



**AMRITA**  
VISHWA VIDYAPEETHAM

# **PROGRAM**

# **DM Medical Oncology**

(Revised with effect from 2016-2017 onwards)

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# Program Outcomes

PO1 Receive specialized training in medical Oncology, including Hospital based oncology practice, Community Oncology development and Community intervention strategies.

PO2 Acquire the concept of wholesome management of a cancer patient.

PO3 Acquire team spirit by involving the radiation oncologist, surgical oncologist, Nuclear medicine & allied imaging departments, palliative care specialists & pathologists as team players in all patients and other departments as & when necessary.

## Program Specific Outcomes

PSO1 Basic Scientific Principles – The trainee should have clear concepts regarding the basic principles of Biology of normal cells, basic processes of carcinogenesis, gene structure, expression and regulation, cell cycle and interaction with therapy, tumor cell kinetics, tumor cell proliferation, tumor immunology and molecular techniques.

PSO2 Basic Principles in the Management and Treatment of Malignant Diseases – The trainee at the end of training program, should be thorough with the basic principles of malignant disease management including clear understanding of pathologic techniques, serum markers, cell membrane and DNA markers, TNM staging systems, Indications for clinical, radiographic and nuclear medicine procedures, response assessment.

PSO3 Management and Treatment of Individual Cancers and their associated complications – After completion of the training program the trainee should be well versed with the management of all human cancers, chiefly Head and neck, Lung, Gastrointestinal, genitourinary, gynecological, breast, mesenchymal, skin, endocrine, neurological and hematological malignancies. He also needs to be competent in managing pediatric oncology patients.

PSO4 Psychosocial Aspects of Cancer – The trainee should become skillful in handling cultural issues, spiritual conflicts, adaptive behavior, coping mechanisms, communication.

PSO5 Patient Education – The trainee should learn to consciously involve in educating the patients in matters of genetic counseling (screening and assessment of risk), health maintenance (Diet, smoking, alcohol consumption), long term complications, risk of treatment induced cancer, endocrine dysfunctions.

PSO6 Bioethics, Legal, and Economic Issues – The trainee should be fully proficient in dealing with issues of taking informed consent for research activities, ethical conduct of medical research, legal issues (Life support and its withdrawal), cost efficiency and professional attitude.

PSO7 Skills – During the training period the trainee should imbibe and develop the skills of anticancer agent administration (Prescribing, administering, Handling and disposal of chemotherapeutic and biologic agents), clinical procedures (bone marrow aspiration, biopsy, lumbar punctures, abdominal and thoracic paracentesis), ommaya reservoir management. He should be capable of treating pain & other symptoms associated with advanced malignancies.

PSO8 Community responsibilities – He should be well versed with community aspects of cancer screening including cancer registry and other aspects of preventive oncology. He should become competent to plan and implement community intervention strategies and should be well trained to link up with the existing health care system and be able to address screening, early detection and health awareness issues.

PSO9 Constant development – He should be aware of the recent developments in the field of Medical Oncology, chemotherapeutics, preventive oncology, molecular biology.

## GOAL

Providing specialized training in medical Oncology, including Hospital based oncology practice, Community Oncology development and Community intervention strategies.

Instill the concept of wholesome management of a cancer patient.

Instill team spirit by involving the radiation oncologist, surgical oncologist, Nuclear medicine & allied imaging departments, palliative care specialists & pathologists as team players in all patients and other departments as & when necessary.

## OBJECTIVES

Basic Scientific Principles – The trainee should have clear concepts regarding the basic principles of Biology of normal cells, basic processes of carcinogenesis, gene structure, expression and regulation, cell cycle and interaction with therapy, tumor cell kinetics, tumor cell proliferation, tumor immunology and molecular techniques.

Basic Principles in the Management and Treatment of Malignant Diseases – The trainee at the end of training program, should be thorough with the basic principles of malignant disease management including clear understanding of pathologic techniques, serum markers, cell membrane and DNA markers, TNM staging systems, Indications for clinical, radiographic and nuclear medicine procedures, response assessment.

Management and Treatment of Individual Cancers and their associated complications – After completion of the training program the trainee should be well versed with the management of all human cancers, chiefly Head and neck, Lung, Gastrointestinal, genitourinary, gynecological, breast, mesenchymal, skin, endocrine, neurological and hematological malignancies. He also needs to be competent in managing pediatric oncology patients.

Psychosocial Aspects of Cancer – The trainee should become skillful in handling cultural issues, spiritual conflicts, adaptive behavior, coping mechanisms, communication.

Patient Education – The trainee should learn to consciously involve in educating the patients in matters of genetic counseling (screening and assessment of risk), health maintenance (Diet, smoking, alcohol consumption), long term complications, risk of treatment induced cancer, endocrine dysfunctions.

Bioethics, Legal, and Economic Issues – The trainee should be fully proficient in dealing with issues of taking informed consent for research activities, ethical conduct of medical research, legal issues (Life support and its withdrawal), cost efficiency and professional attitude.

Skills – During the training period the trainee should imbibe and develop the skills of anticancer agent administration (Prescribing, administering, Handling and disposal of chemotherapeutic and biologic agents), clinical procedures (bone marrow aspiration, biopsy, lumbar punctures, abdominal and thoracic paracentesis), ommaya reservoir management. He should be capable of treating pain & other symptoms associated with advanced malignancies.

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Constant development – He should be aware of the recent developments in the field of Medical Oncology, chemotherapeutics, preventive oncology, molecular biology.

At the end of the training program the candidate should have: -

<u>Region</u>	<u>Level</u>	<u>No. Of Cases</u>	<u>Treatment</u>
Head & Neck	Supervised	20	Multidisciplinary Management of head and neck cancers
	Independently	30	
Breast	Supervised	30	Chemotherapy protocols
	Independently	50	
GI Cancers	Supervised	20	Chemotherapy for major GI malignancies like Ca stomach, Ca pancreas, Colorectal and hepatobiliary cancer.
	Independently	30	
Gynecology Cancer	Supervised	10	Chemotherapy for gynaecological tumours
	Independently	30	
Skin & Sarcomas	Supervised	10	Chemotherapy protocols
	Independently	25	
Hematological	Supervised and Independently (AML / ALL / Lymphomas)		
Germ Cell tumors			
Radiotherapy	Should have assisted in planning and treatment execution of at least 5 malignancies of different sites including at least one brachytherapy plan.		

## **SKILLS**

As a part of 'Hands on training', the following are the minimum stipulated requirements to be fulfilled by the candidate at the end of three-year training period in Medical Oncology. The candidate will maintain a logbook and take signatures of the concerned consultant involved in each case.

# COURSE CONTENTS

## Basic Science

- A. Lectures on basic sciences as relevant to oncology;
- B. Topics: see syllabus (**Annexure 1**)

## Clinical Experience

- C. Clinical work including chemotherapy, daily patient management, management of patients on chemotherapy and palliative care for advanced malignancy patients.
- D. Weekly multi-disciplinary seminar so as to cover the topics of Malignancies of Head & Neck, Gastrointestinal tract, Thorax, Bones & soft tissue sarcomas, Breast, Skin, Gynecologic oncology and other miscellaneous sites - *over a 36-month period.*
- E. Once a month journal club presentation.
- F. Attendance to at least one oncology conference every year.

Involvement in clinical trials.

A research project (thesis).

Teaching and Learning activities like Seminar, Symposium, Guest lectures etc.

Compulsory attendance to at least 2 oncology CME's during the period of three years.

## G.

## Diagnostic Skills

He should carry out diagnostic procedures like bone marrow aspiration and biopsy, Lumbar Puncture, thoracocentesis etc..

## Chemotherapy Treatment – aware of protocols and regimens:

- H. As mentioned in the table on skills.

## Training Period

The proposed duration of the course will be 3 years.

