1	Unit name:	Radiation Protection and Radiation Shielding
2	Code:	NE 4013
3	Classification:	Major Subject
4	Credit Value:	3
5	Semester/Year Offered:	2/4
6	Pre-requisite	NE 1011, Introduction to Radiation and Radioactivity
7	Mode of delivery:	Brainstorming, Presentation, Group Discussion, Role play
8	Assessment system and breakdown of marks:	Assignment, Tutorial, Written Exam
	Assignment	15%
	Tutorial	15%
	Written Exam	70%
9	Academic staff teaching unit:	Department of Nuclear Technology
10	Course outcome of unit: After completion of this course, students will be able to 1. Explain the biological effects of ionizing radiation 2. Describe the current exposure limits and radiation protection criteria 3. Explain the external radiation protection 4. Explain the internal dosimetry and radiation protection 5. Determine the shielding of alpha, beta and photon sources 6. Determine the neutron shielding and neutron dosimetry 7. Explain the production of X-ray and X-ray shielding	
11	Synopsis of unit: The course covers the radiation protection and radiation shielding for external and internal radiation hazard. The course includes the direct and indirect biological effects of radiation, radiation protection criteria, exposure limits, methodology and ICRP dosimetric models. And also cover the shielding against alpha, beta, gamma, X-ray and neutron radiation.	
12	Topic: 1. Chemical and Biological Effects of Radiation 2. Radiation Protection Criteria and Exposure Limits 3. External Radiation Protection 4. Internal Dosimetry and Radiation Protection 5. Radiation Shielding 6. Neutrons 7. X-rays	
13	Main References: 1. James E. Turner: *Atoms, Radiation, and Radiation Protection*, 3rd Edition, 2007 2. James E. Martin: *Physics for Radiation Protection*, 2nd Edition, 2006	

14	Additional References: 1. Alan Martin and Samuel A. Harbison: *Introduction to Radiation Protection*, 4th Edition, 2002. 2. Dr. AbdKhalik bin Haji Wood, Dr. Azali bin Muhammad: *Handbook of Radiation Protection*, Malaysian Nuclear Agency (Nuclear Malaysia) Bangi 43000 KAJANG, 2006.

Prepared by;

Dr.Saw Thantar

Professor