POST GRADUATE DEGREE STANDARD

I. Cancer Biology A. Cell Cycle  
B. Growth of human tumours  
C. Polypeptide and neuropeptide growth factors  
D. Chemical Carcinogenesis  
E. Chromosomes and cancer- Chromosomal abnormalities -myeloid leukaemia, malignant diseases affecting lymphocytes.  
F. Physical Carcinogenesis- Ionizing radiation-Ionizing radiation and Cancer - Physical factors-Ultraviolet radiation and Carcinogenesis.  
G. Genetics and familial Cancer  
H. Pathogenesis of metastasis (Mechanism)  
I. Tumour Immunology- Tumour Associated Antigens, immuno Competence and Human Cancer.

II. Cancer Epidemiology ; Aetiology and prevention of Cancer  
A. Cell and Molecular Mechanisms with Chemical Carcinogenesis  
B. viral Carcinogenesis  
C. Cellular and Molecular mechanisms in radiation Carcinogenesis  
D. Cancer Registry organisation and function  
E. Prospects for tumour chemoprevention  
F. Practical application of new Cancer genetics  
G. Evaluation of Screening for Cancer  
H. Cancer Epidemiology and prevention

III Diagnostic and Investigative Procedure. A. Histopathological Classification and typing of solid tumours  
B. New techniques on pathology and their application in diagnosis and studies of tumour biology.  
C. Cytology  
D. Clinical approaches to pre Cancerous states.  
E. Role of radiological imaging  
F. Positron Emission Tomography  
G. Magnetic resonance in Oncology.  
H. Interventional Radiology- Percutaneous Tissue sampling  
I. Ultrasonic scanning


V Tumour Markers

VI Nuclear Medicine Procedure:

VII Principles of Surgical Oncology  
A. Role of surgery in Prevention Diagnosis and treatment of Cancer.

VIII Principles of Radiation Therapy  
Physical Considerations:- A. Electromagnetic radiation  
1. Roentgen  
2. Gamma  
B. Radiation Techniques  
1. Teletherapy ( Including conformational Therapy)  
2. Brachy Therapy
a. interstitial
b. intracavitary

IX Beam Modifying devices

X Biologic Considerations.
Interaction of radiation with Biologic Materials
Cell Survival considerations.
Survival Curves,
Repair of Radiation damage,
Oxygen Enhancement ratio (OER)
Variation of radiation response during the division cycle
Linear energy transfer
Relative biologic Effectiveness
Adverse effects of radiation
Acute and late Normal Tissue Effects.
Fractionation
Definition of Radio sensitivity,
Radio responsiveness Radiocurability
Total Body radiation
Hemi Body irradiation
Intra operative radiotherapy
Particle radio therapy
Targeted radio therapy

MEDICAL PHYSICS RELATED TO RADIATION ONCOLOGY 1.
Basic concepts

2.
Nuclear Physics

3.
Interaction of radiation with matter
Absorption of Energy linear Attenuation co-efficient-Half value layer - Mass, electronic and atomic attenuation co-efficient-energy transfer and absorption - Photoelectric absorption Compton Scattering-Pairproduction-Total attenuationco-efficient-relative importance of different types interaction - Photon interaction

4.
Production of Xrays

5.
High Energy machines-Isotope Machines - 60Cobalt unit sources Housing- Beam Commission-Penumbra- 137 Caesium- Betatron- Linear Accelerator- Microtron.
6. Radiation Dosimetry


Dose distribution -Opposing pairs of Beams-Three field Techniques -Rotation therapy-Wedge pairs Open and Wedge field Combination.
Preparation of Mould- Shielding blocks-Styrofoam cutting machines-simulator and its applications - role of CT and ultrasound in planning.

9. Brachy therapy Sources- Radium 226, Caesium 137, Cobalt 60. Iridium 192, gold 198, Iodine 125, - Physical Characteristics, Production Storage and Transport facility.


Intracavitory paris technique-stockholm techniques, Manchester technique-Dose specification - Point A and Point B- Loading arrangement -Applications- Manual after loading system - computer dosemetry, Examples of dose calculation - Recent developments in Brachy therapy.


Planning of radiotherapy department - workload - Occupancy and use factor - Protection from primaruy radiation and leakage radiation and scattered ratiation - Design consideration for acceleratror facility. Guideline for safe work and recent development in radiation protection.

TOTAL BODY IRRADIATION - ACUTE EFFECTS

LATE EFFECTS - Non specific life shortening

CARCINOGENESIS
Mechanisms of radiation carcinogenesis.

