R.L JALAPPA INSTITUTE OF ONCOLOGY

REGULATION AND CURRICULUM

FOR

M.Ch SURGICAL ONCOLOGY

DEPARTMENT OF SURGICAL ONCOLOGY

SRI DEVARAJ URS MEDICAL COLLEGE

A DEEMED TO BE UNIVERSITY UNDER

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH (SDUAHER), TAMAKA, KOLAR

2022

Eligibility Criteria and Mode of Selection

Eligibility for admission

The candidate must possess recognized degree in MS (General surgery) or DNB (General surgery). Those who are currently registered for M.Ch courses anywhere in India are **NOT** eligible to apply**.**

Age limit: As per the existing rules/ regulations of NMC/MCI at the time of admission

Mode of Selection: All admissions will be made through NEET-super specialty (NEET-SS) entrance examination conduction by National Board of Examination, New Delhi

Documents needed: The following documents are needed at the time of admission

- Proof of Date of Birth (10^{th} class Mark sheet or birth certificate)
- MCI / State Council Registration Certificate
- MBBS Degree certificate
- MS /DNB Degree certificate
- Course Recognition Certificates: for both MBBS and MS/DNB
- No Objection Certificate (NOC) /Relieving order from the current employer (if currently employed)
- Medical fitness certificate/ Physically Handicapped Certificate (if applicable)

Should a candidate secure admission, then all the original certificates will have to be deposited in the College until the completion of the course.

Intake of Student / year

Number of eligible candidates per year: As for regulatory body guidelines

Duration Program

3 years, Each year will be divided into 6 monthly terms (total 6 terms).

Training process

12 months: training in General surgical oncology

6 months: training in basic/ clinical research methodology

12 months: rotation training through all cancer sub-sites; rotation postings in radiation oncology, medical oncology, onco-imaging, onco-pathology, molecular biology

6 months: training in both pre- and post-operative adjuvant therapies for all cancers must be obtained; training in palliative surgical procedures, vascular access and oncological emergencies and pain control

Fee Schedule:

The fee schedule will be as follows:

YEAR	AMOUNT	DUE DATE
1st		
2nd		
3rd		

- The candidates are required to pay the prescribed fees for the admission year in a prescribed format which will be intimated at time of admission and will be as per regulatory requirements.
- Annual fees in the subsequent year will have to be paid in 2 installments.
- Examination fees and other fees, if any, will be notified at the time of admission or at the appropriate time.
- Any candidate who discontinues the course after admission but before the course commencement will not be entitled for refund of the fees paid and deposits made to the Institution unless the said seat gets filled up by another candidate.
- If the vacated seat is filled up, fees will be refunded after deduction of 10% of the total fees payable as service charges.
- If the candidate discontinues the course after commencement, then, he/she will have to refund the entire stipend paid by the Institution up to the time of discontinuing, pay the fees for the remaining period of the course, and shall also forfeit all the deposits and other fees paid to the Institution.

Subject Specific Objectives

The aims of Surgical Oncology are:

- To produce a competent surgical oncologist who will be a team leader ushering multidisciplinary and comprehensive treatment of all cancer patients with thrust on service, education and research.
- recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy;
- mastering most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
- awareness of the contemporary advances and developments in the discipline concerned;
- acquiring a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology; and
- acquiring the basic skills in teaching of the medical and paramedical professionals.

Subject Specific Competencies

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

Cognitive domain (theoretical knowledge):

The post graduate student should acquire knowledge in the following areas by the end of the training program

- Surgical anatomy of relevant areas in relation to surgical oncology
- Lymphatic drainage of all cancers in relation to staging and therapy.
- Pathology of premalignant and malignant lesions at all sub-sites.
- AJCC/ TNM staging system for various cancers
- Genetic basis of cancers including cancer syndromes
- Surgical principles in the management of cancers at each sub-site.
- Postoperative care, including fluid and electrolyte management.
- Prophylaxis and management of suspected and established cases of venous thromboembolism.
- Concepts of medical and radiation oncology in the management of all cancer sub-sites
- Palliative therapies for all cancer sub-sites

- Cancer pain management

Writing Research articles:

- Should be able to design research protocol, implement the same and interpret the results of the study
- Should be able to evaluate the relevant literature critically
- Would be expected to publish/submit at least two original articles related to the specialty in an indexed journal.

Medical Statistics: The student should acquire knowledge in the following areas of medical statistics:

- Type of data & Sampling
    - Categorical data (nominal, ordinal)
    - Numerical data (discrete and continuous, the Normal distribution, transformation to Normality)
    - Random sampling
    - Standard error of a sample mean and of a proportion, and their differences
- Principles of statistical inference & comparing groups
    - Hypothesis testing and estimation
    - Type I and II errors
    - Interpretation of p-values and confidence intervals
    - Statistical and clinical significance
    - T-tests & Chi square with corrections
- Survival analysis
    - Types of time-to-event data (survival data, recurrence data)
    - Presentation of survival data
    - Kaplan-Meier and actuarial survival curves
    - Summarizing survival data
    - Comparing groups using Log rank test
    - Use of Cox's proportional hazards regression model
    - Hazard ratios and their interpretation

Clinical trials: The various phases (I-IV) of clinical trials need to be appraised of including

- Randomization

    - Need for randomization

- Problems with non-randomized studies and historical controls
- Methods of randomization (simple, bloc, stratified minimization)
- Blinding / masking

- Designs: parallel group, cross-over, factorial
- Contents of a trial protocol
- Ethics and informed consent
- Measures of response: Tumour regression
    - Quality of life, morbidity, local and regional recurrence, metastases and death
    - Principles of sample size calculation
    - Interim analyses & Intent-to-treat analysis (ITT)
    - *Affective Domain:*

- 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.
- Adopt ethical principles and maintain proper etiquette in dealing with patients, relatives and other health care 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.
- Attend at least one course of one week duration dedicated to communication skills being conducted either in the same institution or by any recognized institution.
- Effectively communicate to patient and her relatives the nature of disease, the extent of disease, the treatment options available and expected outcome following management of the disease.
- Able to execute the planned treatment with the help of other colleagues in the specialty of Surgical Oncology.
- Maintain the highest degree of professionalism in executing treatment of the disease and communication to the patient and relatives.

