

Course Specification

RARD 634: Particle Beam Therapy

Institution Name: Mahidol University
Campus/Faculty/Department: Faculty of Medicine Ramathibodi Hospital, Department of Diagnostic and Therapeutic Radiology

Section 1: General information

1. Course number and name

Course number: RARD 634
Course name: Particle Beam Therapy

2. Credits: 1(1-0-2)

3. Curriculum and type of course

3.1 Curriculum: Particle Beam Therapy
3.2 Type of course: Elective course

4. Instructors

4.1 Course Coordinator: Lect.Dr.PuangpenTangboonduangjit
4.2 Instructors
Lect.Dr.PuangpenTangboonduangjit

5. Semester/Year: 1stSemester, Academic Year 2020, 2ndyear students

6. Pre-requisite: RARD 524 Physics of Radiation Therapy

7. Co-requisite: None

8. Classroom: To be announced

9. Revision Date: Nov 2019 **By:** Committee

Note: Revised course learning outcome, course description, and evaluation

Section 2: Purpose and objective

1. Course Learning Outcomes

- 1.1 Describe and discuss the concept, delivery, measurement and treatment planning for particle beam therapy.

Section 3: Course details

1. Course description

Indications and clinical results for particle beam therapy; physics in particle beam therapy; detectors for absorbed dose and dosimetry under reference conditions; dosimetry under non-reference condition; motion management and treatment planning system; QA in particle beam therapy

2. *Hours per semester:* Lecture 15 hours
3. *Assignment feedback:* Within 2 weeks

Section 4: Course Learning Outcomes

Course level learning outcomes	Programme level learning outcomes	Methods	Assessment
1 Describe and discuss the concept, delivery, measurement and treatment planning for particle beam therapy.	ELO 2, 6	-Lecture -Demonstration	- Paper Examination

Section 5: Lesson plan and assessment

1. Lesson plan

Time	Topics	Instructors	Method	Assessment
2	Indications and clinical results for particle beam therapy	Lect.Dr.PuangpenTangboongjit	Lecture	Paper exam
3	Physics in particle beam therapy	Lect.Dr.PuangpenTangboongjit	Lecture	Paper exam
2	Detectors for absorbed dose and dosimetry under reference conditions	Lect.Dr.PuangpenTangboongjit	Lecture/ Demonstration	Paper exam
2	Dosimetry under non-reference condition	Lect.Dr.PuangpenTangboongjit	Lecture/ Demonstration	Paper exam
2	Motion management	Lect.Dr.PuangpenTangboongjit	Lecture	Paper exam
2	Treatment planning system	Lect.Dr.PuangpenTangboongjit	Lecture	Paper exam
2	QA in particle beam therapy	Lect.Dr.PuangpenTangboongjit	Lecture	Paper exam

2. Measurement and Evaluation of Student Achievement

2.1	Theory (short answer questions)	70%
2.3	Assignment	20%
2.4	Behavior/Discipline	10%

Section 6: Assessment and improvement of the course operation

1. Strategies to assess the effectiveness of the courses by the students
 - Assessment of instructor's teaching by student
2. Strategy to assess the instruction
 - Assessment of students' learning records
 - Assessment of instructor's teaching by student

3. Improvement of Instruction

- Consider the students' learning records
- Consider the students' assessment of instructor's teaching
- Consider the program committee's comment

4. Verification of student achievement in the subject

- By program committee and faculty-level academic committee

5. Review and action plan to improve the effectiveness of the course

- Using the results from 1 - 4 as inputs to the instruction improvement

Learning Resources

1. Wayne D Newhauser and Rui Zhang. The physics of proton therapy, *Phys.Med.Biol.* 60(2015) R155-R209.

2. Thomas A Trikalinos et al. Particle Beam Radiation Therapies for Cancer Comparative Effectiveness Technical Briefs, No. 1, Rockville (MD): Agency for Healthcare Research and Quality (US); 2009 Nov. Report No.: 09-EHC019-EF

3. Terasawa T, Dvorak T, Ip S, Raman G, Lau J, Trikalinos TA. Systematic review: charged-particle radiation therapy for cancer. *Ann Intern Med.* 2009 Oct 20;151(8):556-65. Epub 2009 Sep 14.