

**Jawaharlal Institute of Postgraduate Medical Education and
Research (JIPMER)**

**(An Institution of National Importance under the Ministry of Health &
Family Welfare, Govt. of India)**

Pondicherry 605 006



Superspeciality DM- Medical Oncology

COURSE CURRICULUM

Department of Medical Oncology, Regional cancer centre,

JIPMER, Pondicherry

DM MEDICAL ONCOLOGY—COURSE CURRICULUM

1. NAME OF THE COURSE: DM Medical Oncology

2. DURATION OF THE COURSE: 3 years

3. ELIGIBILITY:

- i. **Educational qualification:** M.D. / DNB in Medicine / Pediatrics / Radiotherapy of this Institute or any other Institute/University recognized as equivalent there to by the Medical Council of India.
- ii . **Age limit:** As per institute rules

4. Mode of selection:

The selection process consists of two sections

- i. **A Computer Based Test (CBT)** / online examination will consist of 100 MCQs in the concerned specialty and related fields. The duration of the examination will be 1½ hours. All Questions will be of one best / correct response type having four alternatives. Each answer with correct response shall be awarded four marks. More than one answer indicated against a question will be deemed as incorrect response. Negative marks will be given for incorrect responses marked correct. For every incorrect response marked as correct 1 mark will be deducted. Minimum cut-off shall be 50th percentile for admission. This test will carry 80% weightage in the final score.
- ii. **Departmental interview:** The written exam shall be followed by a departmental academic interview. Number of candidates selected for the departmental interview shall be four times the number of seats available. This interview shall carry 20% weightage in the final score.

- iii. The final ranking shall be a direct summation of the marks according to the weightage described above.

5. Aims & Objectives of the program

To ensure adequate supply of medical oncology experts who assume leadership role in their fields. To produce a medical oncologist who:

- i. Is capable of providing an excellent patient care in management of cancer patients.
- ii. Possesses adequate knowledge base (both basic and applied) to effectively interact with medical colleagues in a wide range of disciplines.
- iii. Has a basic knowledge about radiotherapy facilities and oncologic surgery principles.
- iv. Should be competent in procedures like Central Venous Access device insertions, lumbar punctures, bone marrow aspiration and biopsies.
- v. Should be well versed in managing the complications of chemotherapies.
- vi. Is a good researcher, competent teacher and an efficient administrator.

6. SYLLABUS CONTENT:

- i. The following theoretical areas are included in the syllabus for the 3 year DM course.

A. Basic Science and General Oncology

1. Etiology and epidemiology,
2. General pathology of cancer
3. Genetic in oncology
4. Molecular oncology,
5. Cancer therapeutics
6. Cancer prevention and screening.
7. Clinical trials in cancer
8. Imaging Techniques of Cancer Diagnosis & Management
9. Specialized techniques of Cancer Diagnosis and Management
10. Vascular Access and Specialised Technique of drug delivery

B. Clinical Oncology (Medical) & Stem Cell Transplantation

1. Cancer of Head and Neck
2. Cancer of Lung and Mediastinum
3. Cancer of Gastro Intestinal Track
4. Cancer of Genito Urinary System
5. Cancer of the Breast
6. Cancer of Endocrine System
7. Sarcomas of Soft Tissues & Bone
8. Benign & Malignant Mesotheliomas
9. Cancer of skin
10. Malignant Melanoma
11. Neoplasms of CNS
12. Cancers of childhood
13. Lymphomas
14. Leukemias and other Haematological Malignancies
15. Paraneoplastic Syndromes
16. Cancers of unknown primary site
17. A.I.D.S – related malignancies
18. Oncological Emergencies
19. Treatment of Metastatic Cancers
20. Gynaecological Cancers
21. High Dose Chemotherapy & Transplantation

C. Recent advances, Palliative care, Oncologic emergencies, Supportive Care, community oncology

1. Infections in cancer Patients and neutropenic patients
2. Management of oncologic emergencies
3. Adverse effects of treatment
4. Supportive Care and Quality of Life
5. Rehabilitation of Cancer Patient

6. Newer approaches in cancer treatment
7. Newer drugs in cancer treatment
8. Long term morbidities of cancer survivors
9. Community oncology
10. Socio-economic aspects of oncology

ii. Practical Contents To Be Covered Are Listed Below

- A.** Clinical Exam skills & handling emergencies
- B.** Chemotherapy administration
- C.** Procedures (BM, LP CVC etc.)
- D.** Transplant & related procedures
- E.** Imaging & response assessment
- F.** Transfusion practices
- G.** Medical record maintenance and analysis
- H.** Bio-medical statistics
- I.** Medical ethics

7. DEPARTMENTAL EDUCATIONAL TRAINING AND SCHEDULE AND RESIDENT POSTING

i. ACADEMIC SCHEDULE

The academic schedule in the department is as follows

- A. Mondays 7.45 AM to 8:30AM:** Seminar in Oncology: Candidate presents a given topic and discusses it. Fellow should be able to review the topic critically and make independent observations.
- B. Monday: 8:30AM to 9:00 AM** Medical forum discussion where candidates can present new cases from OPD and ward to decide best treatment plan for the patient.
- C. Tuesday: 7.45 AM to 8:30AM:** Candidate has to present practice changing articles which will be thoroughly discussed.

- D. **Wednesday: Oncology case presentation: 8:00AM to 9:00 AM.** Candidates present a clinical case and he/she shall be assessed for their clinical skill, decision making qualities and knowledge of subject. This class will be attended by clinical hematologist, medical oncologist & pathology experts.
- E. **Thursday: Mortality and morbidity audit: 7.45 AM to 8:30AM** In the mortality meeting, the treatment course and probable cause of death of the patients expired recently in the RCC ward is discussed.
- F. **Thursday: 3.30-4.30 PM Oncoradiology Conference:** is held last Thursday of the month, 3.30 pm to 4.30 pm, for discussion of interesting and difficult cases with radiology experts
- G. **Friday: 8-30AM to 9.00 AM** Seminars in recent advances in cancer treatment
- H. **Friday 3.00 to 4.00 PM: Oncopath Conference,** 2:30 PM to 3.30 PM. The candidates provide the clinical history of the cases and the histopathology slides are discussed with the expert pathologists.
- I. **Saturday: 7.30am to 9.30 AM** Department grant rounds: During this session, the candidates present their log books. All cases admitted in the ward shall be discussed whereby the candidate presents the case history, examination and management plan of the patient.
- J. **SOCIAL ACTIVITIES:** Students are encouraged to take part in the various departmental social activities, awareness campaigns, screening camps, rural clinics and so forth to increase their awareness about perceptions of the disease and its treatment in the society. This also will help improve their communication and presentation skills.

ii. CLINICAL POSTINGS

A. Indoors Posting

Duration is 12 months. The candidate is allotted certain beds and he is required to work up patients admitted on those beds. He plans out a diagnostic work up and treatment plan, discusses it with the concerned consultants, presents it on the grand rounds and assumes complete

responsibility of the patients during their hospital stay. He should work in harmony with the ward nurses.

B. Out Patient Department (Opd) Posting

Duration is 12 months. The candidate is posted to chemotherapy evaluation clinics and various specialty clinics including breast cancer, gastrointestinal, urology, lymphoma-leukemia, pain evaluation, bone and soft tissue, pediatric tumors, head and neck, gynecology oncology, pulmonary oncology. The candidates posted to these clinics work under the supervision of consultants. They are expected to see new as well as follow-up patients so as to plan out the management and assess the therapeutic responses of a particular patient.

C. Day Care And OPD Procedures (Minor OT) Posting

Duration-4 months. During this posting a candidate is expected to learn skills

- In introducing per cutaneous subclavian, internal jugular, and femoral vein catheters
- Familiarity with different venous access devices likes Hickman catheter, subcutaneous port etc.
- Institution of chemotherapy and supervision of side effects
- Procedures like bone marrow biopsy, liver biopsy, trucut biopsy, lumbar puncture, intrathecal
- Chemotherapy and aspiration of fluids.