Psychomotor domain

At the end of the course, the student should acquire following practical and clinical skills, details of which are given under syllabus section.

Syllabus

Course contents: At the end of three year course in Surgical Oncology the post graduate student should have acquired following theoretical, clinical skills and research knowledge.

- Diagnostic techniques and staging of cancers
- Surgery for all cancer sub-sites
- Principles of radiation therapy for all cancer sub-sites
- Chemotherapy, targeted therapy and immunotherapy for solid tumors
- Palliative care for advanced and recurrent cancers
- Pathology of cancers including premalignant conditions
- Research methodology for clinical trials and statistics
- Writing original papers in reputed national & International scientific journals
- Knowledge related to cancer epidemiology and preventive oncology
- Cancer screening
- Integration with allied specialties

Cancer Biology

- Molecular Biology
- Cell Proliferation, Differentiation, and Apoptosis
- Growth Factor Signal Transduction in Cancer
- Oncogenes
- Tumor Suppressor Gene Defects
- Recurring Chromosome Rearrangements in Human Cancer
- Biochemistry of Cancer
- Invasion and Metastases
- Tumor Angiogenesis

Tumor Immunology

Cancer Etiology

- Predisposition to Cancer

- Chemical Carcinogenesis
- Hormones and the Etiology of Cancer
- Ionizing Radiation
- Ultraviolet Radiation Carcinogenesis
- Physical Carcinogens
- Trauma and Inflammation
- Tumor Viruses
- Herpesviruses
- Papillomaviruses and Cervical Neoplasia
- Hepatitis Viruses
- Parasites

Cancer Epidemiology

Theory and Practice Of Clinical Trials

Cancer Prevention

- Prevention of Tobacco-Related Cancers
- Nutrition in the Etiology and Prevention of Cancer
- Chemo-prevention of Cancer
- Cytokinetics
- Drug Resistance and its Clinical Circumvention
- Principles of Dose, Schedule, and Combination
- Chemotherapy
- Regional Chemotherapy
- Animal Models in Developmental Therapeutics
- In Vitro and In Vivo Predictive Tests
- Pharmacology
- Toxicology by Organ System

Chemotherapeutic Agents

- Folate Antagonists
- Pyrimidine and Purine Antimetabolites

- Alkylating Agents and Platinum Antitumor Compounds
- Anthracyclines and DNA Intercalators /
- Epipodophyllotoxins / DNA Topoisomerases
- Microtubule-Targeting Anticancer Drugs Derived from Plants and Microbes: Vinca Alkaloids
- Taxanes, and Epothilones, Asparaginase

Principles of Endocrine Therapy

- Steroid Hormone Binding and Hormone Receptors
- Hypothalamic and Other Peptide Hormones
- Corticosteroids
- Estrogens and Anti-estrogens
- Clinical Use of Aromatase Inhibitors in Breast Carcinoma
- Progestins
- Androgen Deprivation Strategies in the Treatment of Advanced Prostate Cancer

Cancer Screening and Early Detection

Principles of Cancer Pathology

Principles of Imaging

- Imaging Cancer of Unknown Primary Site
- Imaging Neoplasms of the Head and Neck and Central Nervous System
- Imaging Neoplasms of the Thorax
- Imaging Neoplasms of the Abdomen and Pelvis
- Cross-Sectional Imaging of Musculoskeletal Neoplasms
- Imaging the Breast
- Ultrasound in Cancer Medicine
- Radionuclide Imaging in Cancer Medicine
- Perspectives in Imaging
- Interventional Radiology for the Cancer Patient

Principles of Surgical Oncology

- Principles of Surgical Oncology
- Vascular Access in Cancer Patients

Principles of Radiation Oncology

- Physical and Biologic Basis of Radiation Oncology
- Principles of Hyperthermia
- Photodynamic Therapy of Cancer

Principles of Medical Oncology

- Principles of Medical Oncology
- Principles of Biotherapeutics
- Immunostimulants
- Active Specific Immunotherapy with Vaccines
- Interferons
- Cytokines: Biology and Applications in Cancer Medicine
- Hematopoietic Growth Factors.
- Monoclonal Serotherapy
- Cancer Gene Therapy

Principles of Bone Marrow Transplantation

- Autologous Bone Marrow and Stem Cell Transplantation
- Transplantation of Allogeneic Hematopoietic Cells for the Treatment of Malignancies

Principles of Psycho-Oncology

Principles of Oncology Nursing

Principles of Cancer Rehabilitation Medicine

Principles of Multidisciplinary Management

Principles of Societal Oncology

- Ethical Aspects of Caring for Patients with Cancer
- Legal Aspects of Cancer
- The Government and Cancer Medicine
- Clinical Oncology in a Changing Health Care Environment
- Outcomes Assessment