# THESIS

The candidate will carry out one prospective study during his training period. The study will have to be presented before the scientific and ethics committees before initiating. The topic for thesis will be decided within the first 6 months and the study will have to be completed six months before completion of the three-year tenure.

The study should be of a high caliber, worthy of Publication in an indexed journal.

# METHODS OF TRAINING

Year-wise structure of Training Program: The candidate will spend major part of the first and last year in the parent department (Medical oncology).

Postings in other departments (Radiation oncology, Pathology, Molecular Lab, Pain and Palliative care) will be done in co-ordination with those departments.

Rotation and Posting in other departments

The candidate would spend the 3 years with the following structured rotation:

<b>Number of months</b>	<b>Department</b>
24 months	Medical Oncology
3 months	Radiation Oncology
3 months	Molecular Biology & Basic Science Lab
2 months	Pain and Palliative Care
1 month	Radiology
3 months	Rotation to another Cancer Institute (optional and on a reciprocal basis)

The candidates will be full time residents of the institutions and will perform the duties and responsibilities of a full time physician in oncology.

### **COURSE OUTCOMES**

#### **Course – I (DMMO1) Basic Science as Applied to Medical Oncology**

CO1: Candidate should have basic understanding about the etiopathogenesis of cancer.

CO2: Knowledge about the socio-economic aspects of cancer causation and preventive measures.

CO3: Knowledge about the basic molecular pathology in relation to cancer.

**Essentials of Molecular Biology-** Principles, Genomics and Cancer, Signal transduction, Immunology, Cytogenetics, Cell Cycle, Apoptosis, Invasion and metastases, angiogenesis and Carcinogenesis: Genetics, viral, physical and Chemical. Genomics and Proteomics, Destabilization of the Cancer Genome, Telomeres, Telomerase, and Cell Immortalization, Cancer Stem Cells.

#### **Epidemiology-epidemiological methods, descriptive and analytical epidemiology.**

Principles of Cancer management; Surgical Oncology, Medical Oncology, Radiation Oncology and Biologic Therapy.

Cancer Therapy.

#### **Pharmacology of Cancer Biotherapeutics -** Interferon Interleukin, Hormonal therapy,

Differentiating agents, monoclonal antibodies, anti angiogenic factors.

Clinical Trials.

Anti cancer antibiotics

#### **Cancer prevention, Tobacco related cancers, diet, chemo prevention.**

Cancer screening.

Cancer Registry

Palliation in cancer patients

Cancer Diagnosis – Molecular pathology and Cytology, Imaging, Endoscopy, Laparoscopy.

Specialized techniques- vascular access, isolated perfusion, and Intensity Modulated Radiation therapy.

#### **Course - II (DMMO2) Medical Oncology - I (Breast, Gynaec, Genito-urinary, GI and Pediatric malignancies)**

CO1: Basic understanding of the common pediatric malignancies in the community and the competency to manage them as per the present standards of care.

CO2: Basic understanding of breast malignancies in the community and the competency to manage them as per the present standards of care.

CO3: Basic understanding of the common genitourinary malignancies in the community and the competency to manage them as per the present standards of care.

#### **Management , pathogenesis , clinical features and preventive aspects of diseases involving breast , Gynaecology , Genito urinary , GI and pediatric malignancies**

**Options of breast conservation in patients with breast carcinoma**

**Early detection and treatment options for pediatric malignancies**

**Prognosis and quality of life for cancer patients in pediatric age group**

#### **Course – III (DMMO3) Medical Oncology - II(Head & Neck, Thorax, Skin, Soft tissue & bone, Lymphomas and miscellaneous)**

CO1: Basic understanding of the common head and neck malignancies in the community and the competency to manage them as per the present standards of care.

CO2: Basic understanding of the common soft tissue malignancies in the community and the competency to manage them as per the present standards of care.

CO3: Basic understanding of lymphoproliferative malignancies in the community and the competency to manage them as per the present standards of care.

