# ประมวลรายวิชา Course Syllabus

# รังสีรักษาในมะเร็งวิทยา 1

# Radiation Oncology 1

# นิสิตแพทย์ปีที่ 5

# Fifth year medical student

| | |
|---|---|
| **1. รหัสรายวิชา** | 3011514 |
| **Subject code** | 3011514 |
| 2. **จำนวนหน่วยกิต** | 1(1-0-2) |
| **Course Credit** | 1(1-0-2) |
| 3. **ชื่อวิชา** | รังสีรักษาในมะเร็งวิทยา 1 |
| **Course title** | Radiation Oncology 1 |
| 4. **คณะ/ภาควิชา** | แพทยศาสตร์/รังสีวิทยา |
| **Faculty/Department** | Medicine/Radiology |
| 5. **ภาคการศึกษา** | ภาคต้น - ปลาย |
| **Semester** | Year course |
| 6. **ปีการศึกษา** | 2547 |
| **Academic year** | 2004 |
| 7. **ผู้สอน** | |
| **Instructor** | |
| **8. เงื่อนไขรายวิชา** | วิชาที่ต้องเรียนมาก่อน - |
| **Condition** | No |
| 9. **สถานภาพของวิชา** | วิชาบังคับ |
| **Status** | Compulsory |
| **10. ชื่อหลักสูตร** | แพทยศาสตร์ |
| **Curriculum** | Doctor of Medicine |
| **11. วิชาระดับ** | ปริญญาตรี |
| **Degree** | Doctor of Medicine |
| **12. ชั่วโมงที่สอน/สัปดาห์** | 5/สัปดาห์ |
| **Teaching hours/week** | 5/week |

**13. เนื้อหารายวิชา**

**Course description**

Basic principles of equipments in radiation treatment and method of application,

bio-physics of radiation treatment planning, principles of radiation protection, advice of patient management before and after irradiation including radiation complications, principles of common cancer treatment, self learning in radiation oncology via electronic media

## 14. ประมวลการเรียนรายวิชา

### 14.1 General objectives

At the end of the course, the student should be able to

14.1.1 Describe the basic principles of radiation equipments and their clinical applications.

14.1.2 Describe the properties of various types of radiations and their biological basis of radiation effects.

14.1.3 Manage patients before, during and after radiation treatment

14.1.4 Describe the presenting signs, symptoms, physical findings, relevant investigations, management and referral of cancer patients.

14.1.5 Describe the management of common cancers : cancers of the breast, cervix, lung, head and neck, colon and rectum, and brain tumor.

14.1.6 Describe the principles of radiation protection and safety.

14.1.7 Acquire the state of the art in radiation oncology by the process of continuing medical education and self learning via electronic media (internet, CD Rom).

14.1.8 Express sympathy for cancer patients.

### 14.2 เนื้อหารายวิชาโดยละเอียด

**Topic** : **Common Cancer (Lung cancer)**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. List the causes of lung cancer
2. Describe the common features of various pathologic subtypes
3. List the necessary procedures for investigation, clinical and pathologic diagnosis
4. Describe the treatment for each stage
5. Describe the role of radiotherapy

**Learning experience**

**Learning contents** :

1. Presenting sign and symptom of common cancer
2. Staging of cancer
3. Mobility of treatment
4. Complication of treatment

**Method :**

**Group discussion**

| | |
|---|---|
| 1. Case presentation | 50 minutes |
| 2. Discussion | 10 minutes |

**Lecture**

| | |
|---|---|
| 1. Etiology, Epidemiology | 10 minutes |
| 2. Clinical presentation | 10 minutes |
| 3. Investigation and diagnosis | 10 minutes |
| 4. Pathology | 10 minutes |
| 5. Modality of treatment | 10 minutes |
| 6. Roles of radiation therapy | 10 minutes |

**Topic** : **Common Cancer (Carcinoma of Head and Neck)**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. List the causes of the head and neck cancer
2. List the necessary procedures for investigation, clinical and pathologic diagnosis
3. Describe the treatment for each stage
4. Describe the role of radiotherapy
5. Describe the care of patients before, during and after radiotherapy