D. Bone Marrow Transplantation Unit Posting

Duration is 6 months. The candidate works under the supervision of concerned consultants and assumes responsibility of managing the patients undergoing high dose chemotherapy. . He is also made familiar with the various types of stem cell mobilization, harvesting, and cryopreservation techniques

E. Elective Posting

Duration is 2 weeks: As per academic needs, residents shall be sent to certain other centres with specific intention of learning special skills as the need arises. Student will have to take permission from head of medical oncology and director of RCC. During elective posting the candidate, apart from understanding the value of laboratory tests in a given malignancy must possess the basic knowledge of interpreting the laboratory data and correlating it with clinical data. For this purpose, candidate is posted in various laboratories through laboratory posting.

- The candidates are posted to various laboratories, some of which are attached to medical oncology itself, such as cytogenetics laboratory, in-vitro tissue culture laboratory. In addition, candidate is posted in immunology, microbiology, HLA and pathology laboratory
- The candidate is required to learn the basic techniques of tissue culture, cytogenetics, staining and study of peripheral/bone marrow smears, operation of blood cell counter and cell separator machine.

F. Ancillary Posting (1 Months)

- Surgical oncology (1 week)
- Radiation oncology (1 week)
- Pathology (1 week)
- Nuclear medicine (1 week)

G. Exam preparatory period: 2 weeks prior to the beginning of the final exit theory exams, the residents shall be exempted from clinical works. But in case required, the HOD can call back the residents during this period.

8. COMPETENCY IN PRACTICAL PROCEDURE:

- i. It is a 3-year course that imparts intense training to DM candidates in the field of medical oncology and related subjects with adequate exposure to clinical and laboratory based activities. During this the fellows are expected to develop various core competencies which will enable them to excel from others, and the structure of the course will enable them for these.
 - A.** To develop clinical judgment and technical skills in diagnosis and the total management of patients with neoplastic diseases, with various modalities of treatment individually or in combination.
 - B.** To make the student expert in handling all kinds of medical emergencies arising either due to cancer spread or problems related to therapy. The latter include: a) infections secondary to severe neutropenia, respiratory distress/failure, renal insufficiency, hepatic insufficiency, and neurological disturbance, b) hemorrhagic complications, c) electrolyte disturbance, d) other toxicities
 - C.** To impart full knowledge concerning cancer chemotherapy, hormone therapy, biologics, gene therapy, immune therapy; their mechanism of action, side effects, mode of administration, interaction with other drugs and their therapeutic effects.
 - D.** To make the candidate familiar with all the modern diagnosis aids including ultrasound, CT scan, MRI, PET scans, mammography, endoscopy and radionuclide scans. The will be trained to interpret these images and also to independently assess treatment response from imaging modalities.
 - E.** To make the candidate conversant with the indications and application of blood component therapy, newer antibiotics, newer antifungal and antiviral agents and other supportive measures.
 - F.** To make the fellow understand the importance of tumor registry, medical records maintenance and its benefits in analysing data and research methodologies.
 - G.** To make the candidate fully conversant with and trained in various aspects of high dose chemotherapy and stem cell transplantation (both allogeneic and autologous) including organising the logistics of a transplant, scheduling of

treatment, indication for the use of growth factors, GVHD prophylaxis and management of various complications including acute and chronic GVHD.