#### **Management , pathogenesis , clinical features and preventive aspects of diseases involving Head and neck , thorax , skin , soft tissue and bone , lymphomas**

#### **Course – IV (DMMO4) Recent Advances in Oncology and Palliative Care**

CO1: Competency to understand the structure of palliative care/hospice; and the ability to conceive and implement a palliative care unit.

CO2: Competency to analyse clinical trials and derive conclusions to be put into clinical practice.

CO3: Should be upto date with the latest research in the field

CO4: Knowledge of the newer chemotherapy/immunotherapy

## **Knowledge about latest treatment modalities in an international level and its application in today's world**

### **Course V (DMMO5) Soft Skills – Elective Course**

CO1: Competency to conduct a clinical research.

CO2: Competency to work as a team leader.

CO3: Knowledge of medical ethics and etiquette.

CO4: Ability to interact with the patients and their relatives in an effective manner.

CO5: Attitude to be a lifelong learner.

CO6: Ability to be an effective teacher/communicator.

# **SCHEME OF EXAMINATION**

## **I. Theory & Practical Examination**

**Internal assessment of the candidates (100 marks):** This will be done on a continual basis by the faculty with respect to the overall objectives of the course, and specifically with respect to their treatment skills, time spent with patients in pre & post treatment assessments, planning Chemotherapy, seminars, journal club & tumour board presentations.

**Final examination** – A final examination will be conducted at the end of the course by internal and external examiners. It will consist of four theory papers (4 papers x 100 marks each = 400)

Paper 1: Basic science as applied to Medical Oncology

Paper 2: Medical Oncology – I (Breast, Gynaec, Genito-urinary, GI and Pediatric malignancies)

Paper 3: Medical Oncology – II (Head & Neck, Thorax, skin, soft tissue & bone, lymphomas and miscellaneous)

Paper 4: Recent advances in oncology and palliative care

Clinical Cases: 300 marks

Oral: 200 marks

Maximum Marks: 4 theory papers (400) + Clinical cases (300) + Viva (200) = Total Marks 900

## **J.**

## **K. Logbook**

L. Maintenance of a logbook of cases worked up, assisted, done, administered, Chemotherapy and palliative care cases.

## **Annexure 1:**

### **DM MEDICAL ONCOLOGY**

# **SYLLABUS: -**

Essentials of Molecular Biology- Principles, Genomics and Cancer, Signal transduction, Immunology, Cytogenetics, Cell Cycle, Apoptosis, Invasion and metastases, angiogenesis and Carcinogenesis: Genetics, viral, physical and Chemical. Genomics and Proteomics, Destabilization of the Cancer Genome, Telomeres, Telomerase, and Cell Immortalization, Cancer Stem Cells. Epidemiology-epidemiological methods, descriptive and analytical epidemiology. Principles of Cancer management; Surgical Oncology, Medical Oncology, Radiation Oncology and Biologic Therapy. Cancer Therapy.



Pharmacology of Cancer Biotherapeutics - Interferon Interleukin, Hormonal therapy, Differentiating agents, monoclonal antibodies, anti angiogenic factors.  
Clinical Trials.  
Cancer prevention, Tobacco related cancers, diet, chemo prevention.  
Cancer screening.  
Cancer Diagnosis – Molecular pathology and Cytology, Imaging, Endoscopy, Laparoscopy.  
Specialized techniques- vascular access, isolated perfusion, and Intensity Modulated Radiation therapy.  
Systemic Oncology:  
Head and Neck Cancer  
Lung Cancer  
Mediastinal neoplasm  
Gastrointestinal tract cancer  
Cancers of Genitourinary system  
Gynecologic cancer  
Breast cancer  
Endocrine Malignancies  
Musculoskeletal tumours  
Sarcomas of the Soft Tissue

Mesothelioma  
Cancer of the skin  
Malignant Melanoma  
Central nervous system malignancies  
Pediatric malignancies  
Lymphomas and Leukemia's  
Paraneoplastic syndromes.  
Cancer of the unknown primary.  
Peritoneal carcinomatosis.  
Cancer in immunosuppressed host.  
Oncological emergencies – SVC syndrome, spinal cord compression, metabolic emergencies, urology emergencies.  
Treatment of metastatic cancer-brain, lung, bone, liver, malignant Effusions and ascites.  
Haemopoetic therapy-transfusion, growth factors, autologous and Allogenic stem cell transplantation.  
Infection in the cancer patient.  
Supportive care and quality of life-pain management, nutritional support, sexual problems, genetic counseling, psychological issues, community resources, care of the terminally ill patient.  
Adverse effects of treatment –nausea and vomiting. Oral complications, pulmonary toxicity, cardiac toxicity, hair loss, gonadal dysfunction, recurrence, miscellaneous toxicity.  
Rehabilitation of cancer patients.  
Oncology nursing including various access routes.  
Ethical Issues in Oncology.  
Societal Issues in Oncology  
Information systems in Oncology.  
Alternative methods in Cancer treatment.  
Newer approaches in Cancer treatment- Gene therapy, Molecular therapy, Cancer vaccines, image guided surgery, heavy particles in Radiation therapy, Focused Ultrasound, RNA Inhibition, Charged Particle Therapy, Robotic Surgery, Nanotechnology  
Reconstructive surgery.

**Annexure 2:**  
**Model Question Papers**

**PAPER 1:** - Basic sciences as applied to Medical oncology  
Answer briefly and to the point  
Total duration is three hours.

What are the properties of normal stem cells. (5) Discuss the implications of cancer stem cells for the diagnosis and treatment of cancer. (5)

Discuss the role of human papilloma virus in oncology (10)

Discuss the role of serum tumor markers in oncology under the following headings with a couple of examples in each: for screening and early detection (3); for diagnosis (3); for prognosis and prediction of therapeutic response and for monitoring disease (4).

Discuss the role of mammography in  
Screening for breast cancer (6)

A case of established breast cancer (4).

Discuss the components of treatment planning in radiotherapy (10)

Discuss cancer trends in India over the last 30 years and the possible reasons for some of the changing trends (10)

Discuss the molecular mechanisms underlying the metastatic cascade and the current and future therapeutic applications (10)

Short Notes on:

Technique for DNA/RNA microarray. (5)

Senescence and cancer (5)

Radiofrequency ablation (5)

Occupational exposure and cancer (5)

Toxicities of paclitaxel and cisplatin (5)

Stereotactic radiosurgery (5)

**Annexure 3:**

The following is the list of journals for the proposed D.M. course in Medical Oncology.

<b>S. No.</b>	<b>Journal Title</b>	<b>Freq.</b>	<b>Publisher</b>
	Clinics of North America	Q	W.B.Saunders
	Journals of Clinical Oncology	BM	W.B.Saunders
	Lancet Oncology	M	Elsevier Science
	Nature Clinical Practice Oncology	M	Nature
	Indian Journal of Cancer	Q	Medknow Publishers
	Gynecologic Oncology	M	Elsevier Science
	Annals of Oncology	10/Yr	Elsevier Science
	CA: a cancer journal for clinicians	BM	Lippincott Williams and Wilkins
	Cancer Treatment Reviews	BM	W.B.Saunders
	Journal of Experimental & Clinical Cancer Research	Q	Regina Elena Institute for Cancer Research (Italy)
	Cancer Control	BM	Mosfitt Cancer Centre and Research Institute
	Cancer	30/yr	John Wiley & Sons
	British Journal of Cancer	SM	Churchill Livingston
	Acta Oncologica	8/yr	Taylor and Francis
	Current Problems in Cancer	BM	Elsevier Science
	Current Opinion in Oncology	BM	Elsevier Science

**Abbreviations used**

W Weekly  
M Monthly  
SM Semi monthly  
BM Bimonthly  
Q Quarterly  
I Indian  
F Foreign

**Annexure 4:**

**LOG BOOK FORMAT FOR D.M. MEDICAL ONCOLOGY**

No	MRD No	Age	Sex	Diagnosis	Procedure	Activity: (Done/ assisted)	Additional Procedures/ Comments	Signature of Consultant