UNIVERSITI TEKNOLOGI MARA

CMT615: NUCLEAR APPLICATION TECHNOLOGY

Course Name (English)	NUCLEAR APPLICATION TECHNOLOGY APPROVED
Course Code	CMT615
MQF Credit	3
Course Description	This subject is a study of the basic knowledge on the ionizing radiation originating from natural sources and man made, the nature of radiation, radiation interaction with matters, biological impact, safety and radiological protection procedures, and method of measurement. It is also deals with radiation application in various types of industries including NDT and radiography, NORM industries, nuclear technology applications and nuclear medicine. The safety aspect is governed by the Malaysian law and its regulations.
Transferable Skills	Online study learning
Teaching Methodologies	Lectures, Blended Learning
CLO	CLO1 Know the fundamental concepts of radiation applications in various types of industries including testing. CLO2 Apply the knowledge to scientific problems focusing on related industries.
Pre-Requisite Courses	No course recommendations

Topics
1. 1.0 Basic concepts, sources and measurement 1.1) 1.1 Introduction to radiation and radioactivity Stability of atomic nuclei 1.2) 1.2 Radioactive decay Properties of nuclear radiation 1.3) 1.3 Sources of radiation Interaction of radiation with matters 1.4) 1.4 Unit of measurement Detection and measurement
2. 2.0 Biological impact and principle of radiation protection 2.1) 2.1Biological impact of ionizing radiation ,Radiation dose, deterministic and stochastic effects 2.2) 2.2 Radio-logical protection Principle of radiation protection 2.3) 2.3 Instrumentation and method of monitoring 2.4) 2.4 Personnel monitoring and Radiation protection program 2.5) 2.5 Rules and regulations regarding ionizing radiation in Malaysia and worldwide
3. 3.0 Non destructive testing (NDT) and Industrial radiography 3.1) 3.1 Non destructive testing techniques 3.2) 3.2 Industrial radiography techniques 3.3) 3.3 X-ray industry
4. 4.0 Radiation Applications in Non-nuclear Power Industries 4.1) 4.0 Radiation Applications in Non-nuclear Power Industries 4.2) 4.1 Radiation Application in sterilization and food preservation 4.3) 4.2 Radiation application in polymer industries 4.4) 4.3 Nuclear gauging
5. 5.0 Exposure to NORMs in industries 5.1) 5.1 Industries processing naturally radioactive raw materials 5.2) 5.2 Energy production Coal power plant 5.3) 5.3 Petroleum and Minerals industries
6. 6.0 Nuclear Medicine 6.1) 6.1 Radioisotope production and use in medical field 6.2) 6.2 BNCT

7. 7.0 Nuclear Application Technology in Malaysia
7.1) 7.1: Malaysia Nuclear Agencies
7.2) 7.2 : AELB
7.3) 7.3 Nuclear Industries in Malaysia

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	One Written Assignment	20%	CLO2
Test	2 tests: i) One test at the end of first half semester (the late will be week 7th) iii) The second test will be held on the end of second half semester (the late will be week 14th)	40%	CLO1

Reading List

Recommended Text	• **Cooper, J.R., Randle,K., and Sokhi,R.S. 2003, *Radioactive releases in the environment: impact and assessment*, John Wiley & Sons Ltd UK [ISBN: 0-471-89924]**
Reference Book Resources	• **Isabel C F R Ferreira, Amilcar L Antonio, Sandra Cabo Verde 2017, *Food Irradiation Technologies: Concepts, Applications and Outcomes*, 1 edition Ed., Royal Society of Chemistry; UK [ISBN: 978-1-78262-7]**

Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources