and percent of cells in S phase may be relevant in pathologic assessment of neoplasia. Molecular pathology is also used for example to detect expression of specific tumor genes or gene mutations by polymerase chain reaction.

Some of the important highlights are:

1-The super specialty course in Onco-Pathology is intended to produce a well informed and trained specialist who can diagnose and categorize malignancy based on recent molecular



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classification and do Synoptic Pathology Reporting according to latest edition of AJCC and CAP guidelines

2- Intra operative frozen section consultation

3- Confidant synoptic reporting of hematological malignancies

4- Reporting of positive as well as negative fluid cytology

5- Pap smear cytology evaluation according to Bethesda system

6- Performing routine, ultrasound and CT guided fine needle aspiration cytology and reporting as per protocol of the organ

7- Use of latest technology eg IHC, FISH, TMA, PCR and NGS

8-Trained manpower in this super specialty will pave the way of dedicated research that can be applied for understanding the cause, predisposing factors, treatment and prevention of cancer matching global levels

## SUBJECT SPECIFIC OBJECTIVES

**Theoretical Knowledge:**

- Understanding of basic sciences relevant to this specialty
- Quality assurance in Onco-Pathology
- Epidemiology and molecular pathogenesis of cancer
- Carcinogenesis
- Clinical aspects of neoplasia
- Diagnostic criteria, grading and staging of all types of malignant tumors
- Ancillary Techniques used in diagnosis, prognostication and for target therapy
- Cancer cytogenetic
- Tumor immunology
- Hematological malignancies- Peripheral blood smear, Bone marrow immunophenotyping, cytogenetic and molecular genetics findings in various hematological malignancy.
- Cytopathology of various organs, both aspiration and exfoliative cytology



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**Practical skills:**

- Taking a proper clinical history and examination of the patient
- Grossing of all surgical specimens as per protocol
- Tissue processing, paraffin block preparation, routine staining, special stains and overall management of laboratory
- Immunohistochemistry procedure and interpretation
- Diagnose and categorize malignancy based on recent molecular classification and synoptic pathology reporting
- Preparation of frozen section and consultation
- Perform essential cytologic procedures like FNAC of superficial lumps, ultrasound and CT guided FNAC, staining of FNAC and reporting as per protocol of organ
- Preparation and staining of exfoliative cytology, and reporting of positive and negative cytological smears
- Reporting of Pap smear
- Bone marrow aspiration, biopsy and other relevant tests in hematology lab and cytochemistry
- Confidant, comprehensive synoptic reporting of hematological malignancies and integration of reports of immunophenotyping, cytogenetic and molecular genetics etc
- Conversant with principle, steps and interpretation of molecular diagnostic techniques for eg FISH, TMA, PCR and NGS etc

**Writing Research articles:** The candidate should complete two research projects duly cleared by Ethics Committee. Both the research projects should be published/ accepted for publication as original articles in indexed journals or approved as certified by two external reviewers before appearing for final theory exit examination.

**Attitudes including communication skills:** Communication skills with the patients are paramount and trainees are expected to master this during their training period. Regular academic presentations in the teaching programs should help the trainees to develop scientific communicative skills. With round the year presentations in the teaching programs the trainee



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should develop communicative and research skills.

**Training in Research Methodology:** In house research methodology training will be provided for the trainees from time to time. They should attend workshops/ courses outside the working institution. Importantly courses in biostatistics and ethics should be mandatory.

## SUBJECT SPECIFIC COMPETENCIES

At the end of the course, the student should be able to acquire the following competencies under the three domains:

**Cognitive domain (Knowledge domain)**

By the end of the course the DM candidate should have

- Understanding of basic sciences relevant to this specialty
- Should be encompassing skills to achieve precise diagnosis, grading and staging of cancer and also in predicting response to certain targeted therapies
- Knowledge of Hematological malignancies
- Use of newer molecular techniques to precisely diagnose malignancy
- should develop ability in advancing the field by participating in research
- Should be competent enough to impart training and education.

**Affective domain (Attitudes including Communication and Professionalism)**

The DM candidate

- Should become confident communicators and should be well accomplished professionals.
- Should be ready to deliver the knowledge received by them during the course.
- Should have developed skills to debate, deliver scientific lecture, participate in panel discussions, and hold group discussions.
- 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.
- 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.

- 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.