- H.** To make them able to perform various transplant related procedures like apheresis and cryopreservation. The course will also enable them to interpret transplant related special investigations like
- I.** To provide an insight into clinical trials (design, data collection, analysis and interpretation of related statistics), cancer epidemiology, preventive and community oncology.
- J.** To make the candidate understand the psychology of cancer patients which is often disturbed with the knowledge that he or she has a cancer. The candidate will be made to learn to understand and tackle these psychological issues with compassion and gentle behavior.
- K.** To teach the candidate about effective communication skills, how to counsel patients and care takers regarding the disease, its prognosis and treatment, how to take proper informed consent, and how to break bad news to the patients and their care takers.
- L.** To make them expert in managing the terminally ill patients. They would be given knowledge regarding pain management and other palliative care measures.
- M.** To make them well versed in various administrative aspects so as to help them in the initial phases of their career.
- N.** To make the candidate aware of the importance of record maintenance and regular audits of treatment results, so as to improve upon self.
- O.** The residents are expected to get certified for BCLS and ALS, the training for which shall be conducted in the institute at regular intervals.

ii. Mandatory Number of Procedures

The following is the list of mandatory number of minimum procedures the resident is expected to perform during his three years. These should be reflected in the log book also.

	List of Procedures		No. of procedures to be done
1.	Bone Marrow Transplant related procedures	a. Stem cell collection b. Stem cell cryopreservation c. Stem cell thawing and preservation d. High dose chemotherapy administration	5 5 5 5
2.	Central Venous access Device Insertion	a. Hickman's tunneled catheter b. Chemoport c. Peripherally Inserted Central Catheter d. Internal Jugular Vein catheter e. Femoral catheter f. Subclavian catheter	2 1 15 10 5 15
3.	CSF study and Intrathecal therapy		20
4.	Bone Marrow aspiration and biopsy		30
5.	Paracentesis/ Pleurocentesis		30
6.	Chemotherapy and immunotherapy administration		100

9. METHOD OF EVALUATION

i. Internal Assessment:

A. Formative assessment:

Periodic 6 monthly internal assessments happen in the department. The schedule is as follows

Period	Exams	Topics
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6 th month	Theory and Viva	Supportive care, Oncologic emergencies, Cancer Chemotherapy Medical ethics
1 st year	Theory, Practical, Viva	Haemato-oncology, Paediatric tumors
18 th month	Theory, Viva	Thorax, CNS, H & N, Genetics, CUPS Molecular oncology
2 nd year	Theory, Practical, Viva	Breast, GI, GU, STS & Bone, HBP
30 th month	Theory, Viva	Skin tumors, BMT, Endocrine,
Pre final exam	Exit pattern	All topics

- B. Paper publication:** Two publications (any format) are mandatory during the course. As a policy the resident who does the work shall be the first author and the assisting faculty shall be the corresponding author. All publications happening from a work the fellow does during his course shall be published under the address of the department even if it is published after they leave the institute. Interdepartmental works should be acknowledged and where ever necessary co-author ships also allowed as per discussions with the program leader. The department does not provide financial assistance for publications in open access journals.
- C. Log Book:** The resident has to maintain a log book which will be a formal record of the clinical, academic and research activities undertaken by the fellow during the course. It is also an important document in case you apply for higher studies subsequently abroad. The work for the log book should begin from the first posting itself. This shall be duly attested by the program leader. The log book should be submitted to the authorities before the final theory exit exam. The log book should contain mentions about the

- Research publications and presentations in any academic forums
- Case presentations
- Academic presentations
- Departmental discussions
- Internal assessment details

D. PRESENTATIONS IN CME AND CONFERENCES

During the course the residents are allowed to attend one International conference provided there is a presentation to do. More numbers of international conferences can be considered based upon the quality of the presentations to do. Residents can attend two national conferences preferably with presentation. They are encouraged to attend regional meetings (TN and Pondicherry area). Residents are advised to make maximum benefit of these meetings to increase their knowledge as well as interaction with specialists from other area (networking practices). At present the department does not financially support the residents for attending conferences. They are advised to garner support from ethical means, either from the organizers or from authorized agencies.

ii. EXIT EXAMINATION:

The exit exam consists of the following pattern

A. Theory exam: 400 marks (4x100)

Paper – I

Molecular oncology & Basic cancer therapeutics

Paper – II: Clinical Oncology 1

Adult Solid tumors

Paper – III: Clinical Oncology 2

Cancers of Childhood, Haematology and transplant,

Paper – IV

Recent advances, Palliative care, Oncologic emergencies, Supportive care

B. Clinical exam

Shall be assessed as follows:

PARTICULARS	Numbers	/mark	Total mark
Long case	1	150 marks	150 marks
Short cases	2	75 marks each	150 marks
Spotters	4	25 marks each	100 marks
Total			400 marks

C. VIVA, Thesis and Log book:

Shall be assessed as follows:

PARTICULARS	Total mark
Viva	150 marks
Log book	25 marks
Thesis	25 marks
Total	200 marks

TOTAL MARKS:

Theory : 400 marks

Clinical : 400 marks

Viva, Thesis, Log book: 200 marks

D. Model question papers

MODEL QUESTION PAPER

D.M (Medical Oncology)

Paper – I

Molecular oncology & Basic cancer therapeutics

Time: 3 Hours

Max. Marks: 100

(10 X 10 =100 Marks)

Answer all the Questions. Diagrams and Tables wherever necessary

Write Short Notes:

1. Mention the Hallmarks of Cancer and its relevant therapeutic targets.
2. Implication of Dietary factors on incidence of cancer.
3. Mechanism of action and drug targets for Immune check point.
4. Role of Pharmacogenomics in Colorectal cancer.
5. Mention the mechanism of action, indications and side effect profile of various available L-Asparaginase formulations.
6. Compare and Contrast the drugs Abiraterone and Enzalutamide in metastatic Prostate cancer
7. 30 year old female diagnosed with breast cancer with one of her sister having diagnosed with breast cancer at the age of 40 years. There are 2 other sisters aged 18 years and 25 years. How will you do a genetic counselling? What are the relevant management options for her unaffected siblings?
8. Population based cancer registry with a special emphasis on Epidemiology of Lung cancer in India.
9. Indications, Principles and Complications of Radiofrequency ablation.
10. Write the salient features you need to consider while conducting a Metaanalysis.

MODEL QUESTION PAPER

D.M (Medical Oncology)

Paper – II

Adult Solid tumors

Time: 3 Hours

Max. Marks: 100

10 X 10 =100 Marks

1. Evidence for neo-adjuvant chemotherapy in oral cavity cancers
2. BRCAness
3. Platinum and Triple negative breast cancers
4. Liquid biopsies
5. Evidence for Neoadjuvant chemotherapy in bladder cancer
6. Types of surgeries in rectal cancer with indications and benefits of each
7. Approach to a pituitary microadenoma
8. Intraperitoneal chemotherapy for ovarian cancer- successes and challenges
9. Local therapies for metastatic lung cancer – options and benefits
10. Write about the role of signal transduction inhibitors in the treatment of advanced melanoma

MODEL QUESTION PAPER

D.M (Medical Oncology)

Paper – III

Cancers of Childhood, Haematooncology and transplant

Time: 3 Hours

Max. Marks: 100

10 X 10 =100 Marks

- I. Classify bone tumors and outline the management of osteosarcoma arising from the lower end of femur in a 12 yr old child.
- II. Acute leukemia in Downs syndrome patients
- III. Write briefly on the clinically relevant subtypes and molecular features of neuroblastoma.
- IV. Briefly describe the genomic characterization and targetable kinase activating lesions in Ph like acute lymphoblastic leukemia.
- V. Critically analyze the role of allogeneic stem cell transplantation in the treatment of refractory and relapsed acute myeloid leukemia.
- VI. Write about the risk and types of cancer in immunosuppressed organ transplant recipients.
- VII. Briefly outline how will you approach to select a donor for allogeneic stem cell transplant.
- VIII. Algorithm for treatment of hairy cell leukemia and describe the outcome with the planned treatment.
- IX. Role of PET-CT scan in management of multiple myeloma.
- X. Discuss the diagnosis and management of a 4 year old child with average risk Medulloblastoma.