**Learning experience**

**Learning contents :**

1. Presenting signs and symptoms of common cancer
2. Staging of cancer
3. Mobility of treatment
4. Complications of treatment

**Method :**

**Group discussion**

| | |
|---|---|
| 1. Case presentation | 50 minutes |

2. Discussion 10 minutes

**Lecture**

1. Etiology, Epidemiology 20 minutes
2. Clinical presentation 20 minutes
3. Investigation and diagnosis 20 minutes
4. Pathology 20 minutes
5. Modality of treatment 20 minutes
6. Roles of radiation therapy 20 minutes

**Topic** : **Carcinoma of breast**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

1. At the end of the session, the students should be able to describe symptom and sign and diagnosis of breast cancer
2. Describe modality of treatment in various stages of breast cancer

**Learning experience**

**Learning contents :**

1. Presenting signs and symptoms, diagnosis of breast cancer
2. Staging of breast cancer
3. Histopathologic classification and prognostic factors
4. Modality of treatment
5. Indication of irradiation and systemic treatment
6. Complication of treatment

**Method :**

**Inquiry Learning** **2 hours**

1. Case presentation (2 cases) 15 minutes
2. Physical Examination 15 minutes
3. Presenting signs and symptoms diagnosis of breast cancer 10 minutes
4. Staging of breast cancer 10 minutes
5. Histopathologic classification and prognostic factors 10 minutes
6. Modality of treatment 10 minutes
7. Indication of irradiation and systemic

| | |
|---|---|
| treatment | 10 minutes |
| 8. Complication of treatment | 10 mintues |
| 9. Open for discussion | 10 minutes |
| 10. Summary | 20 mintues |

**Topic** : **Introduction to radiation oncology and basic parameter**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. describe modality of cancer treatment
2. describe pro and con in pre and post irradiation of surgery and chemotherapy
3. describe factors modify effects of radiation

**Learning experience**

**Learning contents :**

1. General management of cancer
2. Preoperative and post operative radiotherapy
3. Chemotherapy and Radiation
4. Factors modify effects of radiation
    - 4.1 Dose rate
    - 4.2 Oxygen effect
    - 4.3 Energy of radiation
    - 4.4 Tissue
    - 4.5 Cell cycle
    - 4.6 Technique of radiation
    - 4.7 Type of radiation

**Method : Lecture**

| | |
|---|---|
| 1. General management of cancer | 10 minutes |
| 2. Preoperative and post operative radiotherapy | 10 minutes |
| 3. Chemotherapy and Radiation | 10 minutes |
| 4. Factors modify effects of radiation | 25 minutes |
| 5. 5. Open for discussion | 5 minutes |

**Topic** : **Radiotherapy Equipment**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. Describe the process of radiotherapy
2. Know all the equipment in radiotherapy practice
3. Know modern technique of radiotherapy

**Learning experience**

**Learning contents :**

1. Teletherapy - Contact, superficial, deep x-ray units
   - Co-60, Linear Accelerator
2. Brachytherapy - Radium Manchester and Fletcher applicator.
   - $Cs^{137}$ LDR remote controlled after loading machine.
   - $Ir^{142}$ HDR remote controlled after loading machine.
3. Computed treatment planning system.
4. Tissue compensator machine and immobilization mask for aids of treatment.
5. Radiation treatment machine simulator.
6. Intraoperative Irradiation
7. Total body Irradiation
8. Stereotactic Radiation and 3D conformal irradiation

**Method** :

| **Lecture** | **1 hour** |
|---|---|
| 1. Simulator and treatment planning | 5 minutes |
| 2. Teletherapy equipment and technique | 10 minutes |
| 3. Brachytherapy equipment and technique | 10 minutes |
| 4. Intraoperative irradiation | 5 minutes |
| 5. Total body irradiation | 5 minutes |
| 6. Stereotactic and 3 D conformal irradiation | 10 minutes |
| 7. Tissue compensator, immobilization & Cerroblen block | 5 minutes |
| 8. Open for discussion | 10 minutes |