**Psychomotor Domain (subject specific practice based or practical competencies)**

**Histopathology**

- A student should be able to perform a systematic gross examination of the tissues as per protocol.
- Routine staining of paraffin sections and other special stains needed for diagnosis.
- A student should be able to do Immunohistochemistry on tissue sections and interpret.
- A DM student should diagnose and categorize malignancy based on recent molecular classification and do Synoptic pathology reporting according to latest edition of AJCC and CAP guidelines
- Cut frozen section using cryostat, stain and do consultation.

**Cytopathology**

- Be able to perform routine and guided fine needle aspiration, make good quality smears, stain the smears and report aspiration cytology as per protocol of organ.
- Prepare and stain smears of body fluids. Reporting of positive as well as negative fluid cytology
- Pap smear reporting

**Hematopathology**

- Blood smear and bone marrow staining, Cytochemical characterization of leukemia with special stains like Peroxidase, PAS, Sudan Black etc
- Immunophenotyping using flowcyometry
- Confidant synoptic reporting of hematological malignancies with integration of Peripheral smear, Bone marrow, Immunophenotyping, Cytogenetic and Molecular genetic findings in various hematological malignancy

**Molecular Pathology.**

- Should be conversant with principle, steps and interpretation of molecular techniques for eg, TMA FISH, PCR and NGS etc.



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# Syllabus

## Course contents:

The study of subject includes all aspects of Onco- pathology. Only broad outline is provided here. The student should acquire knowledge in the following areas:

## PAPER I

## BASIC SCIENCES AND PRINCIPLES OF LABORATORY TECHNIQUES

### BASIC SCIENCES:

- Cell injury and cell death
- Cellular adaptation
- Tissue renewal and repair
- Etiology of cancer
- Carcinogenesis, Molecular basis of cancer
- Clinical features of neoplasia
- Epidemiology and role of registries
- Early detection of cancer and screening programs
- Tumor immunity
- Hereditary cancers and familial cancer syndromes
- Quality assurance in Onco-Pathology
- Genomics and Proteomics

### LABORATORY TECHNIQUES:

- Basic Techniques relevant to Onco- Pathology
- Exfoliative Cytology and Aspiration Cytology
- Liquid Based Cytology
- Immunohistochemistry
- Flowcytometry
- Cytogenetics
- Molecular Pathology:



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- Tissue Microarray (TMA)
  - Fluorescent in-situ hybridization (FISH)
  - Polymerase chain reaction (PCR)
  - Next Generation Sequencing (NGS)
  - Other ancillary techniques

## PAPER II

## SYSTEMIC ONCO-PATHOLOGY I

TUMORS OF –

- Hematopoietic System
- Lymphoreticular System
- Breast
- Soft Tissue
- Bone
- Central Nervous System
- Eye
- Nerve
- Skin
- Pediatric Onco-pathology
- Endocrine System

## PAPER III

### SYSTEMIC ONCO-PATHOLOGY II

TUMORS OF

- Gastrointestinal tract
- Liver and Biliary System
- Pancreas

**DM ONCO –PATHOLOGY**

- Head and Neck
- Lung and pleura
- Mediastinum
- Blood Vessels and Heart
- Kidney
- Lower Urinary tract
- Male Genital System and prostate
- Female Genital System
- Tumor like lesions at all sites

## PAPER IV
## RECENT ADVANCES IN ONCO-PATHOLOGY

### TEACHING AND LEARNING METHODS

**Formal Teaching**

a) **Journal Club:** 1 hour duration - Paper presentation/discussion - once per week

b) **Seminar:** One seminar every week of one hour duration

c) **Lecture/discussion:** Lectures on newer topics by faculty, in place of seminar as per need

d) **Slide discussion:** Once every week. Students will present a slide for discussion where in all DM students and departmental faculty will interact

e) **Case conference:** Difficult cases will be discussed in a meeting with all the faculty

f) **Clinico radiological and pathological meet**: Once in a month in which the clinical and radiological features of various tumors are discussed

g) **Tumor Board Meetings** Multidisciplinary approach for the diagnosis and management of cancer



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**Research:** Protocol submission for two research projects related to the field of Onco-Pathology. The students would be required to undertake two research projects with a faculty member as a guide. The candidates are required to submit the research protocol within first 6 months of joining the course. The research projects should be approved by the departmental Research Committee and Ethics Committee. The Post Graduate student would be eligible for appearing for exit examination provided the research projects are complete: either published/accepted for publication in indexed journals or external peer review of completed manuscripts is certified by two experts or as per Post Graduate Regulations, 2000.

**Recommended schedule for three years training:**

Training should be styled on residency system for 3 years.

The student is required to work full time in the department, academic and research activities as described below. DM student will perform duties in Histopathology, Cytopathology and Hematopathology sections and holiday duties in Mahatma Gandhi Medical College and Hospital during the residency period. Student will also assist in Quality assurance work.

A log book will be maintained by each student for each day work. This will be assessed by faculty

Each academic year is divided into two terms of 6 months each.

**First Academic Year**

**First academic term (6months)**

Student will be posted in the Histopathology section for 3 months, 2 months in Hematopathology and 1 month in Cytopathology in the department of Onco–Pathology of Mahatma Gandhi Medical College and Hospital.

In Histopathology section student will learn grossing of Onco-Pathology specimens, refresh the knowledge of basics of tissue processing, section cutting, staining. During this period student will learn synoptic pathology reporting. Student will also perform/order the relevant IHC test panel and learn reporting. Student will be required to learn frozen section reporting.

Student will be posted in Hematopathology section for two months. During hematopathology posting student will learn reporting of hematological malignancies in peripheral blood smear and in bone marrow. Student will refresh the knowledge of cytochemistry (Peroxidase, Sudan Black, PAS,



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LAP, NSE etc). Learning of flowcytometry will be an integral part of hematopathology posting.

In one month Cytopathology posting student will refresh the knowledge of procedure of aspiration cytology, staining and reporting of cytological smears including LBC.

The candidate is required to submit the research protocol within first 6 months of joining the course.

**Second academic term (6months)**

Student will be posted in the Histopathology section for 3 months, 2 months in Hematopathology and 1 month in Cytopathology.

During Histopathology posting student will do grossing of Onco-Pathology specimens and learn synoptic pathology reporting. Student will be posted in IHC section and will be trained to perform, order the relevant IHC test panel and learn to interpret the results. Student will learn frozen section examination also.

Student will be posted in Hematopathology section for two months. During hematopathology posting student will learn reporting of hematological malignancies in peripheral blood smear and in bone marrow. Student will learn interpretation of flowcytometry.

During Cytopathology posting student will learn reporting in Cytopathology.

**Second Academic Year**

**Third academic term (6 months)**

Student will be posted in the Histopathology section for 2 months, 1month in Hematopathology,1 month in Cytopathology and 2 months of Clinical posting.

During Histopathology posting a DM student will do grossing of Onco-Pathology specimens and will assist in synoptic pathology reporting. Student will be posted in IHC section, and will order the relevant IHC test and assist reporting. Student will also assist in frozen section consultation.

During Hematopathology posting of one month student will assist reporting of hematological malignancies in peripheral blood and bone marrow and assist in interpretation of flowcytometry.

During one month Cytopathology posting student will assist reporting of cytopathology.

In the next two months of this term there will be clinical postings in Medical Oncology/Surgical oncology /Radiation Oncology and Radiology department. Student will be posted for 15 days in each of these four departments.

**Fourth academic term (6 months)**

Student will be posted in the Histopathology section for 3 months, 1 month in Hematopathology,1



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month in Cytopathology and 1month in Molecular Pathology Lab.

In histopathology posting student will do grossing of Onco-Pathology specimens, will assist synoptic pathology reporting. Student will order the relevant IHC test panel and will assist in reporting. Student will assist frozen section reporting.

Students will be posted in Hematopathology section for one month and in Cytopathology for one month.

During Hematopathology posting student will assist reporting of hematological malignancies in peripheral blood smear and in bone marrow and assist in interpretation of flowcytometry.

In Cytopathology posting student will assist reporting of aspiration cytology and exfoliative cytology.

Student will be posted in Molecular lab for one month and will be trained to perform and interpret the tests done in molecular lab.

**Third Academic Year**

**Fifth academic term (6 months)**

Student will be posted in the Histopathology for 2 months, 1month in Hematopathology 2 months in Cytopathology section and 1 month in Molecular lab.

In Histopathology, student will do grossing of Onco-Pathology specimens and preliminary synoptic pathology reporting verified by faculty member. Student will do preliminary reporting of frozen section verified by member of faculty.

Student will be posted in Hematopathology section for one month. During hematopathology posting student will do preliminary reporting of hematological malignancies in peripheral blood smear, bone marrow and of flowcytometry verified by faculty.

During Cytopathology posting preliminary reporting will be done by student verified by faculty member.

Student will be posted in Molecular lab for one month and will be trained to perform and interpret the test results.

**Sixth academic term (6 months)**

Student will be posted in the Histopathology section for 3 months, 1 month in Hematopathology and 1 month in Cytopathology and 1month in Molecular lab in this last term.

During this posting in histopathology DM student will do grossing of Onco-Pathology specimens



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and will do provisional synoptic pathology and IHC reporting which will be verified by faculty member. Student will do provisional reporting of frozen section examination verified by faculty member.

Student will be posted in Hematopathology section for one month. During hematopathology posting provisional reporting of hematological malignancies and flowcytometry will be done by DM student verified by faculty.

In Cytopathology posting of one month student will do provisional reporting of Cytopathology verified by faculty.

Student will be posted in Molecular lab and for one month and will be trained to do and interpret the test results.

Analysis and submission of research projects will be done in this term.

**Training Schedule of DM ONCO - PATHOLOGY Students**

| Terms | HISTO | HEMAT | CYTO | MOL | CLINICAL | TOTAL |
|---|---|---|---|---|---|---|
| I | 3 | 2 | 1 | - | - | 6 |
| II | 3 | 2 | 1 | - | - | 6 |
| III | 2 | 1 | 1 | - | 2 | 6 |
| IV | 3 | 1 | 1 | 1 | - | 6 |
| V | 2 | 1 | 2 | 1 | - | 6 |
| VI | 3 | 1 | 1 | 1 | - | 6 |
| TOTAL | 16 | 8 | 7 | 3 | 2 | 36 |

**Teaching Schedule as enumerated under "Teaching and learning methods"**

1. **Logbook**

A copy of the report of all procedures performed, interesting cases, awards during the course, abstracts in various conferences should be maintained in a log book, which should be seen by the entire available faculty in the specialty. Logbook should be submitted to the Head of the Department at least two months before the exit practical examination. The Log books shall be checked and assessed periodically by the faculty members imparting the training. The logbook

should be then presented to external examiners at the time of practical exit examination for appraisal.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially and later to be performed under supervision followed by performing independently. Provision of skills laboratories for cardiopulmonary resuscitation in the medical colleges is mandatory.

## ASSESSMENT

### FORMATIVE ASSESSMENT

**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.**

**Periodic Evaluation:**

Post graduate students will be evaluated continuously for their performance in all areas such as case presentations, seminars, journal clubs, procedures etc. Additional periodic assessment will include theory and practical assessment mimicking the final examination should be conducted every six months. Such an evaluation will help assessing the progress of the trainees and the quality of the training program. Evaluation will be communicated to trainees and their feedback would be taken into consideration for modifications in training program.

Internal Assessment should be frequent, cover all domains of learning used and 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 DM training should be based on:

1. Journal based / recent advances learning
2. Case 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).**

**SUMMATIVE ASSESSMENT**

**The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The summative assessment examination shall include two heads:

A. Theory examination.

B. Practical examination and Viva-voice.

Theory examination and Practical/Clinical, Viva-voce shall be separate heads of passing.

Theory examination shall comprise of four papers. Passing percentage shall be cumulatively 50% with minimum of 40% marks in each theory paper.

Practical /Clinical examination - Passing percentage shall be 50%.

Passing shall be separate for each head and failing shall be common, meaning thereby that clearance at theory and failure at practical / clinical shall amount to failure at Summative examination and vice versa.

A **Theory**: There shall be four theory papers as per MCI norms:

**Paper I: Basic Sciences and Principles of Laboratory Techniques**

**Paper II: Systemic Onco-Pathology I**

(Tumors of Hematopoietic system, Lymphoreticular System, Breast, Soft Tissue, Bone, CNS, Eye, Skin, nerve, Pediatric Oncopathology, Tumors of Endocrine System )

**Paper III: Systemic Onco-Pathology II**

(Tumors of Head and Neck, Gastrointestinal Tract, Liver and Biliary System, Pancreas, Lung and pleura, Mediastinum, Blood vessels and Heart, Kidney, Lower Urinary tract, Male Genital System and prostate, and Female Genital System and tumor like lesions at

all sites)

**Paper IV: Recent Advances in Onco-pathology**

**B Practical and Oral examination:**

Practical/Oral examination shall be comprehensive enough to test the candidate's overall knowledge of the subject. The practical examination shall be held as per MCI norms and as per the prevailing rules of the training institute/ University rules. A broad outline is suggested below:

