

**THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY,
No.69, Anna Salai, Guindy, Chennai – 600 032.**

**D.M/ M.Ch
SUPER SPECIALTY DEGREE COURSE**



SYLLABUS AND CURRICULUM

D.M. - ONCOPATHOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus - D.M ONCOPATHOLOGY

I. AIMS

The practice of pathology had its humble beginning with autopsy and gross examination of specimens. The field has witnessed tremendous growth from them and we are in an era of advanced molecular diagnosis for every disease. Every new edition of WHO Classification of Tumours bears witness to the overwhelming dynamics of tumor biology, which has a direct impact on oncological diagnostic modalities and therapeutics. In keeping with the growing need for advanced training in onco-pathology, the Tamil Nadu Dr. M.G.R. Medical University offers a three-year super-specialty training program for candidates who have specialized in Pathology. The course has been conceptualized to impart advanced and focused training in tumor diagnosis to deliver consistent high-quality cancer care to patients.

II. OBJECTIVES OF LABORATORY TRAINING

The course will be a three-year intense training program at the end of which the candidate should have the following competencies:

1. A strong foundation of basics of Tumor biology
2. Comprehensive understanding of the pathology of neoplastic diseases pertaining to every organ in the body.
3. Training in grossing, histopathological, frozen section reporting of oncology resection specimens according to standard operating protocols.
4. Knowledge of tumor proteomics with their implication in cancer diagnosis (immunohistochemistry, immunofluorescence, flow cytometry) and treatment.
5. Concept of biomarkers of diagnosing and prognosticating different types of tumor
6. Knowledge of molecular and cytogenetic underpinnings of neoplasms, methods to detect them with their prognostic and theranostic implications.
7. Knowledge of tumor immunology and related theranostic tests to guide cancer therapy.
8. Effective communication skills for participating in the multidisciplinary tumor board meetings.
9. Skills to undertake research with a foundation in scientific research methodologies, biostatistics, and bioethics.
10. Effective teaching skills for training junior doctors, laboratory staff, and others as appropriate.
11. Capacity to supervise and work with subordinates and colleagues in a laboratory
12. Basic introduction into principles of Radiotherapy, tumor imaging modalities including nuclear medicine, medical oncology, hemato-oncology, surgical oncology

III. THEORY SYLLABUS

GENERAL PATHOLOGY:

Cellular organization, cell cycle, cellular housekeeping, signal transduction, human genome project, structure, and function of genes, basics of immunology, HLA systems.

TUMOUR BIOLOGY: Genetic and Epigenetic alteration in carcinogenesis Molecular hallmarks of cancer: Self-sufficiency of growth signals, oncogenes, tumor suppressor genes, apoptosis, stem cell-like properties, angiogenesis, Warburg effect, invasion and metastasis, antitumor immunity, genomic instability, cancer enabling inflammation, chromosomal changes, epigenetic changes, noncoding RNAs in cancer.

- Molecular basis of multistep carcinogenesis, tumor cell kinetics, proliferation interaction with chemotherapy
- Carcinogen - Physical, chemical, microbial carcinogens.
- Cancer syndromes and their inheritances
- **Cancer Immunology**

BASIC PRINCIPLES OF CLINICAL ONCOLOGY

- Epidemiology Epidemiologic methods, Descriptive and Analytical epidemiology.
- Cancer staging, oncological imaging and Nuclear medicine.
- Principles of cancer management: Surgical Oncology, Medical Oncology, Radiation Oncology, and Biologic therapy, Cancer Chemotherapy, Cancer Screening, endoscopy, Bone Marrow stem cell transplant, Investigation of Graft versus host disease

SYSTEM ONCOPATHOLOGY:

Principles of Grossing and of specimens, frozen section reporting, and histopathology of neoplasms involving:

1. Head and Neck.
2. Central nervous system.
3. Lung.
4. Mediastinum and heart.
5. Gastrointestinal tract.
6. Genitourinary tract.
7. Gynecologic tract.
8. Breast.
9. Endocrine system.
10. Musculoskeletal system.
11. Peritoneal, pleural and pericardial cavities.
12. Skin.
13. Hematolymphoid system (bone marrow, lymphnode, spleen)

Approach to:

Pediatric neoplasms

CUPS(carcinoma of unknown primary)

