Appendix 2b. Clinical Radiation Oncology Syllabus

For each of the tumour site in the table below, the trainee should be able to:

- Contribute effectively to tumour board discussions
    a. Explain the pathological factors that determine treatment decisions.
    b. Discuss the optimal imaging staging strategy including national or international guidelines.
    c. Stage the cancer appropriately.
    d. Apply national or international guidelines to the management of an individual patient/
    e. Apply research evidence to the management of an individual patient
    f. Discuss the role of radiotherapy in the management of the patient.
    g. This may include patients with benign disease.
    h. Discuss the role of systemic therapy in the management of the patients. This may include, for example: Chemotherapy, Hormonal therapy, Monoclonal antibodies, Tyrosine kinase inhibitors Immunotherapy with curative, neoadjuvant, adjuvant and palliative intent.
    i. Discuss the role of chemoradiotherapy in the management of the patient.
    j. Discuss the role of surgery in the management of the patient.
    k. Describe when surgery is the primary curative modality in the treatment of a cancer.
    l. Describe at a basic level the operations that are indicated for particular cancers including regional nodal surgery.
    m. Discuss the role of surgery in enabling other treatments modalities (for example, placement of clips, pelvic spacers or omentum) to enable optimal radiotherapy treatment.
    n. Discuss the scheduling of radiotherapy, systemic therapy or surgery in patients treated with combined modality therapy.
    o. Discuss how radiotherapy, surgery, systemic therapies may interact during the therapeutic phase of treatment.
    p. Discuss the implications of hereditary gene mutations on the management of a patient.
    q. Discuss the management of a patient when there is therapeutic uncertainty, complexity and ambiguity.
    r. Identify when a patient should be offered the opportunity to enter a research trial.

s. Justify a decision that radiotherapy, systemic therapy and surgery are not indicated.
t. Discuss the role of palliative care in the management of the patient.

- Undertake the initial outpatient consultation
    a. Structure the consultation effectively.
    b. Take a focused history, undertake a careful clinical examination and order relevant imaging and laboratory examinations.
    c. Elicit and manage psychosocial factors.
    d. Evaluate and discuss with the patient the possible management strategies taking into account the factors related to the cancer, the patient's goals, their comorbidities and frailty and the adverse effects of the possible options.
    e. Facilitate shared decision making with the patient.
    f. Explain the implications of hereditary genetic abnormalities and refers appropriately for genetic counselling.
    g. Discuss a radiotherapy treatment strategy including: Pre-treatment procedures such as dental review Goals of treatment Simulation including immobilization and the use of contrast Fractionation regimen Acute toxicities and supportive measures Late toxicities.
    h. Identify when brachytherapy, SCRT, SBRT, proton therapy or IORT may be of value and outline the procedure to the patient Identify when systemic therapy alone or combined with radiotherapy may be of value and outline the process to the patient.
    i. Describe the acute and long term toxicities of the commonly used systemic therapies either alone or combined with radiotherapy Identify when emergency surgery is indicated e.g. bowel obstruction or perforation or upper airways obstruction Identify when surgery may palliate symptoms or prolong life e.g., bile duct obstruction, hydronephrosis.
    j. Diagnose oncological emergencies including spinal cord compression SVC obstruction Neutropenic sepsis Thromboembolic disease Metabolic abnormalities such as hypercalcaemia, hyponatraemia and hyperkalaemia.
    k. Manage them or collaborate with other specialties to do so.

- Implement the treatment strategy
    a. Determine and outline the GTV, CTV, ITV, PTV, OAR and PRV using appropriate diagnostic scanning techniques including CT, MRI and PET/CT for external beam and brachytherapy plans, using planning atlases when indicated.

b. Evaluate the dose constraints for normal tissues as defined on a DVH Evaluate the external beam/brachytherapy treatment plan in collaboration with physicists and RTTs including conformal 3D and IMRT plans.
c. Know the ICRU guidelines for prescribing, recording and reporting dose.
d. Critically evaluate the dose distribution in the tumour volume and the OAR.
e. Identify an adequate plan and suggest options for improving an inadequate plan.
f. Take overall responsibility for the treatment plan.
g. Evaluates the risks and benefits of an external beam/brachytherapy treatment plan.
h. Able to balance tumour control against potential damage to OAR and resulting toxicities.
i. Modify treatment plan according to individual characteristics such as comorbidities and systemic treatment Verify radiotherapy treatments, describes techniques available for real time image guidance.
j. Assess accuracy of patient set up and recommend adjustments.
k. Know the level of tolerance accepted for set up margins in their department and how this influences PTV.
l. Discuss the indications and aims of brachytherapy.
m. Describe the methods available.
n. Describe the principles of dose prescription.
o. Apply radiation protection principles when assessing patients.
p. Assess and manage early radiation reactions in patients receiving external beam, brachytherapy and combined modality treatment.
q. Know the common acute toxicities of systemic therapies but when given as single modalities and when combined with radiotherapy.
r. Administer and take clinical responsibility for delivery of radiation therapy and systemic agents or collaborate with other specialties to do so.
s. Assess the acute toxicities of systemic therapies combined with radiotherapy and manage them or collaborate with other specialties to do so.
t. Modify treatment to adjust for gaps in treatment using the principles of radiobiology.
u. Evaluate response to treatment using RECIST and other commonly used criteria for formally evaluating response.