Details of exercises and distribution of marks-

| | | |
|---|---|---|
| I. | Histopathology Slides - 15 cases,10 marks each | Total 150 Marks |
| II. | Synoptic Reporting in Onco Surgical Pathology | Total 25 Marks |
| III. | Hematopathology slides- 8 cases,10 marks each | Total 80 Marks |
| IV | Cytopathology Slides- 7 cases, 10 marks each | Total 70 Marks |
| V | Molecular Pathology interpretation | Total 25 Marks |
| VI | Grossing of surgical specimen | Total 25 Marks |
| VII | Grand Viva | Total 25 Marks |

TOTAL 400 Marks

**Suggested Books (latest edition)**

| | | |
|---|---|---|
| 1. | WORLD HEALTH ORGANIZATION, all Tumours latest edition | |
| 2. | Curran's Atlas of Histopathology | |
| 3. | Histopathology–A Colour Atlas & textbook | Evan Damjanov |
| 4. | Fine Needle Aspiration Cytopathology | Young |
| 5. | Dacie & Lewis Practical Hematology | Lewis, Bain, Bates |
| 6. | Haenery's clinical Diagnosis and Management by Laboratory method | Todd & Sanford |
| 7. | Enzinger and Weiss' soft tissue Tumors | Weiss, Goldblum |

| | | |
|---|---|---|
| 8. | Cancer – Principal and Practice of oncology | Vincent T. De. Vita |
| 9. | Fletcher Diagnostic Histopathology of Tumor (Vol. 1) | Fletcher |
| 10. | Fletcher Diagnostic Histopathology of Tumor (Vol. 2) | Fletcher |
| 11. | Differential Diagnosis soft tissue and Bone Tumor | Stevan J. Hajdu |
| 12. | Urological Pathology | William & Murphy |
| 13. | Thymus and Lymph node Histopathology | Kristin Henry |
| 14. | Digestive disease Pathology (Vol.1) | Shaw Watanave |
| 15. | Progress in Surgical Pathology –(Vol. 8) | Cecilia Fenoglio |
| 16. | Endocrinology of cancer (Vol. 3) | David P. Rose |
| 17. | Malignant Skin Tumors | Enrmett |
| 18. | Wintrobe's Hematology | |
| 19. | Manual and Atlas of Fine Needle Aspiration cytology | Svante R. Orell |
| 20. | De Gruchy's clinical pathology | Franta, firkin, colin chesterman |
| 21. | General and systemic pathology | JcE underwood |
| 22. | Williams haematology | Ernest beatlerehal |
| 23. | Walters and Israel General Pathology | J.B. watler, I.C. Talbot |
| 24. | Diagnostic Cytopathology | Gray |
| 25. | Pathology Illustrated | Robin Reid, Fiona Raberts, Robin Callander, Ian Ramsden |
| 26. | Pathology Of Bone Marrow And Blood Cells | Farchi |
| 27. | Hematopathology Atlas Peripheral Smear And Bone Marrow Interpretation | Saxena, Pati |
| 28. | BOYD's Textbook of Pathology Vol. I | BOYD's |
| 29. | BOYD's Textbook of Pathology Vol. II | BOYD's |
| 30. | KOSS Diagnostic Cytology Vol. I | KOSS |
| 31. | KOSS Diagnostic Cytology Vol. II | KOSS |
| 32. | Hains & Taylor – Obstetrical and Gynaecological Pathology Vol. I | Haroid Fox, Michael |

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| | | |
|---|---|---|
| | | wells |
| 33. | Hains & Taylor – Obstetrical and Gynaecological Pathology Vol. II | Haroid Fox, Michael wells |
| 34. | Novak's Gynaecologic and Obstetric Pathology with Clinical and Endocrine Relations by | **Edmund R. Novak** |
| 35. | Enzinger and Weiss's Soft Tissue Tumors | Goldblum, john R. et al |
| 36. | Biopsy Interpretation of the bladder | Epstein, Jonathan I et al |
| 37. | Bancroft's Theory and Practice of Histological Techniques | SUVARNA S. Kim |
| 38. | Diagnostic immunohistochemistry Theranostic and Genomic Applications | David J Dabbs |
| 39. | Diagnostic Pathology: Breast. | Hicks, David G. & Lester, Susan C |
| 40. | Biopsy Interpretation Series | Jerome B. Taxy |
| 41. | Rosen's Breast Pathology | Hoda, Syed A. etc |
| 42. | Diagnostic Pathology | Mody. Dina et al |
| 43. | AJCC Cancer Staging Manual | Edge, Stephen B. et al |
| 44. | Morson and Dawson's Gastrointestinal Pathology. | Morson and Dawson's |
| 45. | BRS Board Review Series Pathology | Gupta |
| 46. | Robbins & Cotran Pathology Basic of Disease Vol. I | Kumar |
| 47. | Robbins & Cotran Pathology Basic of Disease Vol. II | Kumar |