CYTOPATHOLOGY :

- FNAC procedures
- Rapid onsite evaluation(ROSE) or guided FNA
- Exfoliative cytology
- Examination of cell block
- Intraoperative cytology
- Liquid-based cytology

HEMATOPATHOLOGY:

- Bone marrow Aspirates staining including stain for iron.
- Blood smears (thick and thin smear)
- Cytochemical and flowcytometric characterization of leukemia

BIOETHICS:

- Respect human life and the dignity of every individual.
- Refrain from supporting or committing crimes against humanity and condemn all such acts

- Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
- Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and
- Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
- Educate the Public about present and future threats to the Health of Huamanity.
- Advocate for Social, Economic, Educational and Political changes that ameliorate suffering and contribute to Human well Being.
- Teach And mentor those who follow us, for they are the future pf our caring profesison.

IV. CLINICAL POSTINGS FOR D.M. ONCOPATHOLOGY STUDENTS

During the three years D.M. Oncopathology course, students will be posted in the various specialties sequentially every year as follows:

Ist year

Surgical Oncopathology	– 6 months
Cyto-Oncopathology	– 2 months
Haemato-Oncopathology	– 2 months
Immunopathology, Transplant pathology/ HLA lab Biochemistry	– 2 months

IInd year

Surgical Oncopathology	– 4 months
Cyto-Oncopathology	– 2 months
Haemato-Oncopathology	– 2 months
Molecular Oncopathology [Molecular techniques]	– 3 months
Peripheral postings at reputed Institutions	– 1 month

IIIrd year

Surgical Oncopathology	– 4 months
Cyto-Oncopathology	– 2 months
Haemato-Oncopathology	– 2 months
Molecular Oncopathology [Karyotyping, FISH]	– 1 month
Ward postings and Peripheral postings at other Institutions	– 3 months

Ward postings:

1. Medical oncology OPD/ward
2. Surgical oncology OPD /ward
3. Hematology OPD /ward
4. Radiology
5. Nuclear medicine
6. Radiation oncology
7. Bone marrow transplant unit

V. SKILL TRAINING

LABORATORY TECHNIQUES:

Knowledge of principle, technique, and interpretations of the results and limitations of the following procedures:

- Histochemistry
- Immunohistochemistry
- Electron microscopy
- ELISA techniques.
- Radioimmuno assay
- Immunofluorescence

- HLA typing
- Cytogenetics and FISH technique (Karyotyping of Leukemia, translocation of solid tumors and hematolymphoid malignancy)
- Flow cytometry
- PCR and its types
- Blot and Hybridisation procedures
- NGS, Bioinformatics pipeline
- Methods of tissue culture
- Artificial intelligence and image analysis

VI. TEACHING METHODOLOGY

The program is designed in a way to enable candidates to learn and investigate for themselves, the aspects of oncopathology via interactive discussions, clinicopathologic conferences, multidisciplinary tumor board meetings, seminars, slide sessions, laboratory bench work, and basic research.

Following academic activities are planned throughout the year and candidates are encouraged to participate actively

- Interesting slide discussion
- Tumor board Discussion.
- Journal club
- Weekly evaluation with theory tests
- Department CME
- CPC (Clinico-Pathological-Conference)

VII. RESEARCH WORK

The candidate is introduced to the field of research in oncopathology including molecular oncopathology.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals, and as a presentation in conferences. The activities would consist of Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

It is mandatory for the candidate to attend the Research Methodology workshop conducted by the University within the first six months of the D.M Course

VIII. LOGBOOK

Candidate shall maintain a record of skills he/she has acquired during the training period certified by the various Heads of Departments where he / she has undergone training including outside the institution.

The record should have a log of:

- Teaching and training program of post-graduate and intern students.
- Seminars, Journal Clubs, Group Discussions
- Clinical, clinicopathological, and multidisciplinary tumor board conferences.
- Interesting cases
- Competencies gained in peripheral postings

Periodic review of Logbook has to be done in the Department by guide/HOD once in every 6 months.

At the end of the course, the candidate should summarise the contents and get the Log Book certified by the Head of the Department.

The Log Book should be submitted at the time of practical examination for the scrutiny of the Board of Examiners.

IX. COMPETENCY ASSESSMENT:

Overall :

1. Communication/commitment/ contribution/ compassion towards the patients and innovation	- 10 marks
2. Implementation of newly learnt techniques	- 10 marks
3. Documentation of case sheets/discharge Summary/review	- 10 marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs/ Seminar/ Papers presented in Conference	- 10 marks
5. No. of Medals/ Certificates won in the Conference / Quiz competitions and other academic meetings with details.	- 10marks
Total	- 50 marks

Assessment I	-	February	-	First year
II	-	August	-	First year
III	-	February	-	Second year
IV	-	August	-	Second year
V	-	February	-	Third year
VI	-	May	-	Third year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 MARKS(50+50)

X. THEORY EXAMINATION

Paper-I - Basic sciences and General Surgical Pathology(Cellular structure and organization, Genetics, Tumour Biology, Biochemistry, Immunology)

Paper-II - Systemic Oncopathology

Paper-III- Oncologic Hematopathology and laboratory techniques (including molecular techniques and Data Interpretation)

Paper-IV- Recent advances in oncopathology, Miscellaneous topics(epidemiology, cancer registry creation, research methodology, bioethics, quality control, artificial intelligence in oncopathology and pathology informatics)

Paper-I and Paper-II

1. Essay questions (2) -	2 X 15 = 30 Marks
2. Short Notes (10) -	10 X 7 = 70 Marks

Total 100 Marks

Paper-III and Paper-IV

1. Essay questions (2) -	2 X 15 = 30 Marks
2. Short Notes (5) -	5 X 7 = 35 Marks
3. Give reasons for (5) - clinical case scenarios and lab scenarios	5 X 7 = 35 Marks

Total	100 Marks

XI. PRACTICAL SCHEME

Practical Examination will spread over for 2 days

Day 1

Sections	No. of Exercises	Time given to candidate	Time for examiner to ask questions	Marks
Histopathology spotters and Discussion	10X10marks	10X5 min=50minutes	60 Minutes	100
Frozen section and gross	5 X10marks Frozen section -3 Gross -2	5X5min=50minutes	60 minutes	50

Day 2

Sections	No. of Exercises	Time given to candidate	Time for examiner to ask questions	Marks
Spotters and Discussion 1.Cytology and fluids 2. Hematology	10X10	10X5 min=50minutes	60 Minutes	100
Multidisciplinary tumor board scenarios	2	2X15 min=30minutes		50
OSPE (molecular pathology result interpretation and laboratory techniques)	5	5X5 min=25minutes		50
Viva			30 minutes	100
Log book				50
Total marks				500 Marks
Passing Minimum				250 Marks

As per Medical council of India Postgraduates Medical Education Regulations 2000 (amended upto 10th august 2016) clause **13.9 A postgraduate student of a post graduate degree course in board 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.**

Apart from Poster / oral paper presentation in National/State conferences, the research paper published by the candidate in the University Journal of Medical Sciences but case reports will not be considered as research paper.

The candidate can also present Research paper as per the Clause 13.9 of Post graduate education regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD , stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the journal for publication should be sent to the university forwarded through the HOD(AS PER 53RD SAB)

The student can submit articles for the University Journal anytime from the time of registration till 6 months prior to the theory examination.

XII. REFERENCE BOOKS

- Histology for Pathologists. Stephen S. Sternberg (Ed), Raven Press, New York.
- General Pathology JB Walter, MS Israel. Churchill Livingstone, Edinburgh
- Robbin's Pathologic Basis of Disease Ramzi S.Cotran, Vinay Kumar, Stanley L Robbins WB Saunders Co., Philadelphia.
- Pathology Emanuel Rubin, John L Farber. JB Lippincott Co., Philadelphia
- Anderson's Pathology. John M Kissane (Ed). The CV Mosby Co., St. Louis
- Ackerman's Surgical Pathology. Juan Rosai Mosby. St. Louis
- Diagnostic Surgical Pathology. Stephen S Sternberg. Lippincott, William Wilkins. Philadelphia
- Diagnostic Histopathology of Tumours. Christopher DM Fletcher (Ed). Churchill Livingstone. Edinburgh.
- Cancer Principles and Practice of Oncology Vincent T. Devita
- AFIP fascicles on various tumours
- WHO fascicles
- Biopsy interpretation series
- Soft Tissue Tumors. Franz M Enzinger, Sharon W Weiss. Mosby, St. Louis
- Cardiovascular Pathology Malcolm D Silver Churchill Livingstone New York.
- Pathology of Pulmonary Diseases Mario J Saldhana. JB Lippincott Co., Philadelphia
- Spencer's Pathology of the Lung. PS Hasleton. Mc Graw-Hill, New York.
- Dahlin's Bone Tumors. K Krishnan Unni. Lippincott-Raven Publishers, Philadelphia, New York
- Bone Tumours Andrew G Huvos WB Saunders Co. Philadelphia
- Greenfield's Neuropathology. J Hume Adams (Ed) Edward Arnold, London.
- Russell & Rubenstein's Pathology of the Tumours of the Nervous System. Darrell D Bigna. Roger E Mc Lendon, Janet M Bruner (Eds.), Arnold, London
- Rosen's Breast Pathology. Paul Peter Rosen. Lippincott-Raven Publishers, Philadelphia, New York.
- Odze and Goldblum Surgical Pathology of the GI Tract, Liver, Biliary Tract. Robert D. Odze, WB Saunders Co. Philadelphia
- Urologic Surgical Pathology, Liang Cheng Greg MacLennan David Bostwick WB Saunders Co. Philadelphia
- Diagnostic Gynecologic and Obstetric Pathology, Christopher Crum Kenneth Lee Marisa NucciElsevier

- Blaustein's Pathology of female genital tract Springer
- Paediatric Pathology – Stocker & Dehner William & Wilkins
- William's Postgraduate Hematology Hoffbrand AV, Lewis SM, Tuddenham EGD, Butterworth Heinemann, Oxford
- Wintrobe's Clinical Hematology, Lee GR, Foerster J, Lupeus J, Paraskevas F, Gveer JP, Rodgers GN, Williams & Wilkins, Baltimore
- Knowles Neoplastic Hematopathology, Attilio Orazi, Kathy Foucar, Daniel Knowles J.B. Lippincott, Philadelphia
- Hematopathology, Elaine Sarkin Jaffe, Elsevier Co., Philadelphia
- Leukemia Diagnosis- A guide to the FAB Classification, Bain BJ, J.B. Lippincott, Philadelphia • Clinical Diagnosis and Management by Laboratory Methods, Henry JB, WB Saunders.(Indian Edition, Eastern Press, Bangalore).
- Theory and Practice of Histological Techniques, Bancroft JD, Stevens A, Turner DR, Churchill Livingstone, Edinburgh
- Histotechnology – A Self Instructional Text, Carson FL, American Society of Clinical Pathologists, Chicago
- Histochemistry Theoretical and Applied. AG Everson Pearse. Churchill Livingstone, Edinburgh
- Manual & Atlas of Fine Needle Aspiration Cytology. Svante R Orell, Gregory F Sterrett, Max NI. Walters, Darrel Whitaker. Churchill Livingstone, London
- Diagnostic Cytology and its Histopathologic Basis, Koss LG, J.B. Lippincott, Philadelphia
Comprehensive Cytopathology, Bibbo M, W.B. Saunders Co., Philadelphia

XIII. JOURNALS

- Cancer,
- British Journal of Cancer,
- International Journal of Cancer,
- Cancer Research,
- Journal of National Cancer Institute,
- Journal of Surgical Oncology
- Journal of Clinical Oncology
- The Seminars in Oncology
- Haematology/Oncology Clinics of North America
- Medical and Pediatric Clinic of North America
- Current Opinion in Oncology
- The Indian Journal of Cancer
- Acta Cytologica
- The American Journal of Pathology
- The American Journal of Surgical Pathology
- The American Journal of Hematology
- The American Journal of Clinical Pathology
- Archives of Pathology and Laboratory Medicine
- British Journal of Haematology
- Blood
- Bone Marrow Transplantation
- Diagnostic Cytopathology
- Histopathology
- Human Pathology
- Indian Journal of Cytology
- Indian Journal of Pathology and Microbiology
- Journal of Pathology
- Journal of Clinical Pathology
- Laboratory Investigation

- Modern Pathology
- Pathology
- Seminars in Hematology
- Seminars in Diagnostic Pathology
- Lancet
- NEJM (New England Journal of Medicine)