Neoplasms of the Central Nervous System

Neoplasms of the Eye

Neoplasms of the Endocrine Glands

- Pituitary Neoplasms
- Neoplasms of the Thyroid/parathyroid
- Neoplasms of the Adrenals
- Neoplasms of the Neuroendocrine System and
- Neoplasms of the Gastroentero-pancreaticEndocrine System
- MEN syndromes

Neoplasms of the Head and Neck

- Head and Neck Cancer
- Odontogenic Tumors

Neoplasms of the Thorax

- Cancer of the Lung
- Malignant Mesothelioma
- Thymomas and Thymic Tumors
- Tumors of the Heart and Great Vessels
- Primary Germ Cell Tumors of the Thorax
- Metastatic Tumors in the Thorax

Neoplasms of the Female Reproductive Organs

- Neoplasms of the Vulva and Vagina
- Neoplasms of the Cervix
- Endometrial Cancer
- Neoplasms of the Fallopian Tube
- Ovarian Cancer
- Gestational Trophoblastic Disease
- Gynecological stromal tumours

Neoplasms of the Breast

Neoplasms of the Skin

Malignant Melanoma

Neoplasms of the Bone and Soft Tissue

Neoplasms of the Alimentary Canal

- Neoplasms of the Esophagus
- Neoplasms of the Stomach
- Primary Neoplasms of the Liver
- Treatment of Liver Metastases
- The Gallbladder
- Diagnosis and Management of Biliary Tract Cancer
- Neoplasms of the Ampulla of Vater
- Neoplasms of the Exocrine Pancreas
- Neoplasms of the Small Intestine, Vermiform Appendix, and Peritoneum
- Neoplasms of the Colon and Rectum
- Neoplasms of the Anus

Neoplasms of the Genitourinary Tract

- Renal Cell Carcinoma
- Neoplasms of the Renal Pelvis and Ureter
- Bladder Cancer
- Neoplasms of the Prostate and seminal vesicles
- Neoplasms of urethra
- Neoplasms of the Penis
- Neoplasms of the Testis

Neoplasms in AIDS

Infections in Patients with Cancer

Neoplasms of Unknown Primary Site

Neoplasms in Children

- Principles and Practice of Pediatric Oncology
- Incidence, Origins, Epidemiology
- Principles of Pediatric Radiation Oncology
- Late Effects of Treatment of Cancer in Children and Adolescents
- Childhood Acute Lymphoblastic Leukemia
- Pediatric Acute Myeloid Leukemia
- Hodgkin's Disease in Children and Adolescents
- Non-Hodgkin's Lymphoma in Children
- Langerhans' Cell Histiocytosis
- Hepatic Tumors
- Renal Tumors of Childhood
- Germ Cell Tumors
- Neuroblastoma
- Soft Tissue Sarcomas of Childhood

Complications of Cancer and its Treatment

- Management of Cancer Pain
- Anorexia and Cachexia
- CINV and its therapy
- Neurologic Complications
- Dermatologic Complications ofCancer Chemotherapy
- Skeletal Complications
- Hematologic Complications and Blood Bank Support
- Coagulopathic Complications of Cancer
- Urologic Complications
- Cardiac Complications
- Respiratory Complications
- Liver Function and Hepatotoxicity in Cancer
- Gastrointestinal Complications
- Oral Complications
- Gonadal Complications
- Endocrine Complications

- Secondary Cancers: Incidence,
- Risk Factors, and Management,

Oncologic Emergencies

Neoplasms of the Hematopoietic System

- Myelodysplastic Syndrome
- Acute Myeloid Leukemia in Adults
- Chronic Myeloid Leukemia
- Acute Lymphocytic Leukemia in Adults
- Chronic Lymphocytic Leukemia
- Hairy-Cell Leukemia
- Hodgkin’s Disease
- Non–Hodgkin’s Lymphomas
- Mycosis Fungoides and the Sézary Syndrome
- Plasma Cell Tumors
- Mast Cell Leukemia and Other Mast Cell Neoplasms
- Polycythemia Vera and Essential Thrombocythemia

List of Surgeries

Head and Neck Oncology

- Tracheostomy
- Neck Dissections
- Radical Neck dissection
- Modified neck dissections
- Selective neck dissections
- Hemi mandibulectomy
- Marginal/segmental mandibulectomy
- Alveolectomy
- Total Glossectomy
- Hemi glossectomy
- Composite resections
- Partial Maxillectomy
- Total Maxillectomy
- Orbital tumors

  Enucleation

  Exenteration
- Skull Base surgeries
- Wide field laryngectomy
- Conservative laryngectomy
- Laryngopharyngo Oesophagectomy
- Tracheo Esophageal Prosthesis (TEP)
- Superficial parotidectomy
- Radical parotidectomy
- Excision of submandibular gland tumors
- Hemi thyroidectomy
- Total thyroidectomy
- Scalp and other skin tumors: Wide excision & reconstruction

Breast oncology

- Lumpectomy
- Breast conservation surgery – wide local excision + axillary clearance
- Modified radical mastectomy
- Radical Mastectomy
- Breast reconstruction

Thoracic Oncology

- Pneumonectomy (R) & (L)
- Lobectomy
- Segmental resection
- Non-Anatomical resection
- Hilar lymphadenectomy
- Mediastinal Tumors resection
- Transhiatal Oesophagectomy
- Sweets's transthoracic Oesophagectomy
- Ivor-lewis transthoracic Oesophagectomy
- Mckeowns three stage Oesophagectomy
- Total Esophagectomy with three field lymphadenectomy

