

Radiation Therapy

Curriculum Guide

Developed as a guide for
Radiation Therapy Education Programs



Based on the Radiation Therapy Competency Profile
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Prepared by the Radiation Therapy Competency Profile Task Group

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CURRICULUM GUIDE – RADIATION THERAPY

This document is a curriculum guide for Radiation Therapy education programs.

It provides guidelines for the development and redesign of curriculum that is necessary to achieve the competencies in the revised Radiation Therapy Competency Profile that will be used for exam development effective with the September 2011 Radiation Therapy certification exams.

With the rapid changes in technology and the move towards a more inter-professional healthcare practice, educational programs have been requesting guidance in the development of curriculum and the provision of clinical experience required to ensure graduates of medical radiation technology education institutions have an educational experience reflective of the needs of the national healthcare environment.

The Curriculum Guide is designed using the format of the revised Radiation Therapy Competency Profile and provides lists of knowledge, skills and judgments required to successfully achieve many of the essential competencies. **Not all competencies are accompanied by lists and these lists are not inclusive. They are provided as a guide ONLY.**

Based on the format of the Competency Profile, the Curriculum Guide is divided into 20 modules

Module A	Professional Practice
Module B	Patient Management
Module C	Radiation Health and Safety
Module D	Quality Management
Module E	Practical Applications
Module F	Breast Cancer
Module G	Genitourinary Cancers
Module H	Respiratory Cancers
Module I	Gastrointestinal Cancers
Module J	Head & Neck Cancers
Module K	Gynecologic Cancers
Module L	Lymphoreticular Cancers
Module M	Central Nervous System Cancers
Module N	Pediatric Cancers
Module O	Hematologic Malignancies
Module P	Cancers of the Endocrine System
Module Q	Sarcomas of the Bone & Soft Tissue
Module R	Skin Cancers
Module S	Benign Conditions
Module T	Palliative and Supportive Care

MODULE A PROFESSIONAL PRACTICE

Whenever both national and provincial regulations/codes of ethics are in place, only the national standards will be tested on the CAMRT certification examination.

A 1 Demonstrates Critical Thinking

A 1.1 Apply critical thinking and problem solving strategies to ensure best practices

- Identify the problem
- Define objective
- Formulate pre-decisions
- Generate alternatives
- Evaluate alternatives
- Make decision
- Implement decision
- Evaluate outcome

A 2 Practice in accordance with legislation, regulations and ethical guidelines related to the profession

A 2.1 Practice patient care in a manner that protects the patient's legal rights

- Informed Consent
- Confidentiality
- Freedom of Information
- Privacy
- Mandatory reporting
 - Suspected Abuse
 - Suspected Malpractice
- Healthcare Directive
 - Do not resuscitate
 - Living wills
- Restraints
 - Physical
 - Chemical

A 2.2 Demonstrate an understanding of the current and emerging issues in the Canadian Healthcare System

- Accountability to various stakeholders
- Privatization
- Access and choice
- Availability of services
- Management of resources
- Policies and procedures to manage risk
- Partnership opportunities
- Impact of technology on practice

A 2.3 Perform all duties in compliance with sexual abuse prevention guidelines

A 2.4 Practice in accordance with national association's /provincial regulatory body's code of ethics

- Dignity and respect
- Trust and confidence

- Accountability
- Safe environment
- Advocacy
- Confidentiality
- Collaborative care
- Continuing competence
- Contribute to the profession

- A 2.5 Practice within scope of practice in accordance with national association and provincial regulatory body's legislation requirements**
- A 2.6 Practice in accordance with the national association's and provincial regulatory body's standards of practice**
- A 2.7 Practice in accordance with legislation, regulations/by-laws regulating radiation therapists**
 - Assault
 - Battery
 - Libel
 - Harassment
 - Slander
 - Negligence
- A 2.8 Provide a diagnostic/therapeutic impression to healthcare professionals to assist in patient care management**
 - Provide impression regarding appearance of a procedure or exam
 - Provide impression to appropriate professional regarding
 - Assessment of patient's condition
 - Recognition of risk
- A 3 Demonstrate professional behaviors**
 - A 3.1 Demonstrate respect and sensitivity in both patient and professional interactions**
 - A 3.2 Utilize stress management techniques**
 - A 3.3 Utilize conflict management techniques**
 - A 3.4 Manage change within the evolving healthcare system**
 - A 3.5 Exchange knowledge/skills with other members of health care teams to promote collaborative practice**
 - A 3.6 Provide clinical instruction, guidance, and evaluation for students**
 - A 3.7 Assume a lead role during diagnostic/therapeutic procedure when working with the healthcare team**
 - A 3.8 Present a professional appearance and manner**
- A 4 Participate in professional development for the purpose of evidence based decision-making**
 - A 4.1 Engage in reflective practice, self-assessment to identify a learning plan that will promote best practices**
 - A 4.2 Demonstrate a basic understanding of current and emerging imaging, planning and therapeutic technologies used by interdisciplinary practices**

- A 5 Participate in research for the purpose of evidence based decision-making**
 - A 5.1 Demonstrate an understanding of: how to review current literature, research methodology, data collection and analysis of statistics in order to promote evidence based practice**
 - Retrospective studies
 - Prospective studies
 - Meta-analysis
 - Survey research
 - A 5.2 Participate in a research-based project**
 - Literature review
 - Research questions and testable hypotheses
 - Methods and design
 - Qualitative
 - Quantitative
 - Data collection, analysis, and interpretation
 - Data presentation
 - A 5.3 Discuss the ethical issues involved with research**
 - Ethical foundations
 - Clinical practice
- A 6 Understand the application of resource management principles**
 - A 6.1 Differentiate between capital and operating budgets**
 - A 6.2 Recognize implications of practice on budgets**
- A 7 Participate in resource management**
 - A 7.1 Prioritize workflow to optimize patient outcomes**
 - Patient status
 - Resources (human and material) available
 - Estimated time of procedure
 - Type of procedure
 - A 7.2 Monitor inventory of materials and supplies**

MODULE B PATIENT MANAGEMENT

- B 1 Provide a safe environment to minimize the risk of adverse events to the patients and to the staff**
 - B 1.1 Provide a safe, clean and comfortable environment**
 - B 1.2 Transport the patient safely, using equipment based on the patient's physical and cognitive status**
 - Wheelchair
 - Stretchers and resources available
 - B 1.3 Transfer the patient safely, using equipment and techniques based on the patient's physical and cognitive status**
 - Patient transfer devices (ex. Sliding board, sheet, mechanical lift)
 - Three person lift
 - Two person transfer
 - B 1.4 Employ proper body mechanics to prevent harm to self and the patient**
 - B 1.5 Implement immobilization techniques based on age, physical and cognitive status of the patient and type of procedure**
 - B 1.6 Adjust the patient's position to prevent harm, promote comfort and optimize procedure outcomes**
 - B 1.7 Verify patient identity following a standardized protocol**
 - B 1.8 Assess documentation for compliance with legal requirements**
 - Verify imaging procedure has been ordered by authorized practitioner
 - Verify treatment plan has been authorized by the oncologist
 - Validate treatment delivery via appropriate therapy personnel
 - B 1.9 Complete documentation in compliance with legal requirements**
- B 2 Interact within the healthcare environment**
 - B 2.1 Establish patient rapport**
 - Greet the patient with the appropriate salutation and identify self
 - Explain provider role
 - Facilitate translation services
 - Respect patient diversity
 - Interact with the patient in a caring and compassionate manner
 - Use appropriate non-verbal communication techniques
 - B 2.2 Use various forms of communication to provide/obtain relevant, accurate and complete information**
 - Verbal
 - Written
 - Electronic
 - B 2.3 Exchange information regarding details of the procedure with patients and their support persons, to enable them to make informed decisions**
 - Explain the procedure
 - Counsel the patient with respect to pre, during and post procedural care
 - Dietary
 - Pharmacokinetics
 - Activity levels
 - Verify understanding of information to give the patient an opportunity to ask questions
 - Respond to the patient's and their support persons concerns
 - Ensure the patient's needs are met prior to release from the therapist's care

- B 2.4 Assess and respond to cultural, ethnic, linguistic, religious and socioeconomic variables affecting communication**

- B 3 Perform patient assessments and medical interventions within scope of practice in accordance with provincial regulatory body's legislation requirements**
 - B 3.1 Perform patient assessments**
 - Interpret data systems
 - Previous medical history
 - Physical medical assessment
 - Laboratory results
 - Nutritional history
 - Pharmacokinetics

 - B 3.2 Assess, monitor and respond to various levels of patient status**
 - Physical status
 - Cognitive status
 - Level of consciousness
 - Learning needs
 - Psychosocial status
 - Adverse reactions
 - Contrast media
 - Other pharmaceuticals
 - Other allergens/ sensitivities
 - Vital signs
 - Weight
 - Medical Disorders
 - Neurological disorders
 - Diabetic emergencies
 - Respiratory distress
 - Cardiac distress
 - Post-surgical
 - Cardiac pacer

 - B 3.3 Participate in/perform therapeutic interventions**
 - Apply sterile bandages/dressings
 - Administer oxygen
 - Assist with suction
 - Perform CPR
 - Assist with first aid/ medical emergencies
 - Assist with bedpans and urinals
 - Assist with ostomy pouches

 - B 3.4 Assess, monitor and respond to therapeutic and supportive devices in order to ensure the patient's safety and comfort**
 - IV therapy
 - Urinary drainage
 - Skeletal supports
 - Therapeutic tubes and drains
 - Blood pressure measurement
 - Oxygen saturation levels

 - B 3.5 Ensure that the patient's needs are met prior to release from the radiation therapist's care**

- B 4 Implement infection control practices**
 - B 4.1 Understand transmission modes of nosocomial infections (host, agent, and environment)**
 - B 4.2 Utilize established practices for preventing the transmission of infection in health care**
 - B 4.3 Apply principles of asepsis**
 - Hand hygiene
 - Cleaning
 - Disinfection
 - Low
 - Medium
 - High
 - Sterilization
 - Dry
 - Steam
 - Mechanical
 - Sterile tray preparation
 - Sterile fields
 - Gloving and gowning
 - Masks and goggles
 - IV preparation
 - B 4.4 Follow established protocols when handling and disposing of contaminated and biohazardous materials such as sharps and body fluids**
 - B 4.5 Adhere to protective environment protocols for patients with compromised immunity**
 - B 4.6 Adhere to protocols when caring for patients with antibiotic resistant organisms**
 - B 4.7 Adhere to transmission based precautions for airborne, droplet and contact modes of transmissions**
 - Airborne
 - Droplet
 - Contact
- B 5 Respond to patient hygiene needs**
 - B 5.1 Assist the patient with personal care**
 - Elimination
 - Cleanliness

MODULE C RADIATION HEALTH, SAFETY AND PROTECTION

- C 1 Apply radiation safety practices to self, patients, care givers and the general public**
 - C 1.1 Use protective devices/apparel according to radiation standards**
 - Gonadal shields
 - Lead Aprons
 - Barriers and screens
 - Thyroid shielding
 - Internal eye shields
 - C 1.2 Use imaging accessory devices following established radiation safety guidelines**
 - Grids
 - Filters
 - Beam limiting devices
 - C 1.3 Determine patient's pregnancy status and take appropriate action**
 - C 1.4 Apply ALARA (As Low As Reasonably Achievable) principle during the practice of radiation therapy**
 - Inverse square law
 - Benefit versus risk
 - Patient orientation to primary beam
 - Digital imaging exposure indices
 - Exposure parameters to minimize dose and optimize image quality
 - Physical location of individuals in relation to primary beam and scatter pattern
 - Practice principles of Time, Distance, Shielding
 - Calculate workload, use and occupancy factors
 - Monitor patient movement
 - C 1.5 Use protective practices specific to each radiation source/equipment**
 - Adhere to transport regulations
 - Maintain accurate records
 - Use survey meters
 - Work only on licensed radiation equipment
 - Use radiation signage/beam indicators
 - Restrict access to radiation areas
 - C 1.6 Recognize emergency situations and implement appropriate procedures**
 - Stuck sources
 - Timer/monitor unit failure
 - Lost sources
 - Spilled radioactive material
- C 2 Monitor radiation exposure dose to self, patients, care givers and the general public**
 - C 2.1 Operate and monitor equipment and handle radioactive sources in compliance with national and provincial radiation safety legislation**
 - Meet established performance standards for radiation safety training
 - Order, store and monitor radioactive materials
 - C 2.2 Monitor personal radiation exposure**
 - Wear radiation monitoring device
 - Store monitoring devices appropriately when not in use
 - Follow guidelines for limiting exposure during pregnancy
 - Report accidental exposure, damage or loss of monitoring device
 - C 2.3 Adhere to radiation dose limit standards**

- C 2.4 Interpret radiation exposure dose reports**
 - Archive exposure reports
 - Implement appropriate action should readings exceed recommended standards
- C 2.5 Participate in radiation safety surveys**
- C 3 Advocate Radiation Safety**
 - C 3.1 Educate individuals regarding radiation risks and practices**
 - X-ray production and properties
 - Risk vs. benefit
 - Genetic effects
 - Somatic effects
 - Stochastic effects
 - Deterministic effects
 - Radioactive sources properties
 - C 3.2 Apply protective practices according to organ sensitivities**
 - C 3.3 Determine relative dose measurements using thermoluminescent dosimeters, diodes and other monitoring equipment**
 - Determine that a treatment setup requires measurement
 - Ensure dose is measured
 - Read dose to monitor patient
 - Report measured dose
- C 4 Identify the regulatory agencies responsible for radiation protection**
 - C 4.1 Adhere to standards set by provincial radiation protection agency**
 - Equipment under 6MV energy
 - C 4.2 Adhere to standards set by federal radiation protection agency**
 - Equipment above 6MV energy
 - Isotopes
 - C 4.3 Explain the CNSC regulations for radiation dose limits**
 - Public
 - Nuclear Energy Worker

MODULE D QUALITY MANAGEMENT

D 1 Participate in Quality Assurance Programs

D 1.1 Participate in quality assurance program activities

- Ensure that technical protocols are updated as required
- Ensure that treatment protocols are updated as required
- Optimize patient scheduling
- Participate in the revision of departmental policies
- Verify that accurate data is collected, securely stored, and shared only with appropriate persons
- Analyze data to improve departmental outcomes, including
 - Identify trends
 - Monitor calibration of instruments
- Maintain quality control records and charts
- Participate in quality assurance surveys
- Facilitate effective flow and exchange of information with all stakeholders
- Participate in performance appraisal

D 1.2 Apply principles of risk management

- Complete an incident report
- Maintain accurate record keeping
- Comply with infection control policies and procedures
- Practice in a manner that will help prevent workplace injuries
- Comply with policies to eliminate workplace harassment
- Promote safe practices to prevent harm to patient and others
- Direct patient with specific concerns to appropriate resource person
- Be familiar with emergency disaster plans

D 1.3 Adhere to Workplace Hazardous Materials Information System (WHIMS) regulations and Occupational Health and Safety (OH&S) regulations

D 2 Participate in Quality Control Program

D 2.1 Identify the primary purpose and function of components of imaging and treatment equipment

D 2.2 Evaluate the performance of treatment planning and treatment delivery equipment according to the manufacturer's specification

- Simulator
- CT Simulator
- Treatment Units
- Remote after-loading brachytherapy units
- Manual after-loading sources
- Film processing equipment

D 2.3 Monitor and maintain image management equipment

- Film
- PACS (Picture Archival and Communication System)
- Individual workstations
- Treatment Planning systems

D 2.4 Perform basic trouble shooting

- Ascertain the source of common errors/faults
- Differentiate between system faults and operator errors
- Demonstrate the necessary procedures to reset the system

Assess the effect of a fault on further equipment function
Demonstrate the importance of effective troubleshooting before calling for service

D 2.5 Initiate corrective actions to address equipment issues

Document errors

Liaise with appropriate service personnel

D 2.6 Perform quality assurance procedures and initiate corrective action on clinical aspects of treatment delivery, patient care and patient education

Treatment chart

Education documents

Treatment plans

MODULE E PRACTICAL APPLICATIONS

- E 1 Explain the radiobiological rationale for**
 - E 1.1 Time, dose and fractionation**
 - E 1.2 Combined treatment modalities**
 - E 1.3 Radiation induced cellular damage**
 - Cell survival curves
 - DNA and chromosomal
 - E 1.4 Response of normal tissue**
 - Timing of side effects
 - Tissue tolerance doses
 - LD 50/5
 - LD 5/5
 - E 1.5 Five radiobiological factors**
 - Radiosensitivity
 - Repair
 - Repopulation
 - Reoxygenation
 - Redistribution
 - E 1.6 Relative Biological Effectiveness (RBE)**
 - E 1.7 Linear Energy Transfer (LET)**
 - E 1.8 Linear Quadratic module for tissues**
 - E 1.9 Radioprotectors/radiosensitizers**
 - E 1.10 Acute effects of total body irradiation**
 - E 1.11 Effects on embryo and fetus**

- E 2 Perform planning procedures for appropriate technique**
 - E 2.1 Assess patient for pre-existing medical conditions that may contraindicate the procedure**
 - E 2.2 Assist the patient as required to prepare for the procedure**
 - E 2.3 Educate patient regarding the planning procedure**
 - E 2.4 Assist in the administration of contrast media if required**
 - E 2.5 Assess patient for hypersensitivity/contra indications to contrast media if required**
 - E 2.6 Respond to patient's adverse reaction to contrast media**
 - E 2.7 Select optimum patient position and immobilization**
 - Patient comfort and safety
 - Compatibility with equipment/technical requirements
 - Patient age, physical and cognitive condition
 - E 2.8 Construct immobilization device if required**
 - E 2.9 Fit immobilization device if required**
 - E 2.10 Initiate corrective actions for improper fit of immobilization device**
 - E 2.11 Operate conventional simulator for the purposes of field localization and verification**
 - Set appropriate distance, approximate field size, target volume and table position
 - Determine the appropriate imaging plane
 - Position the image intensifier
 - Select the field parameters by utilizing the fluoroscope
 - Determine exposure factors with respect to part thickness and tissue density