**Topic** : **Practical Radiotherapy Equipment**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

Knowing Actual Patient Treatment and Planning

**Learning experience**

**Learning contents :**

1. Patients treatment in the Cobalt and Linear Accelerator treatment room.
2. Immobilized in patient
3. Radiotherapy treatment planning

**Method** :

Observation

**Topic** : **Common Cancer (GI Cancer)**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. describe signs and symptoms and recognize patients with gastrointestinal cancer accurately
2. recognize prognostic factors of gastrointestinal cancer
3. describle the treatment of choice in gastrointestinal cancer and its adjuvant therapy

**Learning experience**

**Learning contents**

- Normal anatomy
- Incidence of gastrointestinal cancer
- Etiology
- Presenting signs and symptoms
- Diagnosis
- Staging
- Treatment modality
- Radiotherapy techniques
- Complications of treatment

**Method :**

| | |
|---|---|
| **Lecture** | **1 hour 15 minutes** |
| - anatomy | 10 minutes |
| - Etiology | 10 minutes |
| - Signs and symptoms | 10 minutes |
| - Diagnosis and staging | 10 minutes |

- Treatment 20 minutes
- Radiotherapy technic 15 minutes

**Topic** : **Common Cancer (GYN Cancer)**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. describe signs and symptoms and recognize patients with gynecologic cancer
2. reconize prognostic factors of gynecologic cancer
3. describle the treatment in patients with gynecologic cancer accurately

**Learning experience**

**Learning contents :**

- Normal anatomy
- Incidence of gynecologic cancer
- Etiology and Pathology
- Presenting signs and symptoms
- Diagnosis
- Staging
- Modality & treatment
- Radiotherapy techniques and methods
- Complications of treatment

**Method :**

**Group discussion & Instructor summary** **2 hours**

1. Students presentation 1 hour
2. Case presentation (1-2 cases) 10 minutes
3. Open discussion 20 minutes
4. Instructor summary 30 minutes

**Topic** : **Oncologic Emergency**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. reconize the pathophysiology of superior vena cava syndrome (SVCS)

and spinal cord compression

2. Causes of SVCS and spinal cord compression
3. describe the symtomatic and supportive treatment with proper urgent specific treatment

**Learning experience**

**Learning contents :**

1. Presenting signs and symptoms of SVCS and spinal cord compression
2. Etiology of SVCS and spinal cord compression
3. Modality of treatment
4. Complications of treatment

**Method :**

| | |
|---|---|
| **Lecture** | **45 minutes** |
| 1. Anatomy | 5 minutes |
| 2. Etiology | 10 minutes |
| 3. Diagnosis | 10 minutes |
| 4. Treatment modality | 20 minutes |

**Topic** : **Information System for Radiation Oncology**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. recognize potential roles of computer for radiation oncology
2. acquire knowledge in radiation oncology via electronic medias

**Learning experience**

**Learning contents :**

1. Oncology Information System
2. Internet – Based Communication in Radiation Oncology
   - 2.1 Getting connected to the Internet
   - 2.2 Basic software tools
   - 2.3 Oncologic Internet resources
   - 2.4 Philosophical and medicolegal
3. CD-ROM software for radiation oncology

**Method :**

**Lecture**

1. Oncology Information System 15 minutes
2. Internet – Based Communication in Radiation Oncology 25 minutes
3. CD-ROM softwares for radiation oncology 10 minutes
4. Open discussion 10 minutes

**Topic** : **Common Cancer (Lymphoma, Genito-urinary and Pediatric Cancer)**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. recognize common signs and symptoms, pathological classification for common types of cancer of lymphoma, genito-urinary and pediatric cancers
2. describe indications modalities and possible side-effects of treatments for common types of cancers of lymphoma, genito-urinary and pediatric cancers

**Learning experience**

**Learning contents :**

1. Common presenting signs and symptoms
2. Pathological classification and staging system
3. Modalities and indications of treatments
4. Complications of treatments

**Method :**

**Lecture**

1. Lymphoma 20 minutes
2. Genito-urinary cancer 30 minutes
3. Pediatric cancer 10 minutes
4. Open discussion 10 minutes

**Topic** : **Central Nervous System Cancer**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session the students should be able to