Gastrointestinal Oncology

- Total radical gastrectomy + reconstruction
- Partial Radical gastrectomy + reconstruction – lower & upper
- Duodenal local excision + reconstruction
- Whipples pancreaticoduodenectomy
- Total pancreaticoduodenectomy
- Child's distal pancreaticosplenectomy
- Distal pancreatectomy
- Splenectomy
- Segmental small bowel resection with reconstruction
- Right & left hemicolectomy
- Total colectomy

- Extended colectomy
- APR with TME
- Anterior resection
- Hartmann's procedure
- Pelvic exenteration – anterior / posterior / total
- Wide local excision of rectal / anal tumors
- Colostomy
- Ileostomy
- Mesenteric tumors excision
- Retro peritoneal tumor excision
- Right & left hepatectomy
- Extended right & left hepatectomy
- Segmentectomy
- Non Anatomical resection
- Excision of extra biliary tumors with reconstruction

Genitourinary Oncology

- Cystoscopy: diagnostic/ therapeutic
- Radical Nephrectomy
- Radical cystectomy with reconstruction
- Partial cystectomy
- Radical Prostectomy
- Pelvic lymphadenectomy
- Ureteric Tumor excision with reconstruction
- RPLND
- Radical/High Orchiectomy
- Hemi scrotectomy
- Penectomy – Partial/Total
- Inguinal/Ilio-Inguinal lymphadenectomy

Gynecological Oncology

- Colposcopy: diagnostic/therapeutic

- Cone excision/ LEEP
- Radical hysterectomy for carcinoma cervix
- Staging laparotomy for carcinoma ovary and endometrium
- Pelvic exenteration:Anterior / Posterior/ Total
- Cytoreductive surgery and HIPEC
- Vulvectomy: simple/radical
- Groin node dissection

Musculoskeletal Oncology

- Amputations/Disarticulation
    - Forequarter
    - Shoulder Disarticulation
    - Elbow Disarticulation
    - Above and below elbow Amputation
    - Ray Amputation
    - Hemipelvectomy
    - Extended Hemipelvectomy
    - Hind quarter Amputation
    - Hip disarticulation
    - Above/Below Knee Amputation
    - Symes Amputation
    - Trans-metatarsal Amputation
- Limb sparing surgeries
- Wide excision with reconstruction with or without lymphadenectomy of soft tissue and skin tumors
- Compartmental excision with reconstruction

Endoscopic, Thoracoscopic and Laparoscopic procedures

- Staging laparoscopy/ thoracoscopy
- Therapeutic Laparoscopic procedures

Diagnostic techniques and staging

The trainee should be able to:

- Identify the appropriate diagnostic techniques needed to:
  - establish the diagnosis
  - establish the extent of disease
  - evaluate co-existing disease which may have an important bearing on selection of and response to treatment
  - evaluate the response to treatment
- stage the cancer according to the current TNM classification (AJCC).
- have sufficient knowledge endoscopic evaluation
- perform and understand indications of upper GI endoscopy, cystoscopy, proctosigmoidoscopy, bronchoscopy, triple scopy etc
- be expert in performing relevant biopsies for diagnosis and staging
- understand the indications and techniques for open and percutaneous biopsies of possible metastatic sites such as lung, liver and spine and lymph nodes.
- understand the use and limitations of cytology in the detection of cancer, and know how to obtain the necessary samples

The trainee should know the indications, interpretation and limitations of the techniques such as:-

- Radiographic diagnosis:
  - Standard plain film evaluation of chest, abdomen and skeletal system
  - CT scan and MRI: including indications, treatment response assessment, limitations
  - Mammography
  - Barium studies whenever applicable
- Radioisotope scanning:
  - PET-CT scanning: indications, interpretation, limitations in various cancers
  - Bone scans
- Ultrasonography including Doppler assessment
- Interpretation and measurement of tumor markers in oncology
  - beta HCG
  - AFP

- CEA
- CA125
- CA19-9
- PSA
- Calcitonin and thyroglobulin

- Biochemistry
  - liver function tests
  - renal function tests including creatinine clearance, GFR, serum electrolytes, urine electrolytes, osmolality, osmolality and pH
- Blood coagulation
  - tests for coagulopathies
  - monitoring of anticoagulant therapy
  - prophylactic and therapeutic use of anticoagulants
- Pulmonary function tests (PFT): technique, interpretation and limitations
- Perioperative monitoring: indications and interpretation of
  - central venous pressure and CVP lines
  - pulmonary wedge pressure and Swann Ganz catheters
  - arterial lines
  - ECG and invasive cardiac monitoring
    - Role of HDU/ICU in post-operative care after major oncological surgery

Surgery for cancer

The trainee should gain expertise in:

- Preoperative evaluation
- Pre-operative preparation
  - bowel preparation
    - pre operative antibiotic policy
  - position of ostomy sites
  - fluid and electrolyte management
  - pulmonary and cardiac evaluation

- thromboprophylaxis
- counseling the patient and the family
- obtaining informed consent
- genetic counseling (whenever applicable)

- Choice of treatment – surgical and non-surgical treatment
- Surgical anatomy as relevant to surgical oncology
- Management of complications

  - Familiar with common complications associated with commonly performed surgical procedures.
  - Intraoperative like transfusion reactions, cardiac arrest, injury to bladder, bowel, major blood vessels, tracheobronchial tree etc.
  - Postoperative like atelectasis, other pulmonary complications, bleeding, DVT and pulmonary embolism, entero-cutaneous fistulae, SSIs, renal failure, congestive heart failure, jaundice, pyrexia and sepsis, ARDS, burst abdomen, paralytic ileus, bowel obstruction etc.