RADIATION EFFECTS IN THE DEVELOPING EMBRYO AND FETUS.
1. Intrauterine death - congenital abnormalities including neonatal death - growth retardation -
Dependence of the above facts on gestation stage, dose, dose-rate. - Carcinogenesis followings in utero exposure. - Pregnant women exposed to therapeutic doses - Occupational exposure of potentially pregnant women. - Elective booking of 10 day rule. - Practical threshold for therapeutic abortion. Effects of radiation on the skin, on Bones & Cartilage, On Kidneys.

Principles of Chemotherapy

1. General aspects of Chemotherapy
2. New Drug developments
3. Antimetabolites
4. Alkylating agents
5. Anti-tumor antibiotics
6. Plant alkaloids
7. Cis Platin and analogues
8. New and Miscellaneous anti Cancer drugs
9. Drug resistance
10. High dose Chemotherapy and Autologous, bone marrow rescue
11. Clinical Uses of Haematopoietic growth factors
12. Basis of Hormonal therapy of Cancer
13. Combined Chemotherapy and radiotherapy

Hyperthermia

Photodyanamic therapy

Lasers In Oncology

Paper II

I Cancer of the Head and Neck
Epidemiology, Anatomy Pathology, Natural history, Methods and diagnosis, treatment, principle of Treatment, General principles of Surgery, radiation therapy, Chemotherapy and Combined Modalities, Oral Cavity, Oropharynx, larynx, Hypopharynx, Nasopharynx, Nasal Cavity, Nasal vestibule, Paranasal sinuses, Major and minor salivary Glands, Tumours of external auditory meatus and middle ear, Uncommon Tumours of Head and Neck, Management of Cervical nodes, Skin Cancers other than Melanoma, Cutaneous melanoma, Eye and Orbit, Chemotherapy with radiotherapy and or surgery

II Carcinoma lung
Pathology, Natural History, Screening studies for early diagnosis staging Surgery or Radiotherapy, Curative intention, Radiotherapy Treatment - Non small cell lung Cancer, Small Cell Carcinoma lung, Mesothelioma, Thymic Tumours with Myasthenia Gravis/ Bone Marrow Dyscrasias, Other ThymicTumours Neurogenic tumour, Mesenchymal Tumours, Surgery- Pulmonary Metastases, Uncommon intathoracic tumours.
III Cancer of Oesophagus
Epidemiology Oetiology, Pathalogy, Pathalogic variants Anatomic considerations of Clinical significant
Squamous Cell Carcinoma of Oesophagus Adeno Carcinoma of Oesophagus.
Cancer Stomach
Pathalogy , anatomic Relationships of Stomach
Natural History Clinica presentation staging, Prognosis, Diagnosis and Treatment
Cancer of Pancreas
Cancer Hepatobiliary system
Cancer of the small Intestines
Colo-rectal Cancer
Treatment of rectal Cancers- Special problems in Management Diagnosis of recurrent Colorectal Cancers
Cancer of Anal region
Epidemiology- Anatomy, Pathology, Natural History, Diagnosis - Assessment of prognosis-Staging-Treatment
Cancer of Kidney and Ureters
Renal AdenoCarcinoma - Chemotherapy of Hyper Nephroma,- Carcinoma of Renal Pelvis- Carcinoma of Ureters
Cancer of the Bladder
Epidemiology, Pathology - Clinical Presentation, Staging- Treatment.

IV Cancer of the Prostate.
Epidemiology, Anatomy, History, and rroutes of spread- Pathology- Clinical Features- Staging-prognostic factors - radiotherapy - survival- Sequelae of Radio therapy and Surgery - Hormonal Therapy - Chemotherapy

V Carcinoma Urethra and Penis
Carcinoma Penis - Carcinoma of Female and Male Urethra

VI Cancer of Testes
Anatomy - Etiology, Histology, Physical diagnosis, lab investigation, Staging (Radio graphic Investigation ) - Surgery - Seminoma - Non Seminomatous tumours - Radio therapy following Surgery - Adjuvant Chemotherapy - CNS Metastases - chemotherapy of disseminated diseases

VII Carcinoma Cervix
Epidemiology, Staging, pathology, diagnosis staging- Treatment of Carcinoma Cervix (Surgery, Radiotherapy, Chemotherapy)
- Carcinoma Cervix and Pregnancy
- Carcinoma of Cervical Stump
- Carcinoma of endometrium
- Carcinoma of Vagina, Vulva
- Trophoblastic Tumours

VIII Cancer of the Ovary
Epidemiology pathogenesis - pathology, Diagnosis, Staging - Stromal and Germ Cell tumours-management of mlnimal residual disease after surgery - management of Stromal and Germinal ovarian Tumours
Cancer of Endocrine Glands
Thyroid Glands, Adrenal Glands, Endocrine pancreas, Carcinoid, tumours, Multiple endocrine Neoplasia syndromes.