Place radiographic markers and loaded film cassette
Expose the film and/or archive digital images

- E 2.12 Operate CT Simulator for the purposes of field localization and verification**
 - Determine CT imaging parameters with respect to: field of view, protocol, set-up references, pitch/pitch width, region of interest, scanning parameters, slice increments, slice thickness, window level, window width
 - Perform CT scan
 - Determine reference slice location for dosimetry purposes
- E 2.13 Transfer treatment parameters to immobilization device, shell, or patient**
- E 2.14 Obtain consent for marking/tattooing patient**
- E 2.15 Determine placement and type of skin markings/tattoos that are appropriately referenced to the patient's anatomical landmarks**
- E 2.16 Perform skin markings/tattoos that are referenced to patient's anatomical landmarks**
- E 2.17 Document and/or photograph the critical parameters of treatment setup**
- E 2.18 Display and critique analog/digital images**
 - Produce film/screen image using chemical processing
 - Identify image with correct patient data and field parameters
 - Optimize, save, archive, and export electronic images
- E 2.19 Complete post-procedural tasks**
 - Coordinate with other health care providers for continuity of care
 - Document set-up instructions, treatment parameters, and images taken
 - Determine where the patient's planning information should be sent and initiate action/approval by oncologist
- E 3 Perform Dosimetry**
 - E 3.1 Determine appropriate planes and levels for contours/measurements**
 - E 3.2 Produce contours identifying critical and other structures for dosimetric calculation**
 - E 3.3 Transfer applicable contours to planning computer**
 - CT
 - Wire
 - SSD (source to skin distance) measurements
 - Dicom image transfer
 - E 3.4 Identify the benefits contributed by image fusion to optimize the dosimetry plan**
 - E 3.5 Identify parameters for an acceptable dose distribution**
 - E 3.6 Identify acceptable dose/fractionation regimes for the treatment site**
 - Review and interpret appropriate treatment prescription data
 - E 3.7 Implement plan in consultation with radiation oncologist**
 - E 3.8 Generate an optimal dose distribution for various external beam techniques**
 - Optimize target dose
 - Limit dose to critical structures
 - Utilize beam modification devices as necessary
 - manual wedges/enhanced dynamic wedges
 - MLCs (multi leaf collimator)/Shielding blocks
 - IMRT (intensity modulated radiation therapy) segments

Compensators
Bolus

- E 3.9 Generate an optimal dose distribution for various brachytherapy techniques**
 - Computer calculations
 - Manual calculations
- E 3.10 Modify plan parameters to optimize dose distributions**
- E 3.11 Perform calculations for various external beam procedures**
 - Perform a composite plan
 - Participate in IMRT planning
 - Calculate doses using manual method for photon, and/or electron
 - Calculate doses on and off axis at various patient depths
 - Calculate dose of irregular shaped fields
 - Calculate electron field output factor
 - Calculate the combined entrance/exit doses
 - Calculate the gap between adjacent fields
 - Calculate dose for a point in or beyond a tissue inhomogeneity for photon and/or electron fields
- E 3.12 Perform calculations for various brachytherapy procedures**
- E 3.13 Identify situations which require calculation modification and perform appropriate recalculation**
 - Patient separation changes
 - Patient setup is routinely not reproducible

- E 4 Fabricate Accessory Devices as necessary**
 - E 4.1 Construct and mount shielding blocks**
 - E 4.2 Prepare block positioning templates**
 - E 4.3 Construct lead/ electron cut-out**
 - E 4.4 Prepare bolus material**
 - E 4.5 Construct mouthbite**
 - E 4.6 Construct compensator**
 - E 4.7 Create multi leaf collimator settings**

- E 5 Perform treatment procedures for various techniques**
 - E 5.1 Assess and prepare technical parameters prior to commencing treatment**
 - Write up treatment record
 - Input treatment data to verification system and check entry
 - Recognize and correct errors
 - E 5.2 Educate patient regarding treatment procedures**
 - E 5.3 Align patient and equipment for treatment delivery**
 - Position patient according to prescription instructions
 - Set field and unit parameters
 - Correctly employ beam modification devices
 - E 5.4 Determine acceptability of daily set-ups and perform trouble shooting**
 - Verify set-up parameters
 - Assess effect of minor set-up alterations and take appropriate action
 - Collaborate with colleagues to facilitate appropriate action if continued set-up discrepancy

- E 5.5 Generate portal images for clinical mark ups, clinical trial purposes, and/or field verification as required for the appropriate technique**
 - Hard copy port films
 - Electronic portal images
 - E 5.6 Critique portal images to establish accuracy of patient's treatment field and optimal image quality**
 - E 5.7 Initiate corrective action if patient's treatment field image is unacceptable as per prescription parameters**
 - E 5.8 Obtain oncologist approval where required**
 - E 5.9 Administer external beam radiation therapy as per the prescribed technique**
 - Select and verify parameters on the console
 - Initiate the beam
 - Monitor patient movement and equipment for error
 - Verify and document prescribed treatment delivery
 - Record and report any delivery errors
 - E 5.10 Administer brachytherapy as necessary as per the prescribed technique**
 - Prepare instruments and applicators for procedure
 - Prepare brachytherapy unit
 - Set-up sterile environment for brachytherapy application
 - Assist in insertion of applicators/sources
 - Connect applicators to unit
 - Program parameters and initiate treatment
 - Assist in removal of applicators/sources
 - Complete documentation of procedure
 - E 5.11 Monitor the patient while receiving radiation treatment**
 - E 5.12 Document the technical aspects of care**
 - Document monitor units delivered
 - Document dose delivered
 - E 5.13 Determine that a treatment setup requires a thermoluminescent diode measurement**
 - Ensure dose is measured using thermoluminescent dosimeter or diode
 - Read and report the thermoluminescent dosimeter results
 - Document the results
 - Initiate appropriate action with the results
- E 6 Assess and respond to patient's needs**
- E 6.1 Discuss the possible general side effects of radiation therapy**
 - Fatigue
 - Anorexia/cachexia
 - Skin reaction
 - Sexuality issues
 - Pain
 - E 6.2 Discuss the possible acute reaction/side effects of the selected technique**
 - E 6.3 Identify methods to minimize the acute reactions**
 - Diet and exercise
 - Pharmacological intervention
 - Non-medicinal intervention
 - Lifestyle
 - E 6.4 Discuss the possible chronic reactions/side effects of the selected technique**
 - E 6.5 Identify methods to minimize the chronic reactions**

- Diet and exercise
- Pharmacological intervention
- Non-medicinal intervention
- Lifestyle
- E 6.6 Perform holistic patient assessments**
 - Side effects
 - Psychosocial
 - Disease progression
- E 6.7 Develop individualized patient care plans**
- E 6.8 Discuss, educate and counsel regarding care plan with patient/support person(s)**
- E 6.9 Implement care plan**
- E 6.10 Collaborate with other health care providers for continuity of care**
- E 6.11 Document to ensure continuity**
- E 6.12 Evaluate outcomes**
- E 6.13 Revise strategies as required**
- E 6.14 Understand the role of complimentary and alternative medicine within the cancer experience**

- E 7 Explain the fundamental principles underlying radiation therapy physics**
 - E 7.1 Explain structure of matter**
 - Atomic
 - Nuclear
 - E 7.2 Explain radioactive decay**
 - E 7.3 Explain the production of x-rays**
 - Apparatus
 - Physics concepts
 - E 7.4 Explain the production of electrons**
 - Apparatus
 - Physics concepts
 - E 7.5 Explain dose distributions and scatter analysis attenuation processes**
 - E 7.6 Explain the various interactions of ionizing radiation in air and in a standard phantom**
 - E 7.7 Discuss the processes of measuring ionizing radiation**
 - E 7.8 Describe the criteria behind the quality of x-ray beams**
 - E 7.9 Describe the criteria behind the quality of electron beams**
 - E 7.10 Differentiate between the various methods of absorbed dose measurement**
 - E 7.11 Analyse dose and scatter distributions**

- E 8 Describe the physical properties of radiation therapy equipment**
 - E 8.1 Explain the components of various external beam treatment machines**
 - Orthovoltage
 - Megavoltage
 - Cobalt
 - Particle accelerators
 - E 8.2 Explain the components of various brachytherapy units**
 - E 8.3 Explain the components of various radiation therapy treatment planning units**
 - CT/Simulator
 - Conventional simulator

- E 8.4 Explain the nature of impact of digital imaging technologies on radiation therapy**
 - Computed Radiography (CR)
 - Digital Radiography (DR)
 - Picture Archiving and Communication Systems (PACS)

- E 9 Prevention and Early Detection**
 - E 9.1 Explain Cancer prevention strategies**
 - E 9.2 Explain the purpose and criteria of effective screening programs**

MODULE F BREAST CANCER

F 1 Radiation Treatment of Breast Cancer

F 1.1 State the epidemiology of breast cancer

Risk factors
Incidence

F 1.2 State the etiology of breast cancer

F 1.3 Explain the prognostic indicators of breast cancer

Hormone receptor status
Her-2 status
Lymph node status
Tumor extent
Histology

F 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the thorax in relation to breast cancer

F 1.5 Discuss the natural history of breast cancer

Site of origin in the breast
Tumor progression
Recurrence
Distant metastasis

F 1.6 Identify the clinical presentation of breast cancer

F 1.7 Identify the various detection and diagnostic methods of breast cancer

Complete history and physical examination
Mammography
Ultrasound
Biopsy
MRI
PET
Breast self examination

F 1.8 Describe the pathology and staging of breast cancer as it relates to treatment

Histopathologic types of breast cancer
Staging systems
Histopathologic grade
Dose and fractionation regimes

F 1.9 Describe the routes of spread of breast cancer

Extension in the breast
Progressive levels of lymph node involvement
Distant metastases

F 1.10 Explain the rationale for using surgery to treat breast cancer specific to the stage and pathology of the disease

Lumpectomy
Mastectomy
Axillary lymph node dissection

F 1.11 Explain the rationale for using systemic therapy to treat breast cancer specific to the stage and pathology of the disease

Chemotherapy
Hormone/endocrine therapy

- F 1.12 Explain the rationale for using radiation therapy to treat breast cancer specific to the stage and pathology of the disease**
 - Tangential fields
 - Multi field technique
 - Partial breast irradiation
 - Interstitial brachytherapy
- F 1.13 Explain the rationale for using combined modalities to treat breast cancer specific to the stage and pathology of the disease**
- F 1.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- F 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- F 1.16 Discuss the emerging technologies relevant to the management of breast cancer**
 - PET/CT
 - Gated therapy
 - Adaptive Radiotherapy
 - Mammosite
 - Localization Methods (on board imaging, anatomy matching etc)
- F 1.17 Explain the predicted results of breast treatment based on the stage/grade**
- F 1.18 Explain the predicted results of breast treatment based on treatment modalities**
- F 1.19 Plan radiation treatment for the patient with breast cancer as per Module E2, E3 and E4**
 - Tangential
 - Multi-field
 - Interstitial brachytherapy
- F 1.20 Perform treatment procedures for the patient with breast cancer as per Module E5**
 - Tangential
 - Multi-field
 - Interstitial brachytherapy
- F 1.21 Perform patient care for the patient with breast cancer as per Module E6**

MODULE G GENITOURINARY CANCER

The following have been listed in order of the sites most commonly treated with radiation therapy

G 1 Treatment of Prostate Cancer

G 1.1 State the epidemiology of prostate cancer

Risk factors
Incidence

G 1.2 State the etiology of prostate cancer

G 1.3 Explain the prognostic indicators of prostate cancer

Tumor extent
PSA (prostate-specific antigen) Levels
Lymph node status
Histology
TURP (trans-urethral resection of the prostate)

G 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as landmarks of the pelvis in relation to prostate cancer

G 1.5 Discuss the natural history of prostate cancer

Site of origin in the prostate
Tumor progression
Recurrence
Distant metastasis

G 1.6 Identify the clinical presentation of prostate cancer

G 1.7 Identify the various detection and diagnostic methods of prostate cancer

Complete history and physical examination
PSA blood test
Gleason Score
CT
Biopsy
Bone scan
Transrectal ultrasound

G 1.8 Describe the pathology and staging of prostate cancer as it relates to treatment

Histopathologic types of prostate cancer
Staging systems
Histopathologic grade
Dose and fractionation regimes

G 1.9 Describe the routes of spread of prostate cancer

Extension in the prostate
Extracapsular extension
Progressive lymph node involvement
Distant metastases

G 1.10 Explain the rationale for using surgery to treat prostate cancer specific to the stage and pathology of the disease

Prostatectomy
Orchiectomy
Cryosurgery

G 1.11 Explain the rationale for using systemic therapy to treat prostate cancer specific to the stage and pathology of the disease

Hormone therapy
Chemotherapy

- G 1.12 Explain the rationale for using radiation therapy to treat prostate cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Interstitial brachytherapy
 - Combined external and brachytherapy
- G 1.13 Explain the rationale for using combined modalities to treat prostate cancer specific to the stage and pathology of the disease**
- G 1.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- G 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- G 1.16 Discuss the emerging technologies relevant to the management of prostate cancer**
 - Localization methods(on board imaging, ultrasound imaging, etc)
 - Adaptive Radiation Therapy
- G 1.17 Explain the predicted results of prostate treatment based on stage/grade**
- G 1.18 Explain the predicted results of prostate treatment based on treatment modalities**
- G 1.19 Plan radiation treatment for the patient with prostate cancer as per Module E2, E3 & E4**
 - Multi field external beam
 - Interstitial Brachytherapy
 - Combined External beam and brachytherapy
- G 1.20 Perform treatment procedures for the patient with prostate cancer s per Module E5**
 - Multi field external beam
 - Interstitial Brachytherapy
 - Combined External beam and brachytherapy
- G 1.21 Perform patient care for the patient with prostate cancer as per Module E6**

- G 2 Treatment of Bladder and Urethral Cancer**
 - G 2.1 State the epidemiology of bladder cancer**
 - Risk factors
 - Incidence
 - G 2.2 State the etiology of bladder cancer**
 - G 2.3 Explain the prognostic indicators of bladder cancer**
 - Tumor extent
 - Muscle invasion
 - Lymph node status
 - Histology
 - G 2.4 Apply the knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the pelvis in relation to bladder cancer**

- G 2.5 Discuss the natural history of bladder cancer**
 Site of origin in the bladder
 Tumor progression
 Recurrence
 Distant metastasis
- G 2.6 Identify the clinical presentation of bladder cancer**
- G 2.7 Identify the various detection and diagnostic methods of bladder cancer**
 Complete history and physical examination
 Laboratory studies
 Cystoscopy
 CT
 Biopsy
 Bone scan
 Urinalysis
- G 2.8 Describe the pathology and staging of bladder cancer as it relates to treatment**
 Histopathologic types of bladder cancer
 Staging systems
 Histopathologic grade
 Dose and fractionation regimes
- G 2.9 Describe the routes of spread of bladder cancer**
 Extension in the bladder
 Progressive levels of extension through bladder wall
 Distant metastases
- G 2.10 Explain the rationale for using surgery to treat bladder cancer specific to the stage and pathology of the disease**
 Transurethral resection
 Radical cystectomy
- G 2.11 Explain the rationale for using systemic therapy to treat bladder cancer specific to the stage and pathology of the disease**
 Chemotherapy
- G 2.12 Explain the rationale for using radiation therapy to treat bladder cancer specific to the stage and pathology of the disease**
 Multi field external beam radiation therapy
 Interstitial brachytherapy
- G 2.13 Explain the rationale for using combined modalities to treat bladder cancer specific to the stage and pathology of the disease**
- G 2.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 Radiological modalities
 Nuclear Medicine
 Magnetic Resonance
 Ultrasound
 Health records
 Laboratory reports
- G 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- G 2.16 Discuss the emerging technologies relevant to the management of bladder cancer**
 Adaptive Radiation therapy
 Localization methods (on board imaging, anatomy matching etc)

- G 2.17 Explain the predicted results of bladder treatment based on stage/grade**
- G 2.18 Explain the predicted results of bladder treatment based on treatment modalities**
- G 2.19 Plan radiation treatment for the patient with bladder cancer as per Module E2, E3 & E4**
 - Multi field external beam
 - Interstitial brachytherapy
- G 2.20 Perform treatment procedures for the patient with bladder cancer as per Module E5**
 - Multi field external beam
 - Interstitial brachytherapy
- G 2.21 Perform patient care for the patient with bladder cancer as per Module E6**

- G 3 Treatment of Testicular Cancer**
 - G 3.1 State the epidemiology of testicular cancer**
 - Risk factors
 - Incidence
 - G 3.2 State the etiology of testicular cancer**
 - G 3.3 Explain the prognostic indicators of testicular cancer**
 - Tumor stage
 - Progressive level of lymph node involvement
 - G 3.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the pelvis in relation to testicular cancer**
 - G 3.5 Discuss the natural history of testicular cancer**
 - Site of origin
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - G 3.6 Identify the clinical presentation of testicular cancer**
 - G 3.7 Identify the various detection and diagnostic methods of testicular cancer**
 - Complete history and physical examination
 - Testicular ultrasound
 - Blood work testing Beta HCG and AFP levels
 - Chest x-ray
 - CT
 - G 3.8 Describe the pathology and staging of testicular cancer as it relates to treatment**
 - Histopathologic types of testicular cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - G 3.9 Describe the routes of spread of testicular cancer**
 - Extension in the testes
 - Progressive levels of lymphatic involvement
 - Distant metastases
 - G 3.10 Explain the rationale for using surgery to treat testicular cancer specific to the stage and pathology of the disease**
 - Inguinal orchiectomy
 - Retroperitoneal lymph node dissection

- G 3.11 Explain the rationale for using systemic therapy to treat testicular cancer specific to the stage and pathology of the disease**
Chemotherapy
- G 3.12 Explain the rationale for using radiation therapy to treat testicular cancer specific to the stage and pathology of the disease**
Multi field external beam radiation therapy
- G 3.13 Explain the rationale for using combined modalities to treat testicular cancer specific to the stage and pathology of the disease**
- G 3.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
Radiological modalities
Nuclear Medicine
Magnetic Resonance
Ultrasound
Health records
Laboratory reports
- G 3.15 Interpret protocols for clinical studies and impact on radiation treatment**
- G 3.16 Discuss the emerging technologies relevant to the management of testicular cancer**
Adaptive Radiation therapy
Localization methods (on board imaging, anatomy matching etc)
- G 3.17 Explain the predicted results of testicular treatment based on stage/grade**
- G 3.18 Explain the predicted results of testicular treatment based on treatment modalities**
- G 3.19 Plan radiation treatment for the patient with testicular cancer as per Module E2, E3 & E4**
Multi field external beam
- G 3.20 Perform treatment procedures for the patient with testicular cancer as per Module E5**
Multi field external beam
- G 3.21 Perform patient care for the patient with testicular cancer as per Module E6**
- G 4 Treatment of Kidney Cancer**
- G 4.1 State the epidemiology of kidney cancer**
Risk factors
Incidence
- G 4.2 State the etiology of kidney cancer**
- G 4.3 Explain the prognostic indicators of kidney cancer**
Tumor stage
Histological grade
- G 4.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen/pelvis in relation to kidney cancer**
- G 4.5 Discuss the natural history of kidney cancer**
Site of origin in the kidney
Tumor progression
Recurrence
Distant metastasis
- G 4.6 Identify the clinical presentation of kidney cancer**

- G 4.7 Identify the various detection and diagnostic methods of kidney cancer**
 Complete history and physical examination
 Blood work
 Urinalysis
 IVP
 CT
 Chest xray
 Bone scan
- G 4.8 Describe the pathology and staging of kidney cancer as it relates to treatment**
 Histopathologic types of kidney cancer
 Staging systems
 Histopathologic grade
 Dose and fractionation regimes
- G 4.9 Describe the routes of spread of kidney cancer**
 Extension in the kidney
 Progressive levels of lymphatic involvement
 Distant metastases
- G 4.10 Explain the rationale for using surgery to treat kidney cancer specific to the stage and pathology of the disease**
 Partial/radical nephrectomy
 Lymph node dissection
- G 4.11 Explain the rationale for using systemic to treat kidney cancer specific to the stage and pathology of the disease**
 Chemotherapy
 Bone marrow/stem cell transplant
- G 4.12 Explain the rationale for using radiation therapy to treat kidney cancer specific to the stage and pathology of the disease**
 Multi field external beam radiation
- G 4.13 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 Radiological modalities
 Nuclear Medicine
 Magnetic Resonance
 Ultrasound
 Health records
 Laboratory reports
- G 4.14 Interpret protocols for clinical studies and impact on radiation treatment**
- G 4.15 Discuss the emerging technologies relevant to the management of kidney cancer**
 Adaptive Radiation therapy
 Localization methods (on board imaging, anatomy matching etc)
- G 4.16 Explain the predicted results of kidney treatment based on stage/grade**
- G 4.17 Explain the predicted results of kidney treatment based on treatment modalities**
- G 4.18 Plan radiation treatment for the patient with kidney cancer as per Module E2, E3 & E4**
 Multi field external beam

- G 4.19 Perform treatment procedures for the patient with kidney cancer as per Module E5**
 - Multi field external beam
- G 4.20 Perform patient care for the patient with kidney cancer as per Module E6**
- G 5 Treatment of Cancer of the Penis**
 - G 5.1 State the epidemiology of penile cancer**
 - Risk factors
 - Incidence
 - G 5.2 State the etiology of penile cancer**
 - G 5.3 Explain the prognostic indicators of penile cancer**
 - Tumor stage
 - Histological grade
 - G 5.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the pelvis in relation to penile cancer**
 - G 5.5 Discuss the natural history of penile cancer**
 - Site of origin
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - G 5.6 Identify the clinical presentation of penile cancer**
 - G 5.7 Identify the various detection and diagnostic methods of penile cancer**
 - Complete history and physical examination
 - Urethroscopy
 - Cystoscopy
 - Chest x-ray
 - CT
 - G 5.8 Describe the pathology and staging of penile cancer as it relates to treatment**
 - Histopathologic types of penile cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - G 5.9 Describe the routes of spread of penile cancer**
 - Extension in the penis
 - Progressive levels of lymphatic involvement
 - Distant metastases
 - G 5.10 Explain the rationale for using surgery to treat penile cancer specific to the stage and pathology of the disease**
 - Local resection
 - Total penectomy
 - Lymphadenectomy
 - G 5.11 Explain the rationale for using systemic therapy to treat penile cancer specific to the stage and pathology of the disease**
 - G 5.12 Explain the rationale for using radiation therapy to treat penile cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Brachytherapy
 - G 5.13 Explain the rationale for using combined modalities to treat penile cancer specific to the stage and pathology of the disease**

- G 5.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- G 5.15 Interpret protocols for clinical studies and impact on radiation treatment**
- G 5.16 Discuss the emerging technologies relevant to the management of penile cancer**
 - Adaptive Radiation Therapy
 - Localization Methods (on board imaging, anatomy matching etc)
- G 5.17 Explain the predicted results of penile treatment based on stage/grade**
- G 5.18 Explain the predicted results of penile treatment based on treatment modalities**
- G 5.19 Plan radiation treatment for the patient with penile cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Brachytherapy
- G 5.20 Perform treatment procedures for the patient with penile cancer as per Module E5**
 - Multi field external beam
 - Brachytherapy
- G 5.21 Perform patient care for the patient with penile cancer as per Module E6**

MODULE H RESPIRATORY CANCER

- H 1 Treatment of Respiratory Cancer**
 - H 1.1 State the epidemiology of lung cancer**
 - Risk factors
 - Incidence
 - H 1.2 State the etiology of lung cancer**
 - H 1.3 Explain the prognostic indicators of lung cancer**
 - Tumor stage
 - Histological grade
 - Karnofsky performance scale
 - Lymph node status
 - H 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the thorax in relation to lung cancer**
 - H 1.5 Discuss the natural history of lung cancer**
 - Site of origin in the lung
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - H 1.6 Identify the clinical presentation of lung cancer**
 - H 1.7 Identify the various detection and diagnostic methods of lung cancer**
 - Complete history and physical examination
 - CT Scan
 - Biopsy
 - PET
 - Bone Scan
 - Chest x-ray
 - H 1.8 Describe the pathology and staging of lung cancer as it relates to treatment**
 - Histopathologic types of lung cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - H 1.9 Describe the routes of spread of lung cancer**
 - Extension in the lung
 - Progressive levels of lymph node involvement
 - Distant metastases
 - H 1.10 Explain the rationale for using surgery to treat lung cancer specific to the stage and pathology of the disease**
 - Partial/total pneumonectomy
 - H 1.11 Explain the rationale for using systemic therapy to treat lung cancer specific to the stage and pathology of the disease**
 - Chemotherapy
 - H 1.12 Explain the rationale for using radiation therapy to treat lung cancer specific to the stage and pathology of the disease**
 - Multi-field external beam radiation therapy
 - Brachytherapy
 - H 1.13 Explain the rationale for using combined modalities to treat lung cancer specific to the stage and pathology of the disease**

- H 1.14 Assess data available from images and/or reports of previous medical studies**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- H 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- H 1.16 Discuss the emerging technologies relevant to the management of lung cancer**
 - PET/CT
 - Gated therapy
 - Adaptive radiation therapy
- H 1.17 Explain the predicted results of lung cancer treatment based on stage/grade**
- H 1.18 Explain the predicted results of lung cancer treatment based on treatment modalities**
- H 1.19 Plan radiation treatment for the patient with lung cancer as per Module E2, E3 & E4**
 - Multi field external beam
 - Brachytherapy
- H 1.20 Perform treatment procedures for the patient with lung cancer as per Module E5**
 - Multi field external beam
 - Brachytherapy
- H 1.21 Perform patient care for the patient with lung cancer as per Module E6**

MODULE I GASTROINTESTINAL CANCER

The following have been listed in order of the sites most commonly treated with radiation therapy

- I 1 Treatment of Colorectal Cancer**
- I 1.1 State the epidemiology of colorectal cancer**
 - Risk factors
 - Incidence
- I 1.2 State the etiology of colorectal cancer**
- I 1.3 Explain the prognostic indicators of colorectal cancer**
 - Tumor extent
 - Histology
 - Lymph node status
- I 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen/pelvis in relation to colorectal cancer**
- I 1.5 Discuss the natural history of colorectal cancer**
 - Site of origin
 - Tumor progression
 - Recurrence
 - Distant metastasis
- I 1.6 Identify the clinical presentation of colorectal cancer**
- I 1.7 Identify the various detection and diagnostic methods of colorectal cancer**
 - Complete history and physical examination
 - Barium enema
 - Colonoscopy/sigmoidoscopy
 - CT
 - MRI
 - CEA (Carcinoembryonic antigen) marker
- I 1.8 Describe the pathology and staging of colorectal cancer as it relates to treatment**
 - Histopathologic types of colorectal cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- I 1.9 Describe the routes of spread of colorectal cancer**
 - Local extension
 - Progressive lymph node involvement
 - Distant metastases
- I 1.10 Explain the rationale for the use of surgery to treat colorectal cancer specific to the stage and pathology of the disease**
 - Abdomino-perineal resection
 - Lower-anterior resection
- I 1.11 Explain the rationale for the use of systemic therapy to treat colorectal cancer specific to the stage and pathology of the disease**
 - Chemotherapy
- I 1.12 Explain the rationale for the use of radiation therapy to treat colorectal cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- I 1.13 Explain the rationale for the use of combined modalities to treat colorectal cancer specific to the stage and pathology of the disease**

- I 1.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- I 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- I 1.16 Discuss the emerging technologies relevant to the management of colorectal cancer**
 - Adaptive radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- I 1.17 Explain the predicted results of colorectal treatment based on stage/grade**
- I 1.18 Explain the predicted results of colorectal treatment based on treatment modalities**
- I 1.19 Plan radiation treatment for the patient with colorectal cancer as per Module E2, E3, & E4**
 - Multi field external beam
- I 1.20 Perform treatment procedures for the patient with colorectal cancer as per Module E5**
 - Multi field external beam
- I 1.21 Perform patient care for the patient with colorectal cancer as per Module E6**

- I 2 Treatment of Cancer of the Esophagus**
 - I 2.1 State the epidemiology of esophageal cancer**
 - Risk factors
 - Incidence
 - I 2.2 State the etiology of esophageal cancer**
 - I 2.3 Explain the prognostic indicators of esophageal cancer**
 - Tumor extent
 - Histology
 - Lymph node status
 - Gender
 - Age
 - I 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the thorax in relation to esophageal cancer**
 - I 2.5 Discuss the natural history of esophageal cancer**
 - Site of origin in the esophagus
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - I 2.6 Identify the clinical presentation of esophageal cancer**
 - I 2.7 Identify the various detection and diagnostic methods of esophageal cancer**
 - Complete history and physical examination
 - Barium Swallow
 - Endoscopy

- CT
- Biopsy
- MRI
- Chest x-ray
- I 2.8 Describe the pathology and staging of esophageal cancer as it relates to treatment**
 - Histopathologic types of esophageal cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- I 2.9 Describe the routes of spread of esophageal cancer**
 - Extension in the esophagus
 - Lymph node involvement
 - Skip metastases
 - Distant metastases
- I 2.10 Explain the rationale of using surgery to treat esophageal cancer specific to the stage and pathology of the disease**
 - Partial/total esophagectomy
- I 2.11 Explain the rationale of using systemic therapy to treat esophageal cancer specific to the stage and pathology of the disease**
 - Chemotherapy
- I 2.12 Explain the rationale of using radiation therapy to treat esophageal cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Intraluminal brachytherapy
- I 2.13 Explain the rationale of using combined modalities to treat esophageal cancer specific to the stage and pathology of the disease**
- I 2.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- I 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- I 2.16 Discuss the emerging technologies relevant to the management of esophageal cancer**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching, etc)
- I 2.17 Explain the predicted results of esophageal treatment based on stage/grade**
- I 2.18 Explain the predicted results of esophageal treatment based on treatment modalities**
- I 2.19 Plan radiation treatment for the patient with esophageal cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Intraluminal brachytherapy

- I 2.20 **Perform treatment procedures for the patient with esophageal cancer as per Module E5**
 - Multi field external beam
 - Intraluminal brachytherapy
- I 2.21 **Perform patient care for the patient with esophageal cancer as per Module E6**

- I 3 **Treatment of Cancer of the Anal Canal**
 - I 3.1 **State the epidemiology of anal canal cancer**
 - Risk factors
 - Incidence
 - I 3.2 **State the etiology of anal canal cancer**
 - I 3.3 **Explain the prognostic indicators of anal canal cancer**
 - Tumor extent
 - Histology
 - Lymph node status
 - Extra-pelvic spread
 - I 3.4 **Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the pelvis in relation to anal canal cancer**
 - I 3.5 **Discuss the natural history of anal canal cancer**
 - Site of origin in the anal canal
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - I 3.6 **Identify the clinical presentation of anal canal cancer**
 - I 3.7 **Identify the various detection and diagnostic methods of anal canal cancer**
 - Complete history and physical examination
 - Endoscopy
 - Biopsy
 - CT
 - Ultrasound
 - I 3.8 **Describe the pathology and staging of anal canal cancer as it relates to treatment**
 - Histopathologic types of anal cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - I 3.9 **Describe the routes of spread of anal canal cancer**
 - Local extension
 - Progressive lymph node involvement
 - Distant metastases
 - I 3.10 **Explain the rationale for using surgery to treat anal canal cancer specific to the stage and pathology of the disease**
 - Abdomino-perineal resection
 - I 3.11 **Explain the rationale for using systemic therapy to treat anal canal cancer specific to the stage and pathology of the disease**
 - Chemotherapy
 - I 3.12 **Explain the rationale for using radiation therapy to treat anal canal cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy

- I 3.13 **Explain the rationale for using combined modalities to treat anal canal cancer specific to the stage and pathology of the disease**
- I 3.14 **Demonstrate and understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- I 3.15 **Interpret protocols for clinical studies and impact on radiation treatment**
- I 3.16 **Discuss the emerging technologies relevant to the management of anal canal cancer**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- I 3.17 **Explain the predicted results of anal canal treatment based on stage/grade**
- I 3.18 **Explain the predicted results of anal canal treatment based on treatment modalities**
- I 3.19 **Plan radiation treatment for the patient with anal canal cancer as per Module E2, E3, & E4**
 - Multi field external beam
- I 3.20 **Perform treatment procedures for the patient with anal canal cancer as per Module E5**
 - Multi field external beam
- I 3.21 **Perform patient care for the patient with anal canal cancer as per Module E6**

- I 4 **Treatment of Gastric Cancer**
 - I 4.1 **State the epidemiology of gastric cancer**
 - Risk factors
 - Incidence
 - I 4.2 **State the etiology of gastric cancer**
 - I 4.3 **Explain the prognostic indicators of gastric cancer**
 - Tumor extent
 - Histology
 - Lymph node status
 - I 4.4 **Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen in relation to gastric cancer**
 - I 4.5 **Discuss the natural history of gastric cancer**
 - Site of origin in the stomach
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - I 4.6 **Identify the clinical presentation of gastric cancer**
 - I 4.7 **Identify the various detection and diagnostic methods of gastric cancer**
 - Complete history and physical examination
 - Upper GI Series
 - Endoscopy
 - CT

- Biopsy
- Ultrasound
- I 4.8 Describe the pathology and staging of gastric cancer as it relates to treatment**
 - Histopathologic types of gastric cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- I 4.9 Describe the routes of spread of gastric cancer**
 - Extension in the stomach
 - Progressive lymph node involvement
 - Distant metastases
- I 4.10 Explain the rationale for using surgery to treat gastric cancer specific to the stage and pathology of the disease**
 - Partial/total gastrectomy
- I 4.11 Explain the rationale for using systemic therapy to treat gastric cancer specific to the stage and pathology of the disease**
 - Chemotherapy
- I 4.12 Explain the rationale for using radiation therapy to treat gastric cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- I 4.13 Explain the rationale for using combined modalities to treat gastric cancer specific to the stage and pathology of the disease**
- I 4.14 Demonstrate and understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- I 4.15 Interpret protocols for clinical studies and impact on radiation treatment**
- I 4.16 Discuss the emerging technologies relevant to the management of gastric cancer**
 - Adaptive radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- I 4.17 Explain the predicted results of gastric treatment based on stage/grade**
- I 4.18 Explain the predicted results of gastric treatment based on treatment modalities**
- I 4.19 Plan radiation treatment for the patient with gastric cancer as per Module E2, E3, & E4**
 - Multi field external beam
- I 4.20 Perform treatment procedures for the patient with gastric cancer as per Module E5**
 - Multi field external beam
- I 4.21 Perform patient care for the patient with gastric cancer as per Module E6**