The trainee should have sufficient training and experience that the following procedures may be independently and competently performed and their aftercare managed by the completion of the training period. Some of the listed procedures may be performed via minimally invasive techniques (thoracoscopy/ laparoscopy) for both diagnostic and therapeutic purposes whenever feasible.

PROCEDURE	**NAME**
Endoscopic and Percutaneous	Tracheo-Bronchoscopy +/- BAL/ biopsy Oesophagogastroduodenoscopy +/- biopsy Rigid oesophagoscopy +/- dilatation Image guided transthoracic FNAC/ biopsy ERCP +/- biopsy/ SEMS Image guided FNAC/biopsy Percutaneous pleural/pericardial paracentesis Percutaneous peritoneal paracentesis Proctoscopy +/- biopsy Sigmoidoscopy/ Colonoscopy +/- biopsy Urethroscopy/ Cystoscopy +/- biopsy

	TRUS biopsy/ FNAC PTBD +/- brushing Percutaneous breast biopsy/ FNAC Percutaneous lymph node biopsy/ FNAC
Open Surgical: Minor	Lymph node biopsy Submandibular gland excision Breast lumpectomy only Image guided biopsy of bone/ soft tissue tumors Biopsy of skin tumors
Open Surgical: Major	Tracheostomy Neck dissection: selective/ comprehensive Wide excision of buccal mucosa/ tongue cancer Parotidectomy Hemi/total thyroidectomy Skin tumor wide excision +/- flap reconstruction Subtotal gastrectomy for cancer Splenectomy +/- distal pancreatectomy Radical hemicolectomy: right/left Small bowel resection and anastomosis Stoma creation: ileostomy/colostomy Orchiectomy: low/ high Partial penectomy Groin node dissection Wide excision soft tissue sarcoma +/- reconstruction Disarticulation: shoulder/ hip Bone tumor: open biopsy Amputations: distal MRM/ BCS with axillary staging +/- pedicle flap reconstruction/ oncoplasty Cervix: core biopsy/ LEEP Metastatectomy: liver/ lung (</= 4 lesions)

	Staging laparotomy for CA ovary/ CA endometrium Radical vulvectomy alone Radical nephrectomy/ nephroureterectomy Open radical prostatectomy Hemiscrotectomy Palliative bypass procedures Diagnostic laparoscopy/ thoracoscopy Maxillectomy: partial/total
Open Surgical: Supra Major	Skull base surgeries Laryngo-pharyngo-esophagectomy + gastric pull up Composite resection with flap reconstruction for oral cavity malignancies Wide field laryngectomy with neck dissection Total thyroidectomy with central compartment clearance and neck dissection Mediastinal tumor excision Lung resection: lobectomy/ pneumonectomy Oesophagectomy with two/three field nodal clearance Tracheal resection and reconstruction Liver resection: major Radical cholecystectomy with periportal lymph node clearance Whipple procedure Total gastrectomy +/- DPS with reconstruction Total colectomy +/- pouch reconstruction Rectal cancer surgeries: AR/ISR/APR Radical cystectomy with ileal conduit / continent diversion RPLND Retroperitoneal sarcoma excision +/- multi-visceral resection

	Limb salvage surgery with mega-prosthesis reconstruction Fore/ hind quarter amputation including hemipelvectomy Radical hysterectomy +/- PLND Pelvic exenteration: anterior/ posterior/ total Metastatsectomy: liver/lung (>4 lesions) Chest wall tumor resection + reconstruction Cytoreductive surgery +/- HIPEC Orbital exenteration surgeries Total penectomy with perineal urethrostomy Any surgery needing free flap reconstruction Any surgery needing vascular reconstruction

Principles of Radiation therapy

The trainee should have sufficient familiarity with the principles and practice of Radiation Oncology in treatment planning, execution and in the management of irradiation induced complications.

Radiobiology and Cell biology

- General principles of Radiobiology
  - The cell cycle, basic cell kinetics, tumour vasculature and angiogenesis.
  - Cellular systems and their response to radiation
  - Radiation biology models radiation damage at the cellular level.
- Techniques in molecular biology
  - Nucleic acid analysis including electrophoresis, hybridization, blotting, PCR, sequencing, transfection
  - Micro array techniques
  - Transgenic models
- The genetics of normal and malignant cells
  - Normal chromosomal structure and function, normal gene transcription
  - Normal DNA repair mechanisms
  - Polymorphisms, mini and micro satellites

- Chromosomal and genetic changes in malignancy, point mutations, translocations, deletions, gene amplification and over-expression

- Oncogenes, proto-oncogenes, tumour suppressor genes.

- Normal tissue radiobiology

  - Normal tissue damage & concepts of normal tissue tolerance

  - The concept of damage (lethal, sub-lethal, potentially lethal) & Repair

  - The cell survival curve as a basis for fractionation

  - Hyper fractionation, accelerated fractionation and hypo fractionation

  - Hypoxic cell sensitizers and protectors

- Radiotherapy treatment planning
  - Alpha, beta and gamma rays
  - Inverse square law
  - Immobilization (techniques and accuracy)
  - Tumor localization: direct visual, simulator, CT, MRI, USG, PET
  - Principles of conformal therapy, IMRT and IGRT

- Radiotherapy Treatment
  - External Beam therapy & equipment
    - Principles of superficial, orthovoltage and megavoltage
    - Principles of the Linear Accelerator & Telecobalt machines
    - Radiation Doses: radical & palliative
    - Radiotherapy Techniques: Conventional, 3D-CRT, IMRT & IGRT
  - Brachytherapy
    - Types of sources & their construction
    - Principles of clinical use
    - intracavitary and interstitial brachytherapy systems, source and dose distributions and dose specification
    - Principles of after loading (manual, remote, low, medium and high dose rate)
    - Image guided Brachytherapy
  - Intraoperative radiotherapy (IORT)
  - Radiotherapy to various sites like head and neck, cervix, breast, rectum, lung, sarcomas etc.