**Suggested Journals**

| **Name of Journal** | | **Publisher** |
|---|---|---|
| 1-Histopathology | (F) | John Wiley |
| 2-Acta Hematologica | (F) | Karger |
| 3-Acta Cytologica | (F) | Karger |

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| | |
|---|---|
| 4-Cancer Cytopathology (F) | Wiley |
| 5-Indian Journal of Pathology and microbiology (IN) | Medknow |
| 6-Archives of pathology and Lab medicine | |
| 7-Indian Journal of Pathology and Oncology | |



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**Annexure I**

**Postgraduate Student 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. | 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**

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**MODEL PAPER**

**DM14301** **Basic.Sc.-I**

**DM Examination Month, Year**

**ONCO -PATHOLOGY**

**Paper-I**

**BASIC SCIENCES AND PRINCIPLES OF LABORATORY TECHNIQUES**

**Time: Three Hours**

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labeled diagrams wherever necessary

1- Tumors caused by oncogenic virus
2- Serologic tumor markers and common association
3- Tissue microarray in Pathology- Principle, Technique and applications
4- Detection of MRD in acute Leukemia using flowcytometry
5- BRCA genetic mutation and cancer
6- Application of immunohistochemistry in the evaluation of undifferentiated tumors
7- Apoptosis in cancer and its application in anticancer therapy
8- Discuss Liquid based Cytology
9- Describe the functions of TP 53 gene and its role in cancer development
10- Decalcification techniques, agents used and end point

**MODEL PAPER**

**DM14302** **Systemic-II**

**DM Examination Month, Year**

**ONCO -PATHOLOGY**

**Paper-II**

**SYSTEMIC ONCO -PATHOLOGY 1**

**Time: Three Hours**

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labeled diagrams wherever necessary

1- Discuss epithelial myoepithelial tumors of breast
2- Describe in short recent WHO classification of CNS tumors
3- ASCO/CAP current guidelines on FISH reporting for HER 2 in breast cancer
4- Discuss Mantle Cell Lymphoma
5- Histological classification and risk stratification system of neuroblastoma
6- Discuss Acute Myeloid Leukemia with recurrent genetic abnormalities
7- Histopathology and diagnostic molecular pathology of solitary fibrous tumor
8- Discuss neuroendocrine tumors of Pancreas
9- Discuss prognostic significance of karyotyping in hematological malignancies.
10- Morphology and genetics of dedifferentiated Liposarcoma



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**MODEL PAPER**

**DM14303** **Systemic-III**

**DM Examination, Month, Year**

**ONCO-PATHOLOGY**

**Paper-III**

**SYSTEMIC ONCO- PATHOLOGY II**

**Time: Three Hours**

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labeled diagrams wherever necessary

1- Discuss the use of Immunohistochemistry in diagnosis of liver tumors
2- Changes in FIGO staging of cervical cancer and its impact
3- Molecular profiling of urinary bladder cancers
4- Molecular classification of endometrial carcinoma
5- Differential diagnosis of oncocytic tumors of kidney
6- Discuss key changes in the AJCC 8th edition of staging in oral cavity cancers
7- Gleason's grading of prostatic carcinoma
8- Biomarkers in lung cancers
9- Discuss Molecular classification of gastric carcinoma
10- Discuss pathology and prognosis of Post pubertal teratoma testis

**MODEL PAPER**

**DM14304** **Rec.Adv-IV**

**DM Examination Month, Year**

**ONCO -PATHOLOGY**

**Paper-IV**

**RECENT ADVANCES IN ONCO-PATHOLOGY**

**Time: Three Hours**

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labeled diagrams wherever necessary

1- Artificial intelligence and machine learning in pathology
2- Recent advances on TRIM 28 gene
3- Criteria for malignancy in endocrine tumors
4- Prognostic significance of Tumor Infiltrating Lymphocytes in breast carcinomas
5- Borderline Thyroid tumors –major updates

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