



LAMPUNG UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY / UNDERGRADUATE CHEMISTRY PROGRAM

TEACHING SCHEDULE (COURSE MODULE)

Course Title	Course Code	Credits	Semester	Date
Radiochemistry		2	2	July 21 st , 2022
Authorization	PIC of Course Module Development	Peer Group Coordinator	Head of Department	
	Prof. Drs. John Hendri, MS., PhD..	Prof. Dr.Kamisyah DP, M.Sc.	Mulyono, Ph.D.	
Learning Outcomes	Learning Outcomes (LO)			
	1	Be devoted to God Almighty as an educated person and a responsible citizen and uphold national values (S1).		
	2	Mastering fundamental concepts of natural science and mathematics related to chemistry and its applications (P1).		
	3	Explain the basic concepts of atomic and molecular structure, interaction of matter and energy, isolation and characterization, analysis, separation, and synthesis of materials, natural and synthetic materials, and metabolism of biomolecules (P2).		
4	Work independently or in groups and respect academic integrity (KU2).			
Learning Outcomes	Courses Learning Outcomes (CLO)			
	CLO-1	Able to understand the basic concepts of radiochemistry in various chemical problems.		
Course Description	This course aims to provide students with knowledge about the properties of the nucleus, radioactivity phenomena, nuclear reactions and nuclear reactors, the interaction of radiation with matter, and their industrial applications.			

Syllabus	<ol style="list-style-type: none"> 1. Introduction to Radiochemistry: Isotopes and radionuclides. 2. The properties of atomic nucleus 3. Types of radioactivity 4. Rate of radioactive decay 5. Detection of radiation 6. Nuclear Reaction and Nuclear Reactor 7. Interaction of radiation with matter 8. Application of radiochemistry 	
References	Main :	
	<ol style="list-style-type: none"> 1. G. Friedlander, J.W. Kennedy, E.S. Macias, J.M. Miller, 1981. <i>Nuclear and Radiochemistry</i>, 3 rd Ed., John Willey and Sons, New York. 	
Lecturers	Team	
Prerequisite (if any)	-	

Week-	Lesson Learning Outcomes (LLO)	Topics	Teaching and Learning Methods and Resources	Allocated time	Student Learning Experience	Evaluation		
						Criteria and Category	Indicator	Weight (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	LLO-1 The students will be able to explain introduction to radiochemistry: isotopes and radionuclides.