IX Soft Tissue Sarcoma
Incidence Epidemiology, sites, pathologic classification, Benign and Malignant Tumours, Diagnosis, Staging, Unique features of individual Histologic types of Soft tissue Sarcoma- Treatment.
X Sarcomas of Bone
Classification and types of Bone Tumours, Radiographic Evaluation and diagnosis- staging- pre operative, evaluation and Biopsy considerations - Surgical Management of Skeletal tumours - Benign and Malignant Bone Tumours- Variants of Classic Osteo Sarcoma - Chondro sarcoma- Giant Cell Tumour of Bone- Malignant fibrous, Histio Cytoma- Fibrosarcoma of Bone- Chordoma- Small round Cell Sarcomas of Bone- principles of Radio therapy

XI Central Nervous System
Epidemiology, - Anatomy - Pathology- Treatment

XII Solid Tumours of Childhood
Etiology- Anatomy- Pathology, Staging and Treatment of Tumours of infants and Children (Wilm's Tumour, Neuroblastoma, Retinoblastoma, primary Hepatic Tumours, Germ Cell Tumours, Histiocytosis X syndromes

XIII Tumours of Children and Adults
Rhabdomyo Sarcoma Ewing's Sarcoma, Gynaeologic Tumours Carcinomas.

XIV Leukaemias & Lymphomas of childhood
Epidemiology - etiology - All, AML, CML, NHL, Burkitt's lymphomas, Hodgkin's diseases.

XV HODGKIN'S & NHL
Etiology, epidemiology, Microscopic anatomy of normal lymphoid tissues - cellular orign - Disease diagnosis, and staging of lymphomas - chemotherapy of NHL - Single agent Chemotherapy for NHL - place of rt in NHL - Combination chemotherapy for NHL.

ALL
Etiology, morphology, pathology, Diagnosis, and treatment.

CLL
Etiology, Pathology, Diagnosis and treatment.

XVI PLASMA CELL NEOPLASM
History , Incidence, pathogenesis, Anatomic consideration, pathology dignysis, Investigation and staging screening , different diagnosis, treatment, Special probelm, Survival and causco of death, special syndromes - Future consideration.

XVII PARANEOPLASTIC SYNDROMES
Etiology, pathogenesis, endocrinologic manifestations of malignancy, neurologic mainfestations, haematologic manifestations, anaemia associated with cancer, thrombocytosis associated with cancer, unexplained thrombocytopenia in cancer, hypercaogulable state with cancer , renal manifestation in cancer paraneoplastic lesions involving the skin, gastro - intestinal paraneoplastic syndromes, miscellaneas Paraneoplastic syndromes.

XVIII CANCER OF THE UNKOWN PRIMARY SITE
Definition- Diagnostic - evaluation - Historical approach - basic screening studies - specific studies treatment.

XIX ONCOLOGIC EMERGENCIES 1. Superior venacava syndrome
2. Central Nervous system emergensies spinal cord compression, investigation, treatment, prognosis
3. Metabolic emergensies Hypercalcaemia, Hyperuraeacemia, tumour lysis syndrome, lactic acidosis, adrenal failure
4. surgical emergensies General aspect - inflammatory lesion - obstructive disease - haemorrhage - post operative
XX ABDOMINAL PROBLEMS. 1. Urologic emergencies Hematuria, obstructive uropathy

SUPPORTIVE CARE OF CANCER PATIENT
1. NUTRITIONAL SUPPORT
Etiology of malnutrition, indication of nutritional support, indication for parenteral nutrition - justification for nutritional support - therapeutic trial and efficacy.

2. USE OF BLOOD AND BLOOD PRODUCTS.

3. MANAGEMENT OF CANCER PAIN
Epidemiology, types of cancer pain, clinical assessment of pain, management of cancer pain.

ADVERSE EFFECTS OF TREATMENT 1. Hair loss
2. Nausea and vomiting
3. Oral complication of radiation therapy and chemotherapy
4. Cardiac and pulmonary toxicity
5. Gonadal dysfunction due to chemotherapy and radiotherapy
6. Second cancers (after radiation, chemotherapy and host factors)
Special care of terminally ill patients

TREATMENT OF METABOLIC DISEASE.
1. Brain, lung, liver, bone, malignant pleural effusion, malignant pericardial effusions, malignant ascites.

REHABILITATION OF CANCER PATIENT.