- Manage survivorship
    a. Develop a long term strategy for follow up of the patient.
    b. Discuss the role of exercise or diet and smoking cessation and alcohol as appropriate.

c. Construct a plan for patient specific rehabilitation.
d. Take a focused history to diagnose the common psychological sequelae following a cancer diagnosis and treatment for cancer, manage them or refer appropriately to other specialties.
e. Take a focused history, undertake a careful clinical examination and order. relevant investigations to diagnose long-term toxicities from cancer therapies including secondary malignancies and multiple cancers.
f. Discuss the options for managing these and implement them or refer appropriately to other specialties.
g. Discuss the physical and psychological impacts of surgery.
h. Identify patients who may benefit from surgical procedures to ameliorate these e.g., resiting of a stoma.
i. Discuss the role of surgery in improving function, ameliorating deformities and improving cosmesis including treatment for long term toxicities from radiation therapy.

- Manage patients with relapsed disease
    a. Take a focused history, perform a careful clinical examination and request relevant investigations to diagnose relapsed disease.
    b. Evaluate the possible management strategies taking into account the factors related to the cancer including whether there is a possibility of curative treatment, the patient's goals, their comorbidities and frailty and the adverse effects of the possible options.
    c. Discuss the benefits and toxicities of radiotherapy treatment including reirradiation.
    d. Describe when surgery may be curative e.g., liver metastasis.
    e. Discuss the role and timing of surgery in palliative care.
    f. Discuss the role of radiofrequency ablation and cryotherapy in the management of metastases.
    g. Discuss the role, benefits and common toxicities of systemic therapies in palliative care. This may include, for example: Chemotherapy, Hormonal therapy, Monoclonal antibodies, Tyrosine kinase inhibitors Immunotherapy.
    h. Implement the radiotherapy treatment strategy.
    i. Recognise when radiotherapy, systemic therapy and surgery are not indicated
    j. Discuss the role of palliative care in the management of the patient.
    k. Implement treatment to control symptoms or refer appropriately to other specialties.

The degree of proficiency expected varies according to the site-specific cancer.

Level 1 Knowledge: In the case of rare tumours and some procedures, the trainee may not have the opportunity to observe the management but should have knowledge of the treatment in order to refer patients appropriately.

Level 2: Observation only

Level 3: Perform with direct proactive supervision, i.e., with a supervisor present in the same room.

Level 4: Perform with Indirect reactive supervision, i.e., the supervisor is easily available if necessary.

Level 5: Perform without immediate supervision, but with post hoc report or remote supervision.

Level 6: Trainee supervises more junior trainees

For major tumour sites, trainees are expected to reach levels 4-6 with level 6 in the majority.

For less common tumor sites, trainees are expected to reach levels 2-3.

Level 1 only is accepted in certain specific areas, such as some rare /paediatric tumours, total skin electron treatment and proton treatment.

	Major tumor sites	Less common tumor sites
Breast	Breast Cancer	
Thorax	Non Small Cell Lung Cancer Small Cell Lung Cancer Superior Vena Caval	Mesothelioma Tumours of the Mediastinum

	Obstruction	
Head and Neck	Mucosal Cancers Salivary Gland	
Skin	Non melanomatous Skin Cancer Melanoma	Kaposi's Sarcoma
Male Reproductive System	Prostate Cancer Seminoma of the Testis	Non Seminomatous Germ Cell Tumours of the Testis Penile Cancer
Female Reproductive System	Cervical Cancer Uterine Cancer	Ovarian Cancer Vulval Cancer Vaginal Cancer Gestational Trophoblastic Disease
Urinary Tract	Bladder Cancer	Kidney Cancer Cancer of the Ureter
Gastrointestinal Tract	Oesophageal Cancer Gastric Carcinoma Pancreatic Cancer Rectal Cancer Anal Cancer	Biliary Tract & Gall Bladder Cancers Hepatocellular Carcinoma Gastrointestinal Stromal Tumours Carcinoid Tumour Colon Cancer Liver Metastases
Central Nervous System	Adult Glioma	Ependymoma

	Meningioma Pituitary Tumours Medulloblastoma Primitive Neuroectodermal Tumour Cerebral Metastases Malignant Spinal Cord Compression	Pineal & Germ Cell Tumours Acoustic Neuroma Cerebral Arteriovenous Malformations
Haematology	Hodgkin Lymphoma Non Hodgkin Lymphoma	Leukaemia Multiple Myeloma
Musculoskeletal & Connective Tissue	Soft Tissue Sarcoma Bone Metastases	Primary Tumours of the Bone Aggressive Fibromatoses
Paediatric		Paediatric Cancers
Endocrine	Thyroid Cancer	Adrenal Tumours
Metastatic Disease	Metastatic Carcinoma of Unknown Primary Site	
Non Malignant		Non Malignant diseases treated with radiation therapy
Clinical Oncology	Symptom Control Quality of Life	