- I 5 Treatment of Cancer of the Pancreas**
- I 5.1 State the epidemiology of pancreatic cancer**
 - Risk factors
 - Incidence
 - I 5.2 State the etiology of pancreatic cancer**
 - I 5.3 Explain the prognostic indicators of pancreatic cancer**
 - Tumor extent
 - Histology
 - Lymph node status
 - I 5.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen in relation to pancreatic cancer**
 - I 5.5 Discuss the natural history of pancreatic cancer**
 - Site of origin in the pancreas
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - I 5.6 Identify the clinical presentation of pancreatic cancer**
 - I 5.7 Identify the various detection and diagnostic methods of pancreatic cancer**
 - Complete history and physical examination
 - CT
 - Ultrasound
 - Tumor markers CA 19-9
 - Brush biopsy for cytology
 - I 5.8 Describe the pathology and staging of pancreatic cancer as it relates to treatment**
 - Histopathologic types of pancreatic cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimens
 - I 5.9 Describe the routes of spread of pancreatic cancer**
 - Extension in the pancreas
 - Progressive lymph node involvement
 - Distant metastases
 - I 5.10 Explain the rationale for using surgery to treat pancreatic cancer specific to the stage and pathology of the disease**
 - Partial/total pancreatectomy
 - I 5.11 Explain the rationale for using systemic therapy to treat pancreatic cancer specific to the stage and pathology of the disease**
 - Chemotherapy
 - I 5.12 Explain the rationale for using radiation therapy to treat pancreatic cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - I 5.13 Explain the rationale for using combined modalities to treat pancreatic cancer specific to the stage and pathology of the disease**
 - I 5.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance

- Ultrasound
 - Health records
 - Laboratory reports
- I 5.15 Interpret protocols for clinical studies and impact on radiation treatment**
- I 5.16 Discuss the emerging technologies relevant to the management of pancreatic cancer**
 - Adaptive radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- I 5.17 Explain the predicted results of pancreas treatment based on stage/grade**
- I 5.18 Explain the predicted results of pancreas treatment based on treatment modalities**
- I 5.19 Plan radiation treatment for the patient with pancreas cancer as per Module E2, E3, & E4**
 - Multi field external beam
- I 5.20 Perform treatment procedures for the patient with pancreas cancer as per Module E5**
 - Multi field external beam
- I 5.21 Perform patient care for the patient with pancreas cancer as per Module E6**

- I 6 Treatment of Cancer of the Hepatobiliary Tract**
 - I 6.1 State the epidemiology of hepatobiliary cancer**
 - Risk factors
 - Incidence
 - I 6.2 State the etiology of hepatobiliary cancer**
 - I 6.3 Explain the prognostic indicators of hepatobiliary cancer**
 - Tumor extent
 - Histology
 - Lymph node status
 - I 6.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen in relation to hepatobiliary cancer**
 - I 6.5 Discuss the natural history of hepatobiliary cancer**
 - Site of origin
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - I 6.6 Identify the clinical presentation of hepatobiliary cancer**
 - I 6.7 Identify the various detection and diagnostic methods of hepatobiliary cancer**
 - Complete history and physical examination
 - CT
 - Ultrasound
 - Biopsy
 - Endoscopy
 - I 6.8 Describe the pathology and staging of hepatobiliary cancer as it relates to treatment**
 - Histopathologic types of hepatobiliary cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes

- I 6.9 Describe the routes of spread of hepatobiliary cancer**
 - Extension in the hepatobiliary system
 - Lymph node involvement
 - Distant metastases
- I 6.10 Explain the rationale for using surgery to treat hepatobiliary cancer specific to the stage and pathology of the disease**
- I 6.11 Explain the rationale for using systemic therapy to treat hepatobiliary cancer specific to the stage and pathology of the disease**
 - Chemotherapy
- I 6.12 Explain the rationale for using radiation therapy to treat hepatobiliary cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- I 6.13 Explain the rationale for using combined modalities to treat hepatobiliary cancer specific to the stage and pathology of the disease**
- I 6.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- I 6.15 Interpret protocols for clinical studies and impact on radiation treatment**
- I 6.16 Discuss the emerging technologies relevant to the management of hepatobiliary cancer**
 - Adaptive radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- I 6.17 Explain the predicted results of hepatobiliary treatment based on stage/grade**
- I 6.18 Explain the predicted results of hepatobiliary treatment based on treatment modalities**
- I 6.19 Plan radiation treatment for the patient with hepatobiliary cancer as per Module E2, E3 & E4**
 - Multi field external beam
- I 6.20 Perform treatment procedures for the patient with hepatobiliary cancer as per Module E5**
 - Multi field external beam
- I 6.21 Perform patient care for the patient with hepatobiliary cancer as per Module E6**

MODULE J HEAD AND NECK CANCER

The following have been listed in order of the sites most commonly treated with radiation therapy

- J 1 Treatment of Cancer of the Nasopharynx**
 - J 1.1 State the epidemiology of nasopharyngeal cancer**
 - Risk factors
 - Incidence
 - J 1.2 State the etiology of nasopharyngeal cancer**
 - J 1.3 Explain the prognostic indicators of nasopharyngeal cancer**
 - Tumor extent
 - Lymph node status
 - Histology
 - Cranial nerve involvement
 - J 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head and neck in relation to nasopharyngeal cancer**
 - J 1.5 Discuss the natural history of nasopharyngeal cancer**
 - Site of origin
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - Cranial nerve invasion
 - J 1.6 Identify the clinical presentation of nasopharyngeal cancer**
 - J 1.7 Identify the various detection and diagnostic methods of nasopharyngeal cancer**
 - Complete history and physical examination
 - Indirect and direct nasopharyngoscopy
 - Multiple biopsies
 - CT
 - MRI
 - Plain radiographs
 - J 1.8 Describe the pathology and staging of nasopharyngeal cancer as it relates to treatment**
 - Histopathologic types of nasopharyngeal cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - J 1.9 Describe the routes of spread of nasopharyngeal cancer**
 - Extension in the nasopharynx
 - Lymph node involvement
 - Cranial nerve involvement
 - Distant metastases
 - J 1.10 Explain the rationale for using surgery to treat nasopharyngeal cancer specific to the stage and pathology of the disease**
 - Lymph node dissection
 - J 1.11 Explain the rationale for using systemic therapy to treat nasopharyngeal cancer specific to the stage and pathology of the disease**
 - Chemotherapy

- J 1.12 Explain the rationale for using radiation therapy to treat nasopharyngeal cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Brachytherapy
- J 1.13 Explain the rationale for using combined modalities to treat nasopharyngeal cancer specific to the stage and pathology of the disease**
- J 1.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- J 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- J 1.16 Discuss the emerging technologies relevant to the management of nasopharyngeal cancer**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
 - PET/CT
- J 1.17 Explain the predicted results of nasopharyngeal cancer treatment based on stage/grade**
- J 1.18 Explain the predicted results of nasopharyngeal cancer treatment based on treatment modalities**
- J 1.19 Plan radiation treatment for the patient with nasopharyngeal cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Brachytherapy
- J 1.20 Perform treatment procedures for the patient with nasopharyngeal cancer as per Module E5**
 - Multi field external beam
 - Brachytherapy
- J 1.21 Perform patient care for the patient with nasopharyngeal cancer as per Module E6**

- J 2 Treatment of Cancers of the Oropharynx**
 - J 2.1 State the epidemiology of cancers of the oropharynx**
 - Risk factors
 - Incidence
 - J 2.2 State the etiology of cancers of the oropharynx**
 - J 2.3 Explain the prognostic indicators of cancers of the oropharynx**
 - Tumor extent
 - Lymph node status
 - Histology
 - Age
 - Tumor Location
 - J 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head and neck in relation to cancers of the oropharynx**

- J 2.5 Discuss the natural history of cancers of the oropharynx**
 Site of origin in the oropharynx
 Tumor progression
 Recurrence
 Distant metastasis
- J 2.6 Identify the clinical presentation of cancers of the oropharynx**
- J 2.7 Identify the various detection and diagnostic methods of cancers of the oropharynx**
 Complete history and physical exam
 Fiberoptic/endoscopic exam
 Direct/indirect laryngoscopy
 Biopsies
 Plain radiographs
 CT
 MRI
- J 2.8 Describe the pathology and staging of cancers of the oropharynx as it relates to treatment**
 Histopathologic types of cancer of the oropharynx
 Staging systems
 Histopathologic grade
 Dose and fractionation regimes
- J 2.9 Describe the routes of spread of cancers of the oropharynx**
 Extension in the surrounding area
 Lymph node involvement
 Distant metastases
- J 2.10 Explain the rationale for using surgery to treat cancers of the oropharynx specific to the stage and pathology of the disease**
- J 2.11 Explain the rationale for using systemic therapy to treat cancers of the oropharynx specific to the stage and pathology of the disease**
 Chemotherapy
- J 2.12 Explain the rationale for using radiation therapy to treat cancers of the oropharynx specific to the stage and pathology of the disease**
 Multi field external beam radiation therapy
 Brachytherapy
- J 2.13 Explain the rationale for using combined modalities to treat cancers of the oropharynx specific to the stage and pathology of the disease**
- J 2.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 Radiological modalities
 Nuclear Medicine
 Magnetic Resonance
 Ultrasound
 Health records
 Laboratory reports
- J 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- J 2.16 Discuss the emerging technologies relevant to the management of cancers of the oropharynx**
 Adaptive Radiation therapy
 Localization methods (on board imaging, anatomy matching etc)
 PET/CT

- J 2.17 Explain the predicted results of cancers of the oropharynx treatment based on stage/grade**
- J 2.18 Explain the predicted results of cancers of the oropharynx treatment based on treatment modalities**
- J 2.19 Plan radiation treatment for the patient with cancer of the oropharynx as per Module E2, E3, & E4**
 - Multifield external beam
 - Brachytherapy
- J 2.20 Perform treatment procedures for the patient with cancer of the oropharynx as per Module E5**
 - Multi field external beam
 - Brachytherapy
- J 2.21 Perform patient care for the patient with cancer of the oropharynx as per Module E6**

- J 3 Treatment of Cancers of the Oral Cavity**
 - J 3.1 State the epidemiology of cancers of the oral cavity**
 - Risk factors
 - Incidence
 - J 3.2 State the etiology of cancers of the oral cavity**
 - J 3.3 Explain the prognostic indicators of cancers of the oral cavity**
 - Tumor extent
 - Histology
 - Lymph node status
 - Stage
 - Tumor location
 - J 3.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head and neck in relation to cancers of the oral cavity**
 - J 3.5 Discuss the natural history of cancers of the oral cavity**
 - Site of origin in the oral cavity
 - Tumor progression
 - Recurrence
 - Distant metastases
 - J 3.6 Identify the clinical presentation of cancers of the oral cavity**
 - J 3.7 Identify the various detection and diagnostic methods of cancers of the oral cavity**
 - Complete history and physical examination
 - Fiberoptic/endoscopic exam
 - Biopsy
 - CT
 - MRT
 - Plain radiographs
 - J 3.8 Describe the pathology and staging of cancers of the oral cavity as it relates to treatment**
 - Histopathologic types of cancers of the oral cavity
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes

- J 3.9 Describe the routes of spread of cancers of the oral cavity**
 - Extension in the oral cavity
 - Lymph node involvement
 - Distant metastases
- J 3.10 Explain the rationale for using surgery to treat cancers of the oral cavity specific to the stage and pathology of the disease**
- J 3.11 Explain the rationale for using systemic therapy to treat cancers of the oral cavity specific to the stage and pathology of the disease**
 - Chemotherapy
- J 3.12 Explain the rationale for using radiation therapy to treat cancers of the oral cavity specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Brachytherapy
- J 3.13 Explain the rationale for using combined modalities to treat cancers of the oral cavity specific to the stage and pathology of the disease**
- J 3.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- J 3.15 Interpret protocols for clinical studies and impact on radiation treatment**
- J 3.16 Discuss the emerging technologies relevant to the management of cancers of the oral cavity**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
 - PET/CT
- J 3.17 Explain the predicted results of cancers of the oral cavity treatment based on stage/grade**
- J 3.18 Explain the predicted results of cancers of the oral cavity treatment based on treatment modalities**
- J 3.19 Plan radiation treatment for the patient with cancer of the oral cavity as per Module E2, E3, & E4**
 - Multi field external beam
 - Brachytherapy
- J 3.20 Perform treatment procedures for the patient with cancer of the oral cavity as per Module E5**
 - Multi field external beam
 - Brachytherapy
- J 3.21 Perform patient care for the patient with cancer of the oral cavity as per Module E6**

- J 4 Treatment of Cancers of the Hypopharynx**
 - J 4.1 State the epidemiology of cancers of the hypopharynx**
 - Risk factors
 - Incidence
 - J 4.2 State the etiology of cancers of the hypopharynx**

- J 4.3 Explain the prognostic indicators of cancers of the hypopharynx**
 - Age
 - Gender
 - Race
 - Physical performance status
 - Tumor location
 - Tumor extent
 - Lymph node status
- J 4.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head and neck in relation to cancers of the hypopharynx**
- J 4.5 Discuss the natural history of cancers of the hypopharynx**
 - Site of origin in the oral cavity
 - Tumor progression
 - Recurrence
 - Distant metastases
- J 4.6 Identify the clinical presentation of cancers of the hypopharynx**
- J 4.7 Identify the various detection and diagnostic methods of cancers of the hypopharynx**
 - Complete history and physical examination
 - Indirect laryngoscopy
 - Endoscopy
 - Biopsy
 - CT
 - MRI
 - PET
- J 4.8 Describe the pathology and staging of cancers of the hypopharynx as it relates to treatment**
 - Histopathologic types of cancers of the hypopharynx
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- J 4.9 Describe the routes of spread of cancers of the hypopharynx**
 - Extension in the surrounding area
 - Lymph node involvement
 - Distant metastases
- J 4.10 Explain the rationale for using surgery to treat cancers of the hypopharynx specific to the stage and pathology of the disease**
- J 4.11 Explain the rationale for using systemic therapy to treat cancers of the hypopharynx specific to the stage and pathology of the disease**
 - Chemotherapy
- J 4.12 Explain the rationale for using radiation therapy to treat cancers of the hypopharynx specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- J 4.13 Explain the rationale for using combined modalities to treat cancers of the hypopharynx specific to the stage and pathology of the disease**

- J 4.14 Demonstrate and understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- J 4.15 Interpret protocols for clinical studies and impact on radiation treatment**
- J 4.16 Discuss the emerging technologies relevant to the management of cancers of the hypopharynx**
 - Adaptive Radiation therapy
 - Localization methods (on board imagine, anatomy matching etc)
 - PET/CT
- J 4.17 Explain the predicted results of cancers of the hypopharynx treatment based on stage/grade**
- J 4.18 Explain the predicted results of cancers of the hypopharynx treatment based on treatment modalities**
- J 4.19 Plan radiation treatment for the patient with cancer of the hypopharynx as per Module E2, E3, & E4**
 - Multi field external beam
- J 4.20 Perform treatment procedures for the patient with cancer of the hypopharynx as per Module E5**
 - Multi field external beam
- J 4.21 Perform patient care for the patient with cancer of the hypopharynx as per Module E6**

- J 5 Treatment of Cancers of the Larynx**
 - J 5.1 State the epidemiology of cancers of the larynx**
 - Risk factors
 - Incidence
 - J 5.2 State the etiology of cancers of the larynx**
 - J 5.3 Explain the prognostic indicators of cancers of the larynx**
 - Tumor extent
 - Tumor progression
 - Lymph node status
 - Gender
 - J 5.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head and neck in relation to cancers of the larynx**
 - J 5.5 Discuss the natural history of cancers of the larynx**
 - Site of origin in the larynx
 - Tumor progression
 - Lymph node status
 - Distant metastases
 - J 5.6 Identify the clinical presentation of cancers of the larynx**
 - J 5.7 Identify the various detection and diagnostic methods of cancers of the larynx**
 - Complete history and physical examination
 - Fiberoptic/endoscopic exam

- Direct/indirect laryngoscopy
- CT
- MRI
- Biopsy
- J 5.8 Describe the pathology and staging of cancers of the larynx as it relates to treatment**
 - Histopathologic types of cancers of the larynx
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- J 5.9 Describe the routes of spread of cancers of the larynx**
 - Extension in the surrounding area
 - Lymph node involvement (supra-larynx only)
 - Distant metastases
- J 5.10 Explain the rationale for using surgery to treat cancers of the larynx specific to the stage and pathology of the disease**
 - Partial/total laryngectomy
 - Vocal cordectomy
- J 5.11 Explain the rationale for using radiation therapy to treat cancers of the larynx specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- J 5.12 Explain the rationale for using combined modalities to treat cancers of the larynx specific to the stage and pathology of the disease**
- J 5.13 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- J 5.14 Interpret protocols for clinical studies and impact on radiation treatment**
- J 5.15 Discuss the emerging technologies relevant to the management of cancers of the larynx**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
 - PET/CT
- J 5.16 Explain the predicted results of cancers of the larynx treatment based on stage/grade**
- J 5.17 Explain the predicted results of cancers of the larynx treatment based on treatment modalities**
- J 5.18 Plan radiation treatment for the patient with cancer of the larynx as per Module E2, E3, & E4**
 - Multi field external beam
- J 5.19 Perform treatment procedures for the patient with cancer of the larynx as per Module E5**
 - Multi field external beam
- J 5.20 Perform patient care for the patient with cancer of the larynx as per Module E6**