1. recognize common signs and symptoms, pathological classification for

common central nervous system cancers

2. describe indications, modalities and possible side effects of treatments for common central nervous system cancers

**Learning expericnce**

**Learning contents :**

1. Common presenting signs and symptoms
2. Pathological classification and staging system
3. Modalities and indications of treatments
4. Complications of treatments

**Method :**

**Group discussion**

| | |
|---|---|
| 1. Students presentation | 40 minutes |
| 2. Case presentation | 20 minutes |
| 3. Open discussion | 10 minutes |
| 4. Instructor summary | 20 minutes |

**Topic** : **Radiation Hazard and Protection**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

1. Describe radiation bioeffect.
2. Describe radiation hazard.
3. Describe limits on radiation exposure for perssonnel and publics.
4. Select the proper devices to reduce exposure

**Learning experience**

**Learning contents :**

1. Biological effects
   - Immediate radiochemical effects
   - Long term effects
2. Radiation hazards
   - Acute radiation hazards
   - Chronic radiation hazards
3. Radiation protection guideline
   - Occupational exposure
   - Members of the public

- Genetic dose and bone marrow dose

4. Radiation protection to personnel
   - Protection from external exposure
   - Personnel monitoring
   - Radiation protection survey
5. Radiation protection for patients
   - General shielding, gonadal shielding
   - Field aperture controls
   - Devices and techniques to reduce radiation exposure

**Method :**

**Lecture** **1 hour**

**Media :**

1. Computer presentation with LCD projector
2. Lecture note

**Topic** : **Physics in Radiotherapy**

**Code** : **Radiation Oncology 3011514**

**Learning objectives**

At the end of the course, the students should be able to

1. Explain the charateristic of radiation used in treatment of patient
2. List the unit of radiation
3. describe the principle and operation of teletherapy and brachytherapy machines
4. explain the parameters used in radiation treatment
5. recognize the various techniques of radiation treatment and dose distribution in patients

**Learning experience**

**Learning contents :**

1. Radiation quantity and unit
   - Term and definition of : activity, exposure dose, absorbed dose, dose equivalent
   - Unit of radiation
2. The principle and operation of teletherapy and brachytherapy machines
   - Co – 60 teletherapy machines

- Linear accelerator
- Ra -226, Cs-137, Ir-192 brachytherapy

3. Radiation field in the patient
   - Characteristics of radiation beam, percentage depth dose, isodose distribution and treatment planning

**Method :**

| **Lecture** | **2 hours** |
|---|---|
| 1. Unit of radiation | 20 minutes |
| 2. Teletherapy | 20 minutes |
| 3. Brachytherapy | 20 minutes |
| 4. Parameters in radiation beams | 30 minutes |
| 5. Treatment planning | 20 minutes |
| 6. Open for discussion | 10 minutes |

**Topic** : **Tumor Clinic and Follow-up Clinic**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. recognize common signs and symptoms, pathological classification, prognosis, planning of treatments, complications, planning of treatments, complications and rehabilitation of various of cancer's patients
2. describe the appropriate modalities of treatment for the patients

**Learning experience**

**Learning contents :**

1. Common presenting signs and symptoms
2. Pathological classification and staging system
3. Modalities and indications of treatments
4. Complications of treatments

**Method :**

| | |
|---|---|
| 1. Cases presentation (12 cases) and open disarssion with all staffs and residents | 4 hours |
| 2. Physical examination of the patients with staffs in follow-up clinic (20 patients) | 3 hours |

**Topic** : **Iridium "Cesium & Radium Therapy"**

**Code** : **Radiation Oncology 1 (3011514)**

**Learning objectives**

At the end of the session, the students should be able to

1. describe the steps of intracavity insertion for gynecologic cancers
2. Prescribe the radiation doses

**Learning experience**

**Learning contents:**

1. Cervical and endometrial cancers
2. Intracavitary insertion using Cesium-137 and Iridium-192

**Method :**

1. Observation

**Media :**

1. Patient demonstration
2. Brachytherapy equipment
3. Computer Planning

**Learning Method**

- การสอนแบบบรรยาย (04)

  Lecture

- การสอนแบบบรรยายเชิงปฏิบัติ (11)

  Lecture and Demonstration