- Radiation protection:
  - Radiation risk & Radiation limits
  - Protection mechanisms: time, distance, shielding
  - Monitoring of personnel
  - Dose reporting mechanisms and dose level
- Early radiation reactions

- Late Complications
  - Factors affecting late complications
  - Complication to GI Tract, Urinary tract, Skin, Bone Marrow etc.
  - Managing complications
  - Late radiation induced malignancies
- Combination of chemotherapy and radiation Therapy (neo-adjuvant, concurrent and adjuvant)

Principles of Chemotherapy

The trainee should understand the pharmacology of the major drugs used in cancer chemotherapy and be able to use them.

- Cell biology including:
  - cell cycle kinetics
  - log kill hypothesis
  - cycle and phase specificity
- Classes of chemotherapeutic agents :
  - taxanes
  - alkylating agents
  - anti-metabolites
  - antibiotics
  - vinca alkaloids
  - hormones
  - miscellaneous agents
- Targeted therapy
- Immunotherapy

- Mechanism of action
- Pharmacology of specific agents
  - routes of administration and absorption
    - distribution
  -biotransformation
  - excretion
    - drug interactions
  - pharmacokinetics
- Benefits and limitations of combination chemotherapy
- Intra-peritoneal chemotherapy including HIPEC, EPIC
- High dose chemotherapy
- General guidelines for clinical evaluation including the definitions of complete or partial responses, the concept of phase I, II and III drug trials and adjuvant therapy.
- Chemotherapy toxicity including :
  - general effects on rapidly proliferating epithelium such as bone marrow, gastrointestinal tract and hair follicles
  - drug specific toxicity
  - management of toxicity
- Palliative Chemotherapy: indications, principles and methods

Palliative care for advanced and recurrent cancers

The trainee should able to contribute to palliative care including:

- Pain relief:
  - non-narcotic analgesics
  - narcotic analgesics
  - co-analgesics
  - WHO ladder
  - understanding the role of anesthetist: (a) pain clinics, (b) neural blocks
- Anxiety relief
  - Sedatives and tranquillizers

- counseling (patient and family)
- Home care

- nausea and vomiting relief
  - antiemetics
  - dietary measures
- Community support roles

The trainee should have received practical exposure to hospice care. The trainee should have teaching in and experience of breaking bad news to patients and relatives.

Pathology of common cancers including premalignant conditions

- Should be able to identify, on the basis of direct visual and microscopic evaluation, lesions that are pre-malignant or malignant and distinguish them from benign tumours.
- Histopathological features important in decision making i.e. tumour margins, depth of invasion, lympho-vascular space involvement, grade, node metastases must be known.
- should be familiar with immunohistochemistry and immunophenotyping, receptor studies, molecular testing for prognostication and treatment etc.
- Role of pathologist in multidisciplinary cancer care

Knowledge related to cancer epidemiology and preventive oncology

Cancer screening

Integration with allied specialties

Books and Journals

Books for Reading

- Molecular Diagnosis of Cancer, Cotter F.E.
- Molecular Biology for Oncologists,Yarnold. J.R. et al
- Cancer Chemotherapy Handbook, Baquiranj Delia
- Text book of Malignant Haematology, Degos L et al
- Clinical Haematology, Rochard Leeet al
- Clinical Oncology, Abeloff et al
- Cancer Principles and Practice of Oncology, Devita VT. et al
- AJCC Cancer' Staging Manual (American Joint Committee on Cancer)
- Cancer Treatment, Halnan E .K
- Comprehensive Text book of Oncology, MossaAR
- Oxford textbook of Oncology Peckham M. et al
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Methods of Training

Formal Teaching

1. Residency pattern of training
2. Graded responsibilities according to the year of residency
3. Every candidate must take part in:

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

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

   c) *Lecture/discussion*: Lectures on newer topics by faculty, as an alternative to seminars as per need.

   d) *Case presentation:* Post graduate students will present a clinical case fordiscussion before a faculty and discussion made pertaining to its management anddecision to be recorded in case files.

   e) *Case scenarios*: students are expected to work up one long case or two short cases and present the same to a faculty member and discuss the management.

   f) *Clinico-radiological meeting*: held once a week in which the radiological features of various clinical cases are discussed.

   g) *Clinico-pathology meeting*: with special emphasis on surgical pathology and its correlation with radiological and clinical findings

   h) *Grand Rounds*: to be done for the hospital once a week or once in 2 weeks with presentation of unusual or difficult cases for the benefit of all clinicians.

   i) *Emergency services*: Casualty duty by rotation among the residents by rotation with a faculty cover.

   j)*Bedside clinical training*: to be done daily for half to one hour during ward rounds with faculty and 1-2 hours in the evening by post graduate students /faculty on emergency duty, bed side patient care discussions are made.

   k)*Clinical teaching*: in OPDs, wards, emergency, ICU and the operation theatres.

4. Training must also include laboratory/ experimental work and research activities
5. Participate in the teaching and training program of undergraduate students and interns.

6. Should have attended two conferences/CMEs/Workshops during tenure.
7. 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 the training so as to make him/her eligible to appear at the examination.
8. Post graduate students shall maintain a log book of the work carried out by them and the training program undergone during the period of training including details of surgical operations assisted or done independently by M.Ch. candidates. Log book shall be checked and assessed periodically by the faculty members imparting the training. The logbook is a record of the important activities of the candidate during his/her training. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

   The log book should include following:

   - Cases seen on rounds – description of interesting cases and other miscellaneous topics discussed.
   - Out-patient cases seen and details of interesting cases with follow up.
   - Procedures performed
   - Training programs attended – details of bedside clinics, subject and clinical seminars, Journal clubs, mortality meet and hospital conferences.
   - Night duties – details of patients managed and emergencies, consultation, ward calls attended.
9. The Department should encourage e-learning activities.
10. Clinical Postings: The post graduate student is required to work full time in the department of Surgical Oncology and participate in patient care, academic and research activities, as described hereunder:

<u>1st six months</u>

- Orientation program.
- History taking and case sheet writing in wards
- OT, casualty and ICU exposure
- Attend operation theatre and emergency operations

- Attend ward rounds and visit other wards with senior colleagues to attend call/consultation from other departments.
- Participation in the teaching session in wards for bedside clinical teaching in the afternoon seminar/journal club and case conferences.
- Participation in teaching and training program of UG students and interns.
- Performing minor surgical procedures (eg. biopsies) independently

Next thirty months

- Attend at least two OPDs every week, as delegated by the Head of the Department.
- Discuss problematic cases with consultant(s).
- Attend operation room/theatre at least 3 days in a week.
- Attend 2 morning rounds/week.
- Care of the in-patients on daily basis.
- Attend Journal Club and seminars regularly and present the same by rotation.
- Attend specialty clinics, if available at the institute
- Attend the combined teaching programs of the department including clinical meetings, CPC's, surgico-pathological meetings, surgico-radiological meetings
- Attend emergency duty twice a week as per roster of the department.
- Attend lectures by the visiting faculty to the department/college from India/abroad.
- Attend/participate/present papers in state/zonal/national conferences.
- Actively participate/help in organization of departmental workshop, courses in specialized areas.
- Assist and performance (with assistance) of major surgical procedures
- Attend and perform endoscopy at least once a week
- The department should encourage e-learning activities.

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

11. Postings to allied specialty departments, both within and outside the institution will be follows.

POSTINGS	**PERIOD**
Kidwai Memorial Institute of Oncology/ Tata Memorial Centre	2 months
Medical Oncology	15 days
Radiation Oncology	15 days
Onco-pathology including molecular oncology	15 days
Onco-imaging and radiology	15 days
Pain & Palliative care including psycho-oncology	15 days
Community oncology and social oncology	15 days
TOTAL	**5 months**

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

Project/ Dissertation:

Every candidate pursuing M.Ch (surgical oncology) degree course is required to carry out work in a selected research project under the guideline of a recognized post graduate teacher.

The results of such a project shall be submitted to the university in the form of dissertation.

Monitory Progress of Students

FORMATIVE ASSESSMENT

Formative assessment should be a continuous process and must focus on knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

Quarterly assessment during the training should be based on:

- Journal based / recent advances learning
- Patient based /Laboratory or Skill based learning
- Self-directed learning and teaching
- Departmental and interdepartmental learning activity
- External and Outreach Activities/CMEs

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

Internal evaluation: The candidate will be guided and judged as regards his/her abilities to provide competent patient care in relation to ward rounds, discussions and weekly academic activities. Clinical skills, academic performance and personal attributes shall be graded on a scale of 1 to 5 (5 being the highest). The academic presentations shall be graded at the time of presentation of the consultant in-charge. Evaluation on clinical skills and personal attributes others shall be done by the Unit in-charge at the end of every term. In addition to bedside teaching rounds, formal teaching is necessary.

The departments may select a mix of the following sessions:

- Journal club and audit once a week
- Seminars and lectures once a week
- Case discussions twice a week
- Inter-departmental case/seminars once a week
- Attend accredited scientific meetings (CME, symposia, and conferences)
- Additional sessions on basic sciences, biostatistics and clinical research methodology, teaching methodology, medical ethics and legal issues are suggested.

Periodic assessment will be done comprising of annual tests at the end of 1st and 2nd year and a pre-final test 3 months prior to final examination.

SUMMATIVE ASSESSMENT

The summative assessment examination shall include two heads:

A. Theory examination

B. Practical examination.

A. The *theory examination* will consist of 4 papers of 100 marks each (Total: 400 marks), each of 3 hours duration. Each paper shall consist of two long essay questions each question carrying 20 marks and 6 short essay questions each carrying 10 marks. Question on recent advances may be asked in all papers. The distribution of topics for each paper will be as follows:

Paper I: Basic Sciences, includes cancer biology, tumor immunology, cancer etiology, pharmacology, radiation biology, tumor pathology.

Paper II: Principles of Surgical Oncology, management of head & neck, thorax, breast, gastrointestinal system cancers.

Paper III: Management of genitourinary, gynecological, bone & soft tissue, endocrine, childhood cancers, skin & central nervous system tumors.

Paper IV: Cancer epidemiology, prevention, psycho-oncology, rehabilitation, biostatistics and clinical research methodology

B. The *practical examination* will consist of:

a) Clinical examination (consisting of at least one long case and 3 short cases; each long case will be for 100 marks and each short case will be for 50 marks; Total: 250 marks)

One long case: History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management. Three short cases from various sections of Surgical Oncology. M.Ch. candidates will also be examined in surgical procedures.

b) Viva voce: This will test the candidate's comprehension, analytical approach, expression and interpretation of data. In addition, candidates may be also be given case reports, charts, gross

specimens, radiological images for interpretation. Question on operative surgery and instruments will also be asked. (Total of 100 marks)
GRAND TOTAL (Max. Marks): 400+ 250+ 100= 750

Scheme of Examination

Examination Schedule: The exit exam will be conducted at the end of 3 years

Examiners: There shall be at least 4 examiners: two external and two internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the NMC

Criteria for passing: For theory, the passing percentage shall be cumulatively 50% with minimum of 40% marks in each theory paper. For practical's and viva-voce, the passing percentage shall be 50%. Passing shall be separate for each head and failing shall be common, meaning that if the candidate passes in theory but fails in practical's, it amounts to failure at summative examination and vice versa.