- J 6 Treatment of Cancers of the Nasal Cavity and Paranasal Sinuses**
- J 6.1 State the epidemiology of these cancers**
 - Risk factors
 - Incidence
 - J 6.2 State the etiology of these cancers**
 - J 6.3 Explain the prognostic indicators of these cancers**
 - Stage
 - Lymph node status
 - Tumor extent
 - Histology
 - Tumor location
 - J 6.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head and neck in relation to these cancers**
 - J 6.5 Discuss the natural history of these cancers**
 - Site of origin
 - Tumor progression
 - Lymph node status
 - Histology
 - J 6.6 Identify the clinical presentation of these cancers**
 - J 6.7 Identify the various detection and diagnostic methods of these cancers**
 - Complete history and physical examination
 - Fiberoptic/endoscopic examination
 - Biopsy
 - CT
 - MRI
 - J 6.8 Describe the pathology and staging of these cancers as it relates to treatment**
 - Histopathologic types of cancers of the nasal cavity and paranasal sinuses
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - J 6.9 Describe the routes of spread of these cancers**
 - Extension in the surrounding area
 - Lymph node involvement
 - Distant metastases
 - J 6.10 Explain the rationale for using surgery to treat these cancers specific to the stage and pathology of the disease**
 - J 6.11 Explain the rationale for using radiation therapy to treat these cancers specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Brachytherapy
 - J 6.12 Explain the rationale for using combined modalities to treat these cancers specific to the stage and pathology of the disease**
 - J 6.13 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine

- Magnetic Resonance
- Ultrasound
- Health records
- Laboratory reports
- J 6.14 Interpret protocols for clinical studies and impact on radiation treatment**
- J 6.15 Discuss the emerging technologies relevant to the management of these cancers**
 - Adaptive Radiation therapy
 - Localization methods (on board imagine, anatomy matching etc)
 - PET/CT
- J 6.16 Explain the predicted results of these cancers treatment based on stage/grade**
- J 6.17 Explain the predicted results of these cancers treatment based on treatment modalities**
- J 6.18 Plan radiation treatment for the patient with these cancers as per Module E2, E3, & E4**
 - Multi field external beam
 - Brachytherapy
- J 6.19 Perform treatment techniques for the patient with these cancers as per Module E5**
 - Multi field external beam
 - Brachytherapy
- J 6.20 Perform patient care for the patient with these cancers as per Module E6**

- J 7 Treatment of Cancer of the Salivary Glands**
- J 7.1 State the epidemiology of cancers of the salivary glands**
 - Risk factors
 - Incidence
- J 7.2 State the etiology of cancers of the salivary glands**
- J 7.3 Explain the prognostic indicators of cancers of the salivary glands**
 - Stage
 - Tumor extent
 - Lymph node status
 - Grade
 - Cranial nerve involvement
 - Age
- J 7.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head and neck in relation to cancers of the salivary glands**
- J 7.5 Discuss the natural history of cancers of the salivary glands**
 - Site of origin
 - Tumor progression
 - Lymph node status
 - Histology
- J 7.6 Identify the clinical presentation of cancers of the salivary glands**

- J 7.7 Identify the various detection and diagnostic methods of cancers of the salivary glands**
 Complete history and physical examination
 CT
 Plain radiographs
 MRI
 Biopsy
- J 7.8 Describe the pathology and staging of cancers of the salivary glands as it relates to treatment**
 Histopathologic types of cancers of the salivary glands
 Staging systems
 Histopathologic grade
 Dose and fractionation regimes
- J 7.9 Describe the routes of spread of cancers of the salivary glands**
 Extension in the surrounding area
 Lymph node involvement
 Distant metastases
 Cranial nerve invasion
- J 7.10 Explain the rationale for using surgery to treat cancers of the salivary glands specific to the stage and pathology of the disease**
 Nerve-sparing surgery
 Partial/total parotidectomy
- J 7.11 Explain the rationale for using systemic therapy to treat cancers of the salivary glands specific to the stage and pathology of the disease**
 Chemotherapy
- J 7.12 Explain the rationale for using radiation therapy to treat cancers of the salivary glands specific to the stage and pathology of the disease**
 Multi field external beam radiation therapy
- J 7.13 Explain the rationale for using combined modalities to treat cancers of the salivary glands specific to the stage and pathology of the disease**
- J 7.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 Radiological modalities
 Nuclear Medicine
 Magnetic Resonance
 Ultrasound
 Health records
 Laboratory reports
- J 7.15 Interpret protocols for clinical studies and impact on radiation treatment**
- J 7.16 Discuss the emerging technologies relevant to the management of cancers of the salivary glands**
 Adaptive Radiation therapy
 Localization methods (on board image, anatomy matching etc)
 PET/CT
- J 7.17 Explain the predicted results of cancers of the salivary glands treatment based on stage/grade**
- J 7.18 Explain the predicted results of cancers of the salivary glands treatment based on treatment modalities**

- J 7.19 Plan radiation treatment for the patient with cancer of the salivary glands as per Module E2, E3, & E4**
 - Multi field external beam
- J 7.20 Perform treatment procedures for patient with cancer of the salivary glands as per Module E5**
 - Multi field external beam
- J 7.21 Perform patient care for the patient with cancer of the salivary glands as per Module E6**

MODULE K GYNECOLOGICAL CANCERS

The following are listed in order of sites most commonly treated with radiation therapy

K 1 Radiation treatment of Cervix Cancer

K 1.1 State the epidemiology of cervix cancer

- Risk factors
- Incidence

K 1.2 State the etiology of cervix cancer

K 1.3 Explain the prognostic indicators of cervix cancer

- Stage
- Tumor extent
- Lymph node status
- Histological Grade
- Age

K 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen/pelvis in relation to cervix cancer

K 1.5 Discuss the natural history of cervix cancer

- Site of origin in the cervix
- Tumor progression
- Lymph node status
- Distant metastases

K 1.6 Identify the clinical presentation of cervix cancer

K 1.7 Identify the various detection and diagnostic methods of cervix cancer

- Complete history and physical examination
- Papanicolaou (PAP) Smear
- Colposcopy
- Conization
- Biopsies
- Dilation and curettage (D&C)
- Cytoscopy/ rectosigmoidoscopy
- CT
- MRI
- Colon barium enema (patients with Stage IIB and up)
- PET

K 1.8 Describe the pathology and staging of cervix cancer as it relates to treatment

- Histopathologic types of cancers of the cervix
- Staging systems
- Histopathologic grade
- Dose and fractionation regimes

K 1.9 Describe the routes of spread of cervix cancer

- Extension in the surrounding area
- Lymph node involvement
- Distant metastases

K 1.10 Explain the rationale for using surgery to treat cervix cancer specific to the stage and pathology of the disease

- Therapeutic conization
- Laser Therapy
- Cryotherapy
- Radical Hysterectomy
- Pelvic exenteration

- K 1.11 Explain the rationale for using systemic therapy to treat cervix cancer specific to the stage and pathology of the disease**
 - Chemotherapy
- K 1.12 Explain the rationale for using radiation therapy to treat cervix cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Intracavitary Brachytherapy
- K 1.13 Explain the rationale for using combined modalities to treat cervix cancer specific to the stage and pathology of the disease**
- K 1.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- K 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- K 1.16 Discuss the emerging technologies relevant to the management of cervix cancer**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- K 1.17 Explain the predicted results of cervix treatment based on stage/grade**
- K 1.18 Explain the predicted results of cervix treatment based on treatment modalities**
- K 1.19 Plan radiation treatment for the patient with cervical cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Intracavitary brachytherapy
- K 1.20 Perform treatment procedures for the patient with cancer of the cervix as per Module E5**
 - Multi field external beam radiation therapy
 - Intracavitary Brachytherapy
- K 1.21 Perform patient care for the patient with cancer of the cervix as per Module E6**
- K 2 Radiation treatment of Cancer of the Endometrium**
 - K 2.1 State the epidemiology of endometrial cancer**
 - Risk factors
 - Incidence
 - K 2.2 State the etiology of endometrial cancer**
 - K 2.3 Explain the prognostic indicators of endometrial cancer**
 - Stage
 - Tumor extent
 - Lymph node status
 - Histological Grade
 - Age
 - K 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen/pelvis in relation to endometrial cancer**

- K 2.5 Discuss the natural history of endometrial cancer**
 - Site of origin in the endometrium
 - Tumor progression
 - Recurrence
 - Distant metastases
- K 2.6 Identify the clinical presentation of endometrial cancer**
- K 2.7 Identify the various detection and diagnostic methods of endometrial cancer**
 - Complete history and physical examination
 - Biopsies
 - Fractional Dilation and curettage (D&C)
 - CT
 - MRI
 - Tumor markers
 - Transvaginal ultrasound
- K 2.8 Describe the pathology and staging of endometrial cancer as it relates to treatment**
 - Histopathologic types of cancers of the endometrium
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- K 2.9 Describe the routes of spread of endometrial cancer**
 - Extension in the surrounding area
 - Lymph node involvement
 - Distant metastases
- K 2.10 Explain the rationale for using surgery to treat endometrial cancer specific to the stage and pathology of the disease**
 - Total Abdominal Hysterectomy and Bilateral Salpingo-oophorectomy (TAHBSO)
 - Radical Hysterectomy
 - Pelvic exenteration
- K 2.11 Explain the rationale for using systemic therapy to treat endometrial cancer specific to the stage and pathology of the disease**
 - Chemotherapy
 - Hormonal therapy
- K 2.12 Explain the rationale for using radiation therapy to treat endometrial cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Intracavitary brachytherapy
- K 2.13 Explain the rationale for using combined modalities to treat endometrial cancer specific to the stage and pathology of the disease**
- K 2.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports

- K 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- K 2.16 Discuss the emerging technologies relevant to the management of endometrial cancer**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
 - PET/CT
- K 2.17 Explain the predicted results of endometrial treatment based on stage/grade**
- K 2.18 Explain the predicted results of endometrial treatment based on treatment modalities**
- K 2.19 Plan radiation treatment for the patient with endometrial carcinoma as per Module E2, E3, & E4**
 - Multi field external beam
 - Intracavitary brachytherapy
- K 2.20 Perform treatment procedures for the patient with endometrial cancer as per Module E5**
 - Multi field external beam
 - Intracavitary Brachytherapy
- K 2.21 Perform patient care for the patient with endometrial carcinoma as per Module E6**

- K 3 Radiation treatment of Cancer of the Ovary**
 - K 3.1 State the epidemiology of ovarian cancer**
 - Risk factors
 - Incidence
 - K 3.2 State the etiology of ovarian cancer**
 - K 3.3 Explain the prognostic indicators of ovarian cancer**
 - Stage
 - Tumor extent
 - Lymph node status
 - Grade
 - Histology
 - K 3.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen/pelvis in relation to ovarian cancer**
 - K 3.5 Discuss the natural history of ovarian cancer**
 - Site of origin in the ovary
 - Tumor progression
 - Recurrence
 - Distant metastases
 - K 3.6 Identify the clinical presentation of ovarian cancer**
 - K 3.7 Identify the various detection and diagnostic methods of ovarian cancer**
 - Complete history and physical examination
 - Tumor markers
 - Biopsies
 - CT
 - MRI
 - Transvaginal ultrasound
 - K 3.8 Describe the pathology and staging of ovarian cancer as it relates to treatment**
 - Histopathologic types of cancers of the ovary
 - Staging systems

- Histopathologic grade
- Dose and fractionation regimes
- K 3.9 Describe the routes of spread of ovarian cancer**
 - Extension in the surrounding area
 - Lymph node involvement
 - Distant metastases
 - Peritoneal spread
- K 3.10 Explain the rationale for using surgery to treat ovarian cancer specific to the stage and pathology of the disease**
 - Cytoreduction
 - Total Abdominal Hysterectomy and Bilateral Salpingo-oophorectomy (TAHBSO)
- K 3.11 Explain the rationale for using systemic therapy to treat ovarian cancer specific to the stage and pathology of the disease**
 - Chemotherapy
 - Hormonal therapy
- K 3.12 Explain the rationale for using radiation therapy to treat ovarian cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- K 3.13 Explain the rationale for using combined modalities to treat ovarian cancer specific to the stage and pathology of the disease**
- K 3.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- K 3.15 Interpret protocols for clinical studies and impact on radiation treatment**
- K 3.16 Discuss the emerging technologies relevant to the management of ovarian cancer**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- K 3.17 Explain the predicted results of ovarian treatment based on stage/grade**
- K 3.18 Explain the predicted results of ovarian treatment based on treatment modalities**
- K 3.19 Plan radiation treatment for the patient with ovarian cancer as per Module E2, E3, & E4**
 - Multi field external beam
- K 3.20 Perform treatment procedures for the patient with ovarian cancer as per Module E5**
 - Multi field external beam
- K 3.21 Perform patient care for the patient with ovarian cancer as per Module E6**
- K 4 Radiation treatment of Cancer of the Vagina**
 - K 4.1 State the epidemiology of vaginal cancer**
 - Risk factors
 - Incidence

- K 4.2 State the etiology of vaginal cancer**
- K 4.3 Explain the prognostic indicators of vaginal cancer**
 - Stage
 - Tumor extent
 - Lymph node status
 - Tumor location in the vagina
 - Histology
- K 4.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen/pelvis in relation to vaginal cancer**
- K 4.5 Discuss the natural history of vaginal cancer**
 - Site of origin in the vagina
 - Tumor progression
 - Recurrence
 - Distant metastases
- K 4.6 Identify the clinical presentation of vaginal cancer**
- K 4.7 Identify the various detection and diagnostic methods of vaginal cancer**
 - Complete history and physical examination
 - CT
 - MRI
 - Biopsy
- K 4.8 Describe the pathology and staging of vaginal cancer as it relates to treatment**
 - Histopathologic types of cancers in the vagina
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- K 4.9 Describe the routes of spread of vaginal cancer**
 - Extension in the surrounding area
 - Lymph node involvement
 - Distant metastases
- K 4.10 Explain the rationale for using surgery to treat vaginal cancer specific to the stage and pathology of the disease**
- K 4.11 Explain the rationale for using systemic therapy to treat vaginal cancer specific to the stage and pathology of the disease**
 - Chemotherapy
- K 4.12 Explain the rationale for using radiation therapy to treat vaginal cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Brachytherapy
- K 4.13 Explain the rationale for using combined modalities to treat vaginal cancer specific to the stage and pathology of the disease**
- K 4.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports

- K 4.15 Interpret protocols for clinical studies and impact on radiation treatment**
- K 4.16 Discuss the emerging technologies relevant to the management of vaginal cancer**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- K 4.17 Explain the predicted results of vaginal treatment based on stage/grade**
- K 4.18 Explain the predicted results of vaginal treatment based on treatment modalities**
- K 4.19 Plan radiation treatment for the patient with vaginal cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Brachytherapy
- K 4.20 Perform treatment procedures for the patient with vaginal cancer as per Module E5**
 - Multi field external beam
 - Brachytherapy
- K 4.21 Perform patient care for the patient with cancer of the vagina as per Module E6**

- K 5 Radiation treatment of Cancer of the Vulva**
 - K 5.1 State the epidemiology of vulvar cancer**
 - Risk factors
 - Incidence
 - K 5.2 State the etiology of vulvar cancer**
 - K 5.3 Explain the prognostic indicators of vulvar cancer**
 - Stage
 - Tumor extent
 - Lymph node status
 - Histology
 - K 5.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the abdomen/pelvis in relation to vulvar cancer**
 - K 5.5 Discuss the natural history of vulvar cancer**
 - Site of origin in the vulva
 - Tumor progression
 - Recurrence
 - Distant metastases
 - K 5.6 Identify the clinical presentation of vulvar cancer**
 - K 5.7 Identify the various detection and diagnostic methods of vulvar cancer**
 - Complete history and physical examination
 - Biopsy
 - CT
 - K 5.8 Describe the pathology and staging of vulvar cancer as it relates to treatment**
 - Histopathologic types of cancers of the vulva
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes

- K 5.9 Describe the routes of spread of vulvar cancer**
 - Extension in the surrounding area
 - Lymph node involvement
 - Distant metastases
- K 5.10 Explain the rationale for using surgery to treat vulvar cancer specific to the stage and pathology of the disease**
- K 5.11 Explain the rationale for using systemic therapy to treat vulvar cancer specific to the stage and pathology of the disease**
 - Chemotherapy
- K 5.12 Explain the rationale for using radiation therapy to treat vulvar cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- K 5.13 Explain the rationale for using combined modalities to treat vulvar cancer specific to the stage and pathology of the disease**
- K 5.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- K 5.15 Interpret protocols for clinical studies and impact on radiation treatment**
- K 5.16 Discuss the emerging technologies relevant to the management of vulvar cancer**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
 - PET/CT
- K 5.17 Explain the predicted results of vulvar treatment based on stage/grade**
- K 5.18 Explain the predicted results of vulvar treatment based on treatment modalities**
- K 5.19 Plan radiation treatment for the patient with vulvar cancer as per Module E2, E3, & E4**
 - Multi field external beam
- K 5.20 Perform treatment procedures for the patient with vulvar cancer as per Module E5**
 - Multi field external beam
- K 5.21 Perform patient care for the patient with cancer of the vulva as per Module E6**

MODULE L LYMPHORETICULAR CANCERS

L 1 Treatment of Hodgkin's Disease

L 1.1 State the epidemiology of Hodgkin's Lymphoma

Risk factors

Incidence

L 1.2 State the etiology of Hodgkin's Lymphoma

L 1.3 Explain the prognostic indicators of Hodgkin's Lymphoma

Pathologic classification

Extra-nodal involvement

Tumor extent

L 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the thorax in relation to Hodgkin's Lymphoma field localization and verification

L 1.5 Discuss the natural history of Hodgkin's Lymphoma

Site of origin

Tumor progression

Recurrence

Distant metastases

L 1.6 Identify the clinical presentation of Hodgkin's Lymphoma

L 1.7 Identify the various detection and diagnostic methods of Hodgkin's Lymphoma

Complete history and physical examination

Biopsy

Hematologic studies

Chest x-ray

CT

MRI

PET

L 1.8 Describe the pathology and staging of Hodgkin's Lymphoma as it relates to treatment

Histopathologic types of Hodgkin's Lymphomas

Staging systems

Histopathologic grade

Dose and fractionation regimes

L 1.9 Describe the routes of spread of Hodgkin's Lymphoma

Contiguous lymph node sites

Visceral sites

Hematogenous spread

L 1.10 Explain the rationale of using systemic therapy to treat Hodgkin's Lymphoma specific to the stage and pathology of the disease

Chemotherapy

L 1.11 Explain the rationale of using radiation therapy to treat Hodgkin's Lymphoma specific to the stage and pathology of the disease

Involved field external beam radiation therapy

L 1.12 Explain the rationale of using combined modalities to treat Hodgkin's Lymphoma specific to the stage and pathology of the disease

- L 1.13 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Health records
 - Laboratory reports
- L 1.14 Interpret protocols for clinical studies and impact on radiation treatment**
- L 1.15 Discuss the emerging technologies relevant to the management of Hodgkin's Lymphoma**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- L 1.16 Explain the predicted results of Hodgkin's Lymphoma treatment based on stage/grade**
- L 1.17 Explain the predicted results of Hodgkin's Lymphoma treatment based on treatment modalities**
- L 1.18 Plan radiation treatment for the patient with Hodgkin's Lymphoma as per Module E2, E3, & E4**
 - Involved field external beam
- L 1.19 Perform treatment procedures for the patient with Hodgkin's Lymphoma as per Module E5**
 - Involved field external beam
- L 1.20 Perform patient care for the patient with Hodgkin's Lymphoma as per Module E6**

- L 2 Treatment of Non-Hodgkin's Lymphoma**
 - L 2.1 State the epidemiology of Non-hodgkin's lymphoma**
 - Risk factors
 - Incidence
 - L 2.2 State the etiology of Non-hodgkin's lymphoma**
 - L 2.3 Explain the prognostic indicators of Non-hodgkin's lymphoma**
 - Histology
 - Stage
 - Tumor extent
 - Age
 - L 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to Non-hodgkin's lymphoma**
 - L 2.5 Discuss the natural history of Non-hodgkin's lymphoma**
 - Site of origin
 - Tumor progression
 - Recurrence
 - Distant metastases
 - L 2.6 Identify the clinical presentation of Non-hodgkin's lymphoma**

- L 2.7 Identify the various detection and diagnostic methods of Non-hodgkin's lymphoma**
 - Complete history and physical examination
 - Biopsy
 - CT
 - MRT
 - Lumbar Puncture
- L 2.8 Describe the pathology and staging of Non-hodgkin's lymphoma as it relates to treatment**
 - Histopathologic types of Non-Hodgkin's Lymphomas
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- L 2.9 Describe the routes of spread of Non-hodgkin's lymphoma**
 - Progressive levels of lymph node involvement
 - Extra-nodal sites
- L 2.10 Explain the rationale for using surgery to treat Non-hodgkin's lymphoma specific to the stage and pathology of the disease**
- L 2.11 Explain the rationale for using systemic therapy to treat Non-hodgkin's lymphoma specific to the stage and pathology of the disease**
 - Chemotherapy
- L 2.12 Explain the rationale for using radiation therapy to treat Non-hodgkin's lymphoma specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- L 2.13 Explain the rationale for using combined modalities to treat Non-hodgkin's lymphoma specific to the stage and pathology of the disease**
- L 2.14 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Health records
 - Laboratory reports
- L 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- L 2.16 Discuss the emerging technologies relevant to the management of Non-hodgkin's lymphoma**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- L 2.17 Explain the predicted results of Non-hodgkin's lymphoma treatment based on stage/grade**
- L 2.18 Explain the predicted results of Non-hodgkin's lymphoma treatment based on treatment modalities**
- L 2.19 Plan radiation treatment for the patient with Non-hodgkin's lymphoma as per Module E2, E3, & E4**
 - Multi field external beam
- L 2.20 Perform treatment procedures for the patient with Non-hodgkin's lymphoma as per Module E5**
 - Multi field external beam

- L 2.21 Perform patient care for the patient with Non-hodgkin's lymphoma as per Module E6**
- L 2.22 Explain the rationale for high dose total body irradiation**
- L 2.23 Identify the types of bone marrow transplants**
 - Allogenic
 - Autologous
- L 2.24 Explain the various radiation treatment techniques for total body irradiation**
 - Parallel opposed extended distance with patient laying down
 - Parallel opposed extended distance with patient standing
 - Parallel opposed extended distance with patient sitting
- L 2.25 Explain the dose-fractionation schemes for total body irradiation**
 - Single fraction dose
 - Fractionated treatment
- L 2.26 Plan radiation treatment for the patient with Non-hodgkin's lymphoma receiving total body irradiation as per Module E 2.1-2.4 and E 2.10-2.16**
- L 2.27 Obtain radiographic images as necessary for construction of tissue inhomogeneity compensators**
- L 2.28 Perform treatment procedures for the patient with Non-hodgkin's lymphoma receiving total body irradiation as per Module E 5.1-5.9 and E 5.11-5.12**
- L 2.29 Perform patient care for the patient with Non-hodgkin's lymphoma receiving total body irradiation as per Module E6**

MODULE M CENTRAL NERVOUS SYSTEM TUMORS

- M 1 Radiation Treatment of Cancers of the Brain, Brainstem, and Cerebellum**
 - M 1.1 State the epidemiology of brain cancer**
 - Risk factors
 - Incidence
 - M 1.2 State the etiology of brain cancer**
 - M 1.3 Explain the prognostic indicators of brain cancer**
 - Tumor stage/grade
 - Histology
 - Seizure symptoms
 - Duration of symptoms
 - Age
 - Hypovascularity
 - Karnofsky performance status (KPS)
 - Tumor location
 - M 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the skull in relation to brain cancer**
 - M 1.5 Discuss the natural history of brain cancer**
 - Site of origin
 - Tumor progression and edema
 - Recurrence
 - Distant metastasis
 - M 1.6 Identify the clinical presentation of brain cancer**
 - M 1.7 Identify the various detection and diagnostic methods of brain cancer**
 - Complete history and physical examination
 - Complete neurologic examination
 - Biopsy
 - CT
 - MRI
 - CSF (cerebro-spinal fluid) cytology
 - PET
 - M 1.8 Describe the pathology and staging of brain cancer as it relates to treatment**
 - Histopathologic types of brain cancer
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - M 1.9 Describe the routes of spread of brain cancer**
 - Local invasion
 - Surrounding tissues
 - Distant metastases
 - M1.10 Explain the rationale of using surgery to treat brain cancer specific to the stage and pathology of the disease**
 - Resection
 - CT-directed stereotactic biopsy
 - M1.11 Explain the rationale of using systemic therapy to treat brain cancer specific to the stage and pathology of the disease**
 - Chemotherapy
 - Monoclonal antibodies

- M1.12 Explain the rationale of using radiation therapy to treat brain cancer specific to the stage and pathology of the disease**
 Multi field external beam radiation therapy
 Stereotactic radiation
- M1.13 Explain the rationale of using combined modalities to treat brain cancer specific to the stage and pathology of the disease**
- M1.14 Demonstrate an understanding of related disciplines in order to interpret the images/ reports of previous medical studies for specific use in the planning and treatment process**
 Radiological modalities
 Nuclear Medicine
 Magnetic Resonance
 Ultrasound
 Health records
 Laboratory reports
- M1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- M1.16 Discuss the emerging technologies relevant to the management of brain cancer**
 Adaptive Radiation therapy
 Heavy particles
 Radioimmunotherapy
 PET/CT
- M1.17 Explain the predicted results of brain treatment based on stage/grade**
- M1.18 Explain the predicted results of brain treatment based on treatment modalities**
- M1.19 Explain the predicted results of brain treatment based on histopathology**
- M1.20 Plan radiation treatment for patient with brain cancer as per Module E2, E3, & E4**
 Multi field external beam
- M1.21 Perform treatment procedures for patient with brain cancer as per Module E5**
 Multi field external beam
- M1.22 Perform patient care for patient with brain cancer as per Module E6**

MODULE N PEDIATRIC CANCERS

The following have been listed in order of the sites most commonly treated with radiation therapy

N 1 Radiation Treatment of CNS Tumors

N 1.1 State the epidemiology of pediatric CNS tumors

Risk factors

Incidence

N 1.2 State the etiology of pediatric CNS tumors

N 1.3 Explain the prognostic indicators of pediatric CNS tumors

Tumor extent

Pathology

Histology

N 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the brain and spinal column in relation to pediatric CNS tumors

N 1.5 Discuss the natural history of pediatric CNS tumors

Site of origin

Tumor progression and edema

Recurrence

Distant metastasis

N 1.6 Identify the clinical presentation of pediatric CNS tumors

N 1.7 Identify the various detection and diagnostic methods of pediatric CNS tumors

Complete history and physical examination

Complete neurologic examination

Biopsy

CT

MRI

Cerebral spinal fluid (CSF) cytology

PET

N 1.8 Describe the pathology and staging of pediatric CNS tumors as it relates to treatment

Histopathologic types of brain cancer

Staging systems

Histopathologic grade

Dose and fractionation regimes

N 1.9 Describe the routes of spread of pediatric CNS tumors

Local invasion

Surrounding tissues

Distant metastases

N 1.10 Explain the rationale for using surgery to treat pediatric CNS tumors specific to the stage and pathology of the disease

N 1.11 Explain the rationale for using systemic therapy to treat pediatric CNS tumors specific to the stage and pathology of the disease

Chemotherapy

N 1.12 Explain the rationale for using radiation therapy to treat pediatric CNS tumors specific to the stage and pathology of the disease

Multi field external beam radiation therapy

Stereotactic radiosurgery

- N 1.13 Explain the rationale for using combined modalities to treat pediatric CNS tumors specific to the stage and pathology of the disease**
 - N 1.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Health records
 - Laboratory reports
 - N 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
 - N 1.16 Discuss the emerging technologies relevant to the management of pediatric CNS tumors**
 - PET/CT
 - Adaptive Radiation Therapy
 - Localization methods (on board imaging, anatomy matching etc)
 - N 1.17 Explain the predicted results of pediatric CNS treatment based on stage/grade**
 - N 1.18 Explain the predicted results of pediatric CNS treatment based on treatment modalities**
 - N 1.19 Plan radiation treatment for pediatric patient with CNS cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - N 1.20 Perform treatment procedures for pediatric patient with CNS cancer as per Module E5**
 - Multi field external beam
 - N 1.21 Perform patient care for pediatric patient with CNS cancer as per Module E6**
- N 2 Radiation Treatment of Ewing's Sarcoma**
- N 2.1 State the epidemiology of Ewing's sarcoma**
 - Risk factors
 - Incidence
 - N 2.2 State the etiology of Ewing's sarcoma**
 - N 2.3 Explain the prognostic indicators of Ewing's sarcoma**
 - Tumor extent
 - Soft tissue extension
 - Histology
 - N 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the skeletal system in relation to Ewing's sarcoma**
 - N 2.5 Discuss the natural history of Ewing's sarcoma**
 - Site of origin
 - Tumor progression
 - Recurrence
 - Distant metastasis
 - N 2.6 Identify the clinical presentation of Ewing's sarcoma**
 - N 2.7 Identify the various detection and diagnostic methods of Ewing's sarcoma**
 - Complete history and physical examination
 - CT
 - MRI

- Bone marrow biopsy
- Bone Scan
- N 2.8 Describe the pathology of Ewing's sarcoma as it relates to treatment**
 - Site of presentation
 - Tumor volume
 - Metastases
 - Dose and fractionation regimes
- N 2.9 Describe the routes of spread of Ewing's sarcoma**
 - Extension into the bone
 - Distant metastases
- N 2.10 Explain the rationale for using surgery to treat Ewing's sarcoma specific to the pathology of the disease**
- N 2.11 Explain the rationale for using systemic therapy to treat Ewing's sarcoma specific to the pathology of the disease**
 - Chemotherapy
- N 2.12 Explain the rationale for using radiation therapy to treat Ewing's sarcoma specific to the pathology of the disease**
 - Multi field external beam radiation therapy
- N 2.13 Explain the rationale for using combined modalities to treat Ewing's sarcoma specific to the pathology of the disease**
- N 2.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Health records
 - Laboratory reports
- N 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- N 2.16 Discuss the emerging technologies relevant to the management of Ewing's sarcoma**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching)
- N 2.17 Explain the predicted results of Ewing's sarcoma treatment based on pathology**
- N 2.18 Explain the predicted results of Ewing's sarcoma treatment based on treatment modalities**
- N 2.19 Plan radiation treatment for a patient with Ewing's sarcoma as per Module E2, E3, & E4**
 - Multi field external beam
- N 2.20 Perform treatment procedures for a patient with Ewing's sarcoma as per Module E5**
 - Multi field external beam
- N 2.21 Perform patient care for a patient with Ewing's sarcoma as per Module E6**

N 3 Radiation Treatment of Wilm's Tumor

- N 3.1 State the epidemiology of Wilm's tumor**
 - Risk factors
 - Incidence

- N 3.2 State the etiology of Wilm's tumor**
- N 3.3 Explain the prognostic indicators of Wilm's tumor**
 - Tumor extent
 - Histology
- N 3.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the skeletal system in relation to Wilm's tumor**
- N 3.5 Discuss the natural history of Wilm's tumor**
 - Tumor progression
 - Recurrence
 - Distant metastases
- N 3.6 Identify the clinical presentation of Wilm's tumor**
- N 3.7 Identify the various detection and diagnostic methods of Wilm's tumor**
 - Complete history and physical examination
 - CT
 - MRI
 - Ultrasound
 - Laboratory studies
- N 3.8 Describe the pathology and staging of Wilm's tumor as it relates to treatment**
 - Staging systems
 - Dose and fractionation regimes
- N 3.9 Describe the routes of spread of Wilm's tumor**
 - Extension beyond the kidney capsule
 - Lymph node involvement
 - Peritoneal involvement
 - Hematogenous
- N 3.10 Explain the rationale for using surgery to treat Wilm's tumor specific to the stage and pathology of the disease**
 - Modified radical nephrectomy
 - Lymph node sampling
- N 3.11 Explain the rationale for using systemic therapy to treat Wilm's tumor specific to the stage and pathology of the disease**
 - Chemotherapy
- N 3.12 Explain the rationale for using radiation therapy to treat Wilm's tumor specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- N 3.13 Explain the rationale for using combined modalities to treat Wilm's tumor specific to the stage and pathology of the disease**
- N 3.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- N 3.15 Interpret protocols for clinical studies and impact on radiation treatment**

- N 3.16 Discuss the emerging technologies relevant to the management of Wilm's tumor**
 - PET/CT
 - Adaptive Radiotherapy
 - Localization methods (on board imaging, anatomy matching etc)
- N 3.17 Explain the predicted results of Wilm's tumor treatment based on stage/grade**
- N 3.18 Explain the predicted results of Wilm's tumor treatment based on treatment modalities**
- N 3.19 Plan radiation treatment for a patient with Wilm's tumor as per Module E2, E3, & E4**
 - Multi field external beam
- N 3.20 Perform treatment procedures for a patient with Wilm's tumor as per Module E5**
 - Multi field external beam
- N 3.21 Perform patient care for a patient with Wilm's tumor as per Module E6**

N 4 Radiation Treatment of Retinoblastoma

- N 4.1 State the epidemiology of retinoblastoma**
 - Risk factors
 - Incidence
- N 4.2 State the etiology of retinoblastoma**
- N 4.3 Explain the prognostic indicators of retinoblastoma**
 - Tumor extent
 - Age at presentation
- N 4.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the eye in relation to retinoblastoma**
- N 4.5 Discuss the natural history of retinoblastoma**
 - Site of origin in the retina
 - Tumor progression
 - Distant metastases
- N 4.6 Identify the clinical presentation of retinoblastoma**
- N 4.7 Identify the various detection and diagnostic methods of retinoblastoma**
 - Complete history and physical examination
 - Ophthalmologic exam
 - Ultrasound
 - MRI
- N 4.8 Describe the pathology and staging of retinoblastoma as it relates to treatment**
 - Staging systems
 - Dose and fractionation regimes
- N 4.9 Describe the routes of spread of retinoblastoma**
 - Extension beyond the retina
 - Lymph node involvement
 - Distant metastases
- N 4.10 Explain the rationale for using surgery to treat retinoblastoma specific to the stage and pathology of the disease**
 - Enucleation
- N 4.11 Explain the rationale for using systemic therapy to treat retinoblastoma specific to the stage and pathology of the disease**

- N 4.12 Explain the rationale for using radiation therapy to treat retinoblastoma specific to the stage and pathology of the disease**
 - Single field external beam radiation therapy
 - Multi field external beam radiation therapy
- N 4.13 Explain the rationale for using combined modalities to treat retinoblastoma specific to the stage and pathology of the disease**
- N 4.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Ultrasound
 - Magnetic Resonance
 - Health records
- N 4.15 Explain the predicted results of retinoblastoma treatment based on stage**
- N 4.16 Explain the predicted results of retinoblastoma treatment based on treatment modalities**
- N 4.17 Plan radiation treatment for a patient with retinoblastoma as per Module E2, E3, & E4**
 - Single field external beam
 - Multi field external beam
- N 4.18 Perform treatment procedures for a patient with retinoblastoma as per Module E5**
 - Single field external beam
 - Multi field external beam
- N 4.19 Perform patient care for a patient with retinoblastoma as per Module E6**

N 5 Radiation Treatment of Neuroblastoma

- N 5.1 State the epidemiology of neuroblastoma**
 - Risk factors
 - Incidence
- N 5.2 State the etiology of neuroblastoma**
- N 5.3 Explain the prognostic indicators of neuroblastoma**
 - Age
 - Stage
 - Histology
 - MYCN (protooncogene)
- N 5.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head in relation to neuroblastoma**
- N 5.5 Discuss the natural history of neuroblastoma**
 - Site of origin
 - Tumor progression
 - Distant metastases
- N 5.6 Identify the clinical presentation of neuroblastoma**
- N 5.7 Identify the various detection and diagnostic methods of neuroblastoma**
 - Complete history and physical examination
 - CT
 - MRI
 - Ultrasound
 - Laboratory studies
 - Biopsy
 - Bone marrow aspirate

- Chest x-ray
- Bone Scan
- N 5.8 Describe the pathology and staging of neuroblastoma as it relates to treatment**
 - Histopathologic types of neuroblastoma
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- N 5.9 Describe the routes of spread of neuroblastoma**
 - Extension at the site of origin
 - Lymph node involvement
 - Distant metastases
- N 5.10 Explain the rationale for using surgery to treat neuroblastoma specific to the stage and pathology of the disease**
 - Bone marrow transplant for metastatic disease
- N 5.11 Explain the rationale for using systemic therapy to treat neuroblastoma specific to the stage and pathology of the disease**
 - Chemotherapy
- N 5.12 Explain the rationale for using radiation therapy to treat neuroblastoma specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- N 5.13 Explain the rationale for using combined modalities to treat neuroblastoma specific to the stage and pathology of the disease**
- N 5.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- N 5.15 Interpret protocols for clinical studies and impact on radiation treatment**
- N 5.16 Discuss the emerging technologies relevant to the management of neuroblastoma**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
- N 5.17 Explain the predicted results of neuroblastoma treatment based on stage/grade**
- N 5.18 Explain the predicted results of neuroblastoma treatment based on treatment modalities**
- N 5.19 Plan radiation treatment for a patient with neuroblastoma as per Module E2, E3, & E4**
 - Multi field external beam
- N 5.20 Perform treatment procedures for a patient with neuroblastoma as per Module E5**
 - Multi field external beam
- N 5.21 Perform patient care for a patient with neuroblastoma as per Module E6**

N 6 Radiation Treatment of Rhabdomyosarcoma

N 6.1 State the epidemiology of rhabdomyosarcoma

Risk factors
Incidence

N 6.2 State the etiology of rhabdomyosarcoma

N 6.3 Explain the prognostic indicators of rhabdomyosarcoma

Tumor extent
Stage
Tumor location
Lymph node status
Pathology

N 6.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to rhabdomyosarcoma

N 6.5 Discuss the natural history of rhabdomyosarcoma

Site of origin
Tumor progression
Distant metastases

N 6.6 Identify the clinical presentation of rhabdomyosarcoma

N 6.7 Identify the various detection and diagnostic methods of rhabdomyosarcoma

Complete history and physical examination
CT (primary site and thoracic)
MRI
Bone Scan
Bone marrow Biopsy
Bone marrow aspirate
Chest x-ray

N 6.8 Describe the pathology and staging of rhabdomyosarcoma as it relates to treatment

Histopathologic types of rhabdomyosarcoma
Staging systems
Histopathologic grade
Dose and fractionation regimes

N 6.9 Describe the routes of spread of rhabdomyosarcoma

Local spread
Lymph node involvement
Distant metastases

N 6.10 Explain the rationale for using surgery to treat rhabdomyosarcoma specific to the stage and pathology of the disease

N 6.11 Explain the rationale for using systemic therapy to treat rhabdomyosarcoma specific to the stage and pathology of the disease

Chemotherapy

N 6.12 Explain the rationale for using radiation therapy to treat rhabdomyosarcoma specific to the stage and pathology of the disease

Multi field external beam radiation therapy

N 6.13 Explain the rationale for using combined modalities to treat rhabdomyosarcoma specific to the stage and pathology of the disease

- N 6.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- N 6.15 Interpret protocols for clinical studies and impact on radiation treatment**
- N 6.16 Discuss the emerging technologies relevant to the management of rhabdomyosarcoma**
 - PET/CT
 - Adaptive Radiation therapy
 - Localization method (anatomy matching, on board imaging etc)
- N 6.17 Explain the predicted results of rhabdomyosarcoma treatment based on stage/grade**
- N 6.18 Explain the predicted results of rhabdomyosarcoma treatment based on treatment modalities**
- N 6.19 Plan radiation treatment for a patient with rhabdomyosarcoma as per Module E2, E3, & E4**
 - Multi field external beam
- N 6.20 Perform treatment procedures for a patient with rhabdomyosarcoma as per Module E5**
 - Multi field external beam
- N 6.21 Perform patient care for a patient with rhabdomyosarcoma as per Module E6**

MODULE O HEMATOLOGIC MALIGNANCIES

O 1 Radiation Treatment of Leukemia

O 1.1 State the epidemiology of leukemia

Risk factors
Incidence

O 1.2 State the etiology of leukemia

O 1.3 Explain the prognostic indicators of leukemia

Age at diagnosis
White blood counts at diagnosis

O 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to leukemia

O 1.5 Discuss the natural history of leukemia

Tumor progression
Relapse

O 1.6 Identify the clinical presentation of leukemia

O 1.7 Identify the various detection and diagnostic methods of leukemia

Complete history and physical exam
Bone marrow aspirate
Hematologic laboratory studies
Chest x-ray

O 1.8 Describe the pathology and staging of leukemia as it relates to treatment

Morphology
Cytogenetics
Classification
Dose and fractionation regimes

O 1.9 Describe the routes of spread of leukemia

Extramedullary

O 1.10 Explain the rationale for using systemic therapy to treat leukemia specific to the stage and pathology of the disease

Chemotherapy

O 1.11 Explain the rationale for using radiation therapy to treat leukemia specific to the stage and pathology of the disease

multi field external beam radiation therapy
Total body irradiation

O 1.12 Explain the rationale for using combined modalities to treat leukemia specific to the stage and pathology of the disease

O 1.13 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies in the planning and treatment process

Radiologic modalities
Health records
Laboratory reports

O 1.14 Explain the predicted results of leukemia treatment based on stage/grade

O 1.15 Explain the predicted results of leukemia treatment based on treatment modalities

O 1.16 Plan radiation treatment for the patient with leukemia as per Module E2, E3, & E4

Multi field external beam

O 1.17 Perform treatment procedures for the patient with leukemia as per Module E5

Multi field external beam

O 1.18 Perform patient care for the patient with leukemia as per Module E6

O 1.19 Explain the rationale for high dose total body irradiation

O 1.20 Identify the types of bone marrow transplants

Allogenic

Autologous

O 1.21 Explain the various radiation treatment techniques for total body irradiation

Parallel opposed fields extended distance with patient laying down

Parallel opposed fields extended distance with patient standing

Parallel opposed fields extended distance with patient sitting

O 1.22 Explain the dose-fractionation schemes for total body irradiation

Single fraction dose

Fractionated dose

O 1.23 Plan radiation treatment for the patient with leukemia receiving total body irradiation as per Module E 2.1-2.4 and E 2.10-2.16

O 1.24 Obtain radiographic images as necessary for construction of tissue inhomogeneity compensators

O 1.25 Perform treatment procedures for the patient with leukemia receiving total body irradiation as per Module E 5.1-5.9 and E 5.11-5.12

O 1.26 Perform patient care for the patient with leukemia receiving total body irradiation as per Module E6

O 2 Radiation Treatment of Multiple Myeloma and Plasmacytoma

O 2.1 State the epidemiology of multiple myeloma and plasmacytoma

Risk factors

Incidence

O 2.2 State the etiology of multiple myeloma and plasmacytoma

O 2.3 Explain the prognostic indicators of myeloma and plasmacytoma

Cytogenetic abnormalities

Microglobulin levels

LDH levels

O 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to myeloma and plasmacytoma

O 2.5 Discuss the natural history of myeloma and plasmacytoma

Site of origin

Tumor progression

Recurrence

Histology

O 2.6 Identify the clinical presentation of myeloma and plasmacytoma

O 2.7 Identify the various detection and diagnostic methods of myeloma and plasmacytoma

Complete history and physical examination

Hematologic lab studies

Bone marrow aspirate

Skeletal survey

- O 2.8 Describe the pathology and staging of myeloma and plasmacytoma as it relates to treatment**
 - Durie-Salmon staging system
 - Dose and fractionation schemes
- O 2.9 Describe the routes of spread of myeloma and plasmacytoma**
 - Extramedullary
- O 2.10 Explain the rationale for using systemic therapy to treat myeloma and plasmacytoma specific to the stage and pathology of the disease**
 - Chemotherapy
- O 2.11 Explain the rationale for using radiation therapy to treat myeloma and plasmacytoma specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Hemi body irradiation
- O 2.12 Explain the rationale for using combined modalities to treat myeloma and plasmacytoma specific to the stage and pathology of the disease**
- O 2.13 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiologic modalities
 - Health records
 - Laboratory reports
 - MRI
- O 2.14 Explain the predicted results of myeloma and plasmacytoma treatment based on stage/grade**
- O 2.15 Explain the predicted results of myeloma and plasmacytoma treatment based on treatment modalities**
- O 2.16 Plan radiation treatment for a patient with myeloma and plasmacytoma as per Module E2, E3, & E4**
 - Multi field external beam
- O 2.17 Perform treatment procedures for a patient with myeloma and plasmacytoma as per Module E5**
 - Multi field external beam
- O 2.18 Perform patient care for a patient with myeloma and plasmacytoma as per Module E**

MODULE P CANCERS OF THE ENDOCRINE SYSTEM

The following have been listed in order of the sites most commonly treated with radiation therapy

P 1 Radiation Treatment of Thyroid Cancer

P 1.1 State the epidemiology of thyroid cancer

Risk factors

Incidence

P 1.2 State the etiology of thyroid cancer

P 1.3 Explain the prognostic indicators of thyroid cancer

Tumor extent

Histopathologic classification

Age

Gender

P 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the neck and thorax in relation to thyroid cancer

P 1.5 Discuss the natural history of thyroid cancer

Site of origin

Tumor progression

Recurrence

Distant metastasis

P 1.6 Identify the clinical presentation of thyroid cancer

P 1.7 Identify the various detection and diagnostic methods of thyroid cancer

Complete history and physical examination

Serum calcitonin levels

Thyroid scan

CT

Ultrasound

FNA biopsy

P 1.8 Describe the pathology and staging of thyroid cancer as it relates to treatment

Histopathologic types

Staging systems

Histopathologic grade

Dose and fractionation regimes

P 1.9 Describe the routes of spread of thyroid cancer

Local invasion

Extra-thyroid invasion

Distant metastases

P 1.10 Explain the rationale for using surgery to treat thyroid cancer specific to the stage and pathology of the disease

Lobectomy

Thyroidectomy

P 1.11 Explain the rationale for using systemic therapy to treat thyroid cancer specific to the stage and pathology of the disease

Thyroxine

- P 1.12 Explain the rationale for using radiation therapy to treat thyroid cancer specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Radioactive Iodine 131
- P 1.13 Explain the rationale for using combined modalities to treat thyroid cancer specific to the stage and pathology of the disease**
- P 1.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- P 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- P 1.16 Discuss the emerging technologies relevant to the management of thyroid cancer**
 - Adaptive Radiation therapy
 - Localization methods (on board imaging, anatomy matching etc)
 - PET/CT
- P 1.17 Explain the predicted results of thyroid treatment based on stage/grade**
- P 1.18 Explain the predicted results of thyroid treatment based on treatment modalities**
- P 1.19 Explain the predicted results of thyroid treatment based on histopathology**
- P 1.20 Plan radiation treatment for a patient with thyroid cancer as per Module E2, E3, & E4**
 - Multi field external beam
- P 1.21 Perform treatment procedures for a patient with thyroid cancer as per Module E5**
 - Multi field external beam
- P 1.22 Perform patient care for a patient with thyroid cancer as per Module E6**

P 2 Radiation Treatment of Tumors of the Pituitary

- P 2.1 State the epidemiology of pituitary tumors**
 - Risk factors
 - Incidence
- P 2.2 State the etiology of pituitary tumors**
- P 2.3 Explain the prognostic indicators of pituitary tumors**
 - Tumor type
 - Extent of presenting abnormalities
 - Freedom from recurrence
- P 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the head in relation to pituitary tumors**
- P 2.5 Discuss the natural history of pituitary tumors**
 - Tumor progression
 - Recurrence
- P 2.6 Identify the clinical presentation of pituitary tumors**

- P 2.7 Identify the various detection and diagnostic methods of pituitary tumors**
 Complete history and physical examination
 Hormone levels
 skull films
 CT
 MRI
- P 2.8 Describe the pathology and staging of pituitary tumors as it relates to treatment**
 Morphologic classification
 Staging systems
- P 2.9 Describe the routes of spread of pituitary tumors**
 Extension into sella
 Extra-sella extension
- P 2.10 Explain the rationale of using surgery to treat pituitary tumors specific to the stage and pathology of the disease**
 Trans-sphenoidal adenectomy
- P 2.11 Explain the rationale of using systemic therapy to treat pituitary tumors specific to the stage and pathology of the disease**
- P 2.12 Explain the rationale of using radiation therapy to treat pituitary tumors specific to the stage and pathology of the disease**
 Multi field external beam radiation therapy
 Stereotactic radiosurgery
- P 2.13 Explain the rationale of using combined modalities to treat pituitary tumors specific to the stage and pathology of the disease**
- P 2.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 Radiological modalities
 Nuclear Medicine
 Magnetic Resonance
 Ultrasound
 Health records
 Laboratory reports
- P 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- P 2.16 Discuss the emerging technologies relevant to the management of pituitary tumors**
 Adaptive Radiation therapy
 Localization methods (on board imaging, anatomy matching etc)
 PET/CT
- P 2.17 Explain the predicted results of pituitary treatment based on stage/grade**
- P 2.18 Explain the predicted results of pituitary treatment based on treatment modalities**
- P 2.19 Plan radiation treatment for a patient with pituitary tumors as per Module E2, E3, & E4**
 Multi field external beam
- P 2.20 Perform treatment procedures for a patient with pituitary tumors as per Module E5**
 Multi field external beam
- P 2.21 Perform patient care for a patient with pituitary tumors as per Module E6**

MODULE Q SARCOMAS OF BONE AND SOFT TISSUE

The following have been listed in order of the sites most commonly treated with radiation therapy

Q 1 Radiation treatment of Sarcomas of the Bone

Q 1.1 State the epidemiology of sarcomas of the bone

- Risk factors
- Incidence

Q 1.2 State the etiology of sarcomas of the bone

Q 1.3 Explain the prognostic indicators of sarcomas of the bone

- Tumor stage
- Histological grade
- Tumor location
- Pain at presentation
- Age
- Tumor size
- Presence of metastases at presentation

Q 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the skeleton in relation to sarcomas of the bone

Q 1.5 Discuss the natural history of sarcomas of the bone

- Site of origin
- Tumor progression and edema
- Recurrence
- Distant metastasis

Q 1.6 Identify the clinical presentation of sarcomas of the bone

Q 1.7 Identify the various detection and diagnostic methods of sarcomas of the bone

- Complete history and physical examination
- Plain radiographs
- Biopsy
- CT
- MRI
- Laboratory studies
- Bone Scan

Q 1.8 Describe the pathology and staging of sarcomas of the bone as it relates to treatment

- Histopathologic types of sarcomas of the bone
- Staging systems
- Histopathologic grade
- Dose and fractionation regimes

Q 1.9 Describe the routes of spread of sarcomas of the bone

- Local extension
- Surrounding tissues/organs
- Skip metastases
- Distant metastases

Q 1.10 Explain the rationale for using surgery to treat sarcomas of the bone specific to the stage and pathology of the disease

- Resection
- Limb sparing
- Amputation

- Q 1.11 Explain the rationale for using systemic therapy to treat sarcomas of the bone specific to the stage and pathology of the disease**
Chemotherapy
- Q 1.12 Explain the rationale for using radiation therapy to treat sarcomas of the bone specific to the stage and pathology of the disease**
Multi field external beam radiation therapy
- Q 1.13 Explain the rationale for using combined modalities to treat sarcomas of the bone specific to the stage and pathology of the disease**
- Q 1.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
Radiological modalities
Nuclear Medicine
Magnetic Resonance
Ultrasound
Health records
Laboratory reports
- Q 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- Q 1.16 Discuss the emerging technologies relevant to the management of sarcomas of the bone**
Adaptive Radiation therapy
Localization methods (anatomy matching, on board imaging etc)
PET/CT
- Q 1.17 Explain the predicted results of sarcomas of the bone treatment based on stage/grade**
- Q 1.18 Explain the predicted results of sarcomas of the bone treatment based on treatment modalities**
- Q 1.19 Explain the predicted results of sarcomas of the bone treatment based on histopathology**
- Q 1.15 Plan radiation treatment for a patient with sarcoma of the bone as per Module E2, E3, & E4**
Multi field external beam
- Q 1.16 Perform treatment procedures for a patient with sarcoma of the bone as per Module E5**
Multi field external beam
- Q 1.17 Perform patient care for a patient with sarcoma of the bone as per Module E6**