MODEL QUESTION PAPER

D.M (Medical Oncology)

Paper – IV

Recent advances, Palliative care, Oncologic emergencies, Supportive care

Time: 3 Hours

Max. Marks: 100

10 X 10 =100 Marks

1. How will you manage impending paraparesis from D8 metastases from triple negative breast carcinoma in a 30 yr old female?
2. Write about the indications for prophylaxis of tumor lysis syndrome and agents used.
3. Briefly describe the structure and mechanism of action of antibody drug conjugates (ADCs) and enumerate the recently reported ADCs in the treatment of acute leukemia.
4. Rules and regulations for morphine storage and usage.
5. WHO ladder approach for cancer pain management.
6. Policy of antifungal use for hematological malignancies at your centre.
7. Immune Checkpoint Blockade in treatment of solid tumors.
8. American Society of Clinical Oncology (ASCO) statement on Human Papillomavirus Vaccination for Cancer Prevention
9. Chemotherapy induced peripheral neuropathy (CIPN): causative agents, types and assessment
10. Write a brief concept proposal on any aspect of evaluation or management of nutritional status in patients planned for palliative chemotherapy

10. RECOMMENDED BOOKS AND JOURNALS

i. LIST OF BOOKS RELEVANT TO THE SUBJECT

SL No	TITLE	AUTHOR	YEAR
1	Concise Manual of Hematology and Oncology	Berger	2008
2	Clinical bone marrow and Blood Stem cell transplantation	Atkinson	2008
3	Hodgins's lymphoma	Hoppe	2007
4	The Chemotherapy Source Book	Perry	2007
5	Atlas of Clinical Hematology	H.Logger	2004
6	Diseases of the Breast	LWW	2010
7	Clinical Nutrition for oncology patients	J&B	2010
8	Principles and Practice of lung cancer	LWW	2010
9	Principles and Practice of Palliative care and supportive oncology	LWW	2007
10	Treatment and Management of Cancer in the elderly	Taylor	2006
11	Non Hodgins's lymphoma	LWW	2010
12	Principles and practice of gastrointestinal Oncology	LWW	2008
13	Cancer stage Manual	AJCC Springer	2010
14	Lecture Notes oncology	Bowler Blackwell	2010
15	Cancer : Principles and Practice of Oncology	Devita LWW	2011
16	Principle and Practice of Gynecologic Oncology	Barakat LWW	2009
17	Cancer : Principles and practice of Oncology, primer of the molecular Biology of Cancer	Devita LWW	2011
18	Hell and Frei Cancer Medicine	Horg PMPH	2010
19	Cancer chemotherapy and Biotherapy principles and	Chabner LWW	2011

	practice		
20	Antibiotic and chemotherapy	Elsevier	2010
21	Comprehensive text Book of genitourinary oncology	LWW	2011
22	Handbook of Cancer chemotherapy	LWW	2012
23	Differential Diagnosis in Orthopedic Oncology	LWW	2007
24	Principles and practice of Pediatric Oncology	LWW	2011
25	Text Book of Uncommon cancer	Wiley	2012
26	Manual of emergency medicine	LWW	2011
27	Contemporary Management of Multiple Myeloma	JP	2012
28	Clinical trials in oncology	Demos	2010
29	Principles of Molecular Diagnostics and personalities Cancer Medicine	LWW	2013

ii. JOURNALS

1. Cancer Treatment Review
2. Journals of Pediatric Hematology/Oncology
3. Current Opinion in Oncology
4. The Indian Journal of Cancer
5. The Seminars in Oncology
6. Haematology/Oncology Clinics of North America
7. Medical and Pediatric Clinic of North America
8. Cancer
9. Current Problems in cancer
10. Journal of Clinical Oncology
11. Lancet
12. NEJM (New England Journal of Medicine)
13. Blood
14. British Journal of Hematology
15. Bone Marrow Transplantation
16. Seminars in Hematology
17. Annals of oncology
18. Lancet oncology
19. Nature Reviews Clinical Oncology
20. Nature Reviews Cancer
21. Clinical Cancer Research