Surgical Oncology Education Programme

PREAMBLE

A surgical oncologist is an oncologist who performs surgery. He forms as important member of the multidisciplinary team when treating cancer patients. With advances in surgery, radiation, medical oncology, and approaches such as immunotherapy and hyperthermia, the surgical oncologist helps in integrating these approaches to the patient care. Furthermore, the surgical oncologist has a special training that makes it possible for him or her to understand these divergent fields and appreciate their potential roles in treatment.

The surgical oncologist should be specially trained to perform unique and complicated surgical procedures, such as resection of soft tissue sarcomas and total pelvic exenteration, not normally performed by the community-based general surgeon. It is expected that general surgeons will perform most of the standard cancer resections, with more complex and less frequently performed procedures being handled by specialists in surgical oncology. The surgical oncologist should also take the responsibility for training new residents and educating the general surgical staff of their hospitals and medical schools to better define the concepts and indications of advances in cancer diagnosis and management. The surgical oncologist should be involved with clinical and basic science research activities in oncology and should help to organize clinical protocols for the study of cancer patients.

Management of each patient's care should be coordinated with other departments like medical oncologists, radiation therapists, and other disciplines in the practice of medicine as needed, in order to establish the highest possible standards of care for treatment of cancer. Finally, a surgical oncologist must lead fellow surgeons who remain the primary treatment source for most patients with malignant disease. Such leadership includes establishment of protocols for research, convincing colleagues that patients should be entered into clinical trials and other studies, helping to explain the results of such trials, and being critical of ineffective or poorly conceived studies. Thus the surgical oncologist will both direct and stimulate better investigation and treatment, and also provide a critical viewpoint as new and innovative management approaches come to the clinical arena.

Cancer Prevention

Oncologists have a special obligation among physicians to educate the general public, including other professionals with a less intense interest in cancer prevention. Smoking is the principal correctable cancer-inducing activity. Oncologists should counsel patients and families about good nutrition and healthy sexual practices. This is entirely appropriate for conditions known to be associated with a genetic predisposition, but not for all types of cancer. It is usually the oncologist's responsibility to assess the risk for a particular disease and to conduct the necessary surveillance.

Clinical Research

No cancer is so well treated that an improvement in outcome or therapeutic approach cannot readily be imagined. Thus, research is imperative. Therapies that allow preservation of the involved organ are much to be desired, and investigations that have led, in many patients, to breast preservation, limb salvage, bladder conservation, and avoidance of Abdomino-perineal resection are major dividends in the treatment of cancers in these organs. Although in these instances it would appear self-evident, measuring the quality of life is now quantitatively valid and has added a major opportunity to each value judgment.

Every established paradigm of oncologic management arose from some investigative effort. In many instances, these were one-armed studies that were so successful they became adopted. Every oncologist during his or her training be exposed to, and almost always be a participant in, clinical research. Virtually no regimen or treatment for any tumor is entirely satisfactory. There is much reason to anticipate that progress would be more rapid if clinical research were accepted as an integral part of the practice of oncology so that more oncologists and patients would participate than at present. The technology exists in medical informatics for oncologists to ally themselves with their alma mater or other academic centers to participate in diagnostic, preventive, and therapeutic research trials using the computer, e-mail, and fax as expedient tools. As a part of the commitment to oncology, an oncologist should reserve a certain number of hours per week for participation in clinical research. This has the virtue of maintaining greater currency with ongoing investigation. Clinical investigation should serve as the bridge to fundamental science and the excitement in the new molecular biologic understanding of the cancer cell. A set-aside for research, however, constitutes the same imperative commitment as a set-aside for education and updating.

Goals

To produce a competent surgical oncologist who will be a team leader ushering multidisciplinary and comprehensive treatment of all cancer patients with thrust on service, education and research.

Objectives

- General
    - Recognition of the importance of the concerned specialty in the context of the health need of the community and the national priorities in the health sector.
    - Practice the specialty concerned ethically and in step with the principles of primary health care.
    - Demonstrate sufficient understanding of the basic sciences relevant to the concerned specialty.
    - Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/strategies.
    - Diagnose and manage majority of the conditions in the specialty concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.
    - Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty.
    - Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
    - Demonstrate empty and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations.
    - Play the assigned role in the implementation of national health programs, effectively and responsibly.
    - Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
    - Develop skills as a self-directed learner, recognize continuing educational needs; select and use appropriate learning resources.
    - Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyze relevant published research literature.

    - Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
    - Function as an effective leader of a health team engaged in health care, research or training.
- Components of the curriculum: theory knowledge, clinical/practical skills, attitude towards peers and patients, communication skills and training in research methodology

Requirements: The centre should have expertise in other associated areas which includes:

- Neuro-spinal surgery
- Head and Neck surgery
- Thoracic surgery
- Gastrointestinal surgery
- Genito-urological surgery
- Gynecological surgery
- Orthopedic surgery
- Reconstructive and plastic surgery
- Others are radiology, pathology, medical oncology, radiation oncology and pediatric oncology