Q 2 Radiation Treatment of Sarcomas of Soft Tissue

- Q 2.1 State the epidemiology of sarcomas of the soft tissue**
Risk factors
Incidence
- Q 2.2 State the etiology of sarcomas of the soft tissue**
- Q 2.3 Explain the prognostic indicators of sarcomas of the soft tissue**
Tumor stage
Histological grade
Tumor location
Surgical margins
Distant metastases

- Q 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to sarcomas of the soft tissue**
- Q 2.5 Discuss the natural history of sarcomas of the soft tissue**
 Site of origin
 Tumor progression and edema
 Recurrence
 Distant metastasis
- Q 2.6 Identify the clinical presentation of sarcomas of the soft tissue**
- Q 2.7 Identify the various detection and diagnostic methods of sarcomas of the soft tissue**
 Complete history and physical examination
 Chest x-ray
 Biopsy
 CT
 MRI
- Q 2.8 Describe the pathology and staging of sarcomas of the soft tissue as it relates to treatment**
 Histopathologic types of sarcomas of the soft tissue
 Staging systems
 Histopathologic grade
 Dose and fractionation regimes
- Q 2.9 Describe the routes of spread of sarcomas of the soft tissue**
 Local extension
 Surrounding tissues/organs
 Lymph node involvement
 Distant metastases
- Q 2.10 Explain the rationale for using surgery to treat sarcomas of the soft tissue specific to the stage and pathology of the disease**
 Excision
 Limb sparing
 Amputation
- Q 2.11 Explain the rationale for using systemic therapy to treat sarcomas of the soft tissue specific to the stage and pathology of the disease**
 Chemotherapy
- Q 2.12 Explain the rationale for using radiation therapy to treat sarcomas of the soft tissue specific to the stage and pathology of the disease**
 Multi field external beam radiation therapy
- Q 2.13 Explain the rationale for using combined modalities to treat sarcomas of the soft tissue specific to the stage and pathology of the disease**
- Q 2.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 Radiological modalities
 Nuclear Medicine
 Magnetic Resonance
 Ultrasound
 Health records
 Laboratory reports
- Q 2.15 Interpret protocols for clinical studies and impact on radiation treatment**

- Q 2.16 Discuss the emerging technologies relevant to the management of sarcomas of the soft tissue**
Adaptive Radiation therapy
Localization Methods (anatomy matching, on board imaging etc)
PET/CT
- Q 2.17 Explain the predicted results of sarcomas of the soft tissue treatment based on stage/grade**
- Q 2.18 Explain the predicted results of sarcomas of the soft tissue treatment based on treatment modalities**
- Q 2.19 Explain the predicted results of sarcomas of the soft tissue treatment based on histopathology**
- Q 2.20 Plan radiation treatment for a patient with sarcoma of the soft tissue as per Module E2, E3, & E4**
Multi field external beam
- Q 2.21 Perform treatment procedures for a patient with sarcoma of the soft tissue as per Module E5**
Multi field external beam
- Q 2.22 Perform patient care for a patient with sarcoma of the soft tissue as per Module E6**

MODULE R SKIN CANCERS

- R 1 Radiation Treatment of Non-Melanoma Skin Cancers**
 - R 1.1 State the epidemiology of non-melanoma skin cancers**
 - Risk factors
 - Incidence
 - R 1.2 State the etiology of non-melanoma skin cancers**
 - R 1.3 Explain the prognostic indicators of non-melanoma skin cancers**
 - Tumor extent
 - Histology
 - Lymph node status
 - R 1.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to non-melanoma skin cancers**
 - R 1.5 Discuss the natural history of non-melanoma skin cancers**
 - Site of origin
 - Tumor progression and edema
 - Recurrence
 - Distant metastasis
 - R 1.6 Identify the clinical presentation of non-melanoma skin cancers**
 - R 1.7 Identify the various detection and diagnostic methods of non-melanoma skin cancers**
 - Complete history and physical examination
 - Plain radiographs
 - Biopsy
 - CT
 - MRI
 - R 1.8 Describe the pathology and staging of non-melanoma skin cancers as it relates to treatment**
 - Histopathologic types of skin cancers
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
 - R 1.9 Describe the routes of spread of non-melanoma skin cancers**
 - Local extension
 - Surrounding tissues/organs
 - Lymph node involvement
 - Distant metastases
 - R 1.10 Explain the rationale for using surgery to treat non-melanoma skin cancers specific to the stage and pathology of the disease**
 - Cryosurgery
 - Curettage
 - Electrodesiccation
 - MOH's micrographic surgery
 - R 1.11 Explain the rationale for using systemic therapy to treat non-melanoma skin cancers specific to the stage and pathology of the disease**
 - Chemotherapy
 - R 1.12 Explain the rationale for using radiation therapy to treat non-melanoma skin cancers specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
 - Single field external beam radiation therapy

- R 1.13 Explain the rationale for using combined modalities to treat non-melanoma skin cancers specific to the stage and pathology of the disease**
- R 1.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- R 1.15 Interpret protocols for clinical studies and impact on radiation treatment**
- R 1.16 Discuss the emerging technologies relevant to the management of non-melanoma skin cancers**
 - Photodynamic therapy
 - Adaptive Radiation therapy
- R 1.17 Explain the predicted results of non-melanoma skin treatment based on stage/grade**
- R 1.18 Explain the predicted results of non-melanoma skin treatment based on treatment modalities**
- R 1.19 Plan radiation treatment for a patient with non-melanoma skin cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Single field external beam
- R 1.20 Perform treatment procedures for a patient with non-melanoma skin cancer as per Module E5**
 - Multi field external beam
 - Single field external beam
- R 1.21 Perform patient care for a patient with non-melanoma skin cancer as per Module E6**

- R 2 Radiation Treatment of Melanoma Skin Cancer**
 - R 2.1 State the epidemiology of melanoma skin cancers**
 - Risk factors
 - Incidence
 - R 2.2 State the etiology of melanoma skin cancers**
 - R 2.3 Explain the prognostic indicators of melanoma skin cancers**
 - Tumor extent
 - Histopathology
 - Lymph node status
 - Gender
 - R 2.4 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to melanoma skin cancers**
 - R 2.5 Discuss the natural history of melanoma skin cancers**
 - Site of origin
 - Tumor progression and edema
 - Recurrence
 - Distant metastasis

- R 2.6 Identify the clinical presentation of melanoma skin cancers**
- R 2.7 Identify the various detection and diagnostic methods of melanoma skin cancers**
 - Complete history and physical examination
 - Plain radiographs
 - Biopsy
 - CT
 - MRI
- R 2.8 Describe the pathology and staging of melanoma skin cancers as it relates to treatment**
 - Histopathologic types of skin cancers
 - Staging systems
 - Histopathologic grade
 - Dose and fractionation regimes
- R 2.9 Describe the routes of spread of melanoma skin cancers**
 - Extension from site of origin
 - Surrounding tissues/organs
 - Progressive levels of lymph node involvement
 - Distant metastases
- R 2.10 Explain the rationale for using surgery to treat melanoma skin cancers specific to the stage and pathology of the disease**
- R 2.11 Explain the rationale for using systemic therapy to treat melanoma skin cancers specific to the stage and pathology of the disease**
 - Chemotherapy
- R 2.12 Explain the rationale for using radiation therapy to treat melanoma skin cancers specific to the stage and pathology of the disease**
 - Multi field external beam radiation therapy
- R 2.13 Explain the rationale for using combined modalities to treat melanoma skin cancers specific to the stage and pathology of the disease**
- R 2.14 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Ultrasound
 - Health records
 - Laboratory reports
- R 2.15 Interpret protocols for clinical studies and impact on radiation treatment**
- R 2.16 Discuss the emerging technologies relevant to the management of melanoma skin cancers**
 - Adaptive Radiation Therapy
 - Localization Methods (anatomy matching, on board imaging etc)
 - PET/CT
- R 2.17 Explain the predicted results of melanoma skin treatment based on stage/grade**
- R 2.18 Explain the predicted results of melanoma skin treatment based on treatment modalities**
- R 2.19 Plan radiation treatment for the patient with melanoma skin cancer as per Module E2, E3, & E4**
 - Multi field external beam

R 2.20 Perform treatment procedures for the patient with melanoma skin cancer as per Module E5

Multi field external beam

R 2.21 Perform patient care for the patient with melanoma skin cancer as per Module E6

MODULE 5 BENIGN CONDITIONS

- S 1 Treatment of Arteriovenous malformations (AVMs), Exophthalmos, Heterotropic Bone Formation, Keloid Scars, Ovarian Ablation**
- S 1.1 Discuss the incidence of benign conditions**
- S 1.2 Apply the knowledge of the anatomy and physiology of the body in relation to the treatment of various benign conditions**
- S 1.3 Identify the clinical presentations of the various benign conditions**
- S 1.4 Explain the rationale of using surgery to treat assorted benign conditions**
- S 1.5 Explain the rationale of using radiation therapy to treat assorted benign conditions**
- S 1.6 Explain the rationale of using single field technique to treat assorted benign conditions**
- S 1.7 Explain the rationale of using multi field techniques to treat assorted benign conditions**
- S 1.8 Explain the rationale of using combined modalities to treat assorted benign conditions**
- S 1.9 Explain dose and fractionation regimes as they apply to various benign conditions**
- S 1.10 Explain the predicted results of the treatment**
- S 1.11 Plan radiation treatment for patients with various benign conditions as per Module E2, E3, & E4**
- S 1.12 Perform treatment procedures for patients with various benign conditions as per Module E5**
- S 1.13 Perform patient care for patients with various benign conditions as per Module E6**

MODULE T PALLIATIVE AND SUPPORTIVE CARE

T1 Outline the philosophy and approach of active palliative care

- T 1.1 Discuss principles of the practice of palliative radiation therapy**
- T 1.2 Identify causes of underlying pain and symptoms**
- T 1.3 Identify psychosocial aspects surrounding end of life issues**

T2 Describe the radiation therapist's role on a palliative oncology team

- T 2.1 Discuss the rationale of implementing a palliative care team**
- T 2.2 Identify common patient concerns regarding pain and symptom management**
- T 2.3 Educate patient regarding pain and symptom management**

T 3 Radiation Treatment of Brain Metastases

- T 3.1 Explain the prognostic indicators of metastases**
- T 3.2 Apply the knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the skull and brain in relation to metastatic brain cancer**
- T 3.3 Discuss the natural history of brain metastases**
- T 3.4 Explain the clinical presentation of brain metastases**
- T 3.5 Explain the various detection and diagnostic methods of brain metastases**
 - Complete history and physical examination
 - Plain radiographs
 - CT
 - MRI
 - PET
- T 3.6 Explain dose and fractionation regimes as they relate to brain metastases**
- T 3.7 Explain the rationale of using surgery to treat metastatic brain cancer**
- T 3.8 Explain the rationale of using systemic therapy to treat metastatic brain cancer**
 - Chemotherapy
 - Hormone therapy
- T 3.9 Explain the rationale of using radiation therapy to treat metastatic brain cancer**
 - Multi field external beam radiation therapy
 - Stereotactic radiosurgery
- T 3.10 Explain the rationale of using combined modalities to treat metastatic brain cancer**
- T 3.11 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Health records
 - Laboratory reports
- T 3.12 Interpret protocols for clinical studies and impact on radiation treatment**

- T 3.13 Discuss the emerging technologies relevant to the management of brain metastases**
 - Adaptive Radiation therapy
 - PET/CT
 - Localization methods (anatomy matching, on board imaging etc)
- T 3.14 Plan radiation treatment for the patient with metastatic brain cancer as per Module E2, E3, & E4**
 - Multi field external beam
- T 3.15 Perform treatment procedures for the patient with metastatic brain cancer as per Module E5**
 - Multi field external beam
- T 3.16 Perform patient care for the patient with metastatic brain cancer as per Module E6**

T 4 Treatment of Spinal cord Metastases

- T 4.1 Explain the prognostic indicators of spinal cord metastases**
- T 4.2 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the vertebrae in relation to metastatic spinal cord cancer**
- T 4.3 Discuss the natural history of spinal cord metastases**
- T 4.4 Identify the clinical presentation of spinal cord metastases**
- T 4.5 Identify the various detection and diagnostic methods of spinal cord metastases**
 - Complete history and physical examination
 - Plain radiographs
 - CT
 - MRI
 - Bone Scan
- T 4.6 Explain dose and fractionation regimes as they relate to spinal cord metastases**
- T 4.7 Explain the rationale of using surgery to treat metastatic spinal cancer**
- T 4.8 Explain the rationale of using systemic therapy to treat metastatic spinal cancer**
 - Chemotherapy
 - Hormone therapy
- T 4.9 Explain the rationale of using radiation therapy to treat metastatic spinal cancer**
 - Multi field external beam radiation therapy
 - Single field external beam radiation therapy
- T 4.10 Explain the rationale of using combined modalities to treat metastatic spinal cancer**
- T 4.11 Demonstrate an understanding of related disciplines in order to interpret the images / reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Health records
 - Laboratory reports
- T 4.12 Interpret protocols for clinical studies and impact on radiation treatment**

- T 4.13 Discuss the emerging technologies relevant to the management of spinal cord metastases**
 - Adaptive Radiation therapy
 - Localization methods (anatomy matching, on board imaging etc)
- T 4.14 Plan radiation treatment for the patient with metastatic spinal cord cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Single field external beam
- T 4.15 Perform treatment procedures for the patient with metastatic spinal cord cancer as per Module E5**
 - Multi field external beam
 - Single field external beam
- T 4.16 Perform patient care for the patient with metastatic spinal cord cancer as per Module E6**

T 5 Treatment of Bone Metastases

- T 5.1 Explain the prognostic indicators of metastases**
- T 5.2 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to bone metastases**
- T 5.3 Discuss the natural history of metastatic bone disease**
- T 5.4 Identify the clinical presentation of bone metastases**
- T 5.5 Identify the pathological presentation of bone metastases**
- T 5.6 Identify the various detection and diagnostic methods of bone metastases**
 - Complete history and physical examination
 - Plain radiographs
 - CT
 - MRI
 - Bone Scan
- T 5.7 Explain dose and fractionation regimes as they relate to bone metastases**
- T 5.8 Explain the rationale of using surgery to treat metastatic bone cancer**
- T 5.9 Explain the rationale of using systemic therapy to treat metastatic bone cancer**
 - Chemotherapy
 - Hormone therapy
- T 5.10 Explain the rationale of using radiation therapy to treat patients with bone metastases**
 - Multi field external beam radiation therapy
 - Single field external beam radiation therapy
- T 5.11 Explain the rationale of using combined modalities to treat patients with bone metastases**
- T 5.12 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - Radiological modalities
 - Nuclear Medicine
 - Magnetic Resonance
 - Health records
 - Laboratory reports
- T 5.13 Interpret protocols for clinical studies and impact on radiation treatment**

- T 5.14 Discuss the emerging technologies relevant to the management of bone metastases**
 - Adaptive Radiation therapy
 - Localization methods (anatomy matching, on board imaging etc)
 - T 5.15 Plan radiation treatment for the patient with metastatic bone cancer as per Module E2, E3, & E4**
 - Multi field external beam
 - Single field external beam
 - T 5.16 Perform radiation treatment procedures for the patient with metastatic bone cancer as per Module E5**
 - Multi field external beam
 - Single field external beam
 - T 5.17 Perform patient care for the patient with metastatic bone cancer as per Module E6**
- T 6 Radiation Treatment of Visceral Recurrences and Metastases**
- Treatment of SVCO (superior vena cava obstruction), Esophageal obstruction, Gynecologic bleeding, Nodal recurrences, Skin metastases**
- T 6.1 Explain the prognostic indicators of metastases**
 - T 6.2 Apply knowledge of gross and cross sectional anatomy and physiology as well as anatomical landmarks of the body in relation to visceral metastases**
 - T 6.3 Discuss the natural history of metastatic disease**
 - T 6.4 Identify the clinical presentation of specific visceral metastases**
 - T 6.5 Identify the pathological presentation of specific visceral metastases**
 - T 6.6 Identify the various detection and diagnostic methods of specific visceral metastases**
 - T 6.7 Explain dose and fractionation regimes as they relate to specific visceral metastases**
 - T 6.8 Explain the rationale of using various non-radiation methods to treat patients with specific visceral metastases**
 - T 6.9 Explain the rationale of using radiation therapy to treat patients with specific visceral metastases**
 - T 6.10 Explain the rationale of using combined modalities to treat patients with specific visceral metastases**
 - T 6.11 Demonstrate an understanding of related disciplines in order to interpret the images/reports of previous medical studies for specific use in the planning and treatment process**
 - T 6.12 Interpret protocols for clinical studies and impact on radiation treatment**
 - T 6.13 Discuss the emerging technologies relevant to the management of specific visceral metastases**
 - T 6.14 Plan radiation treatment for the patient with specific visceral metastases as per Module E2, E3, & E4**
 - T 6.15 Perform radiation treatment procedures for the patient with specific visceral metastases as per Module E5**
 - T 6.16 Perform patient care for the patient with specific visceral metastases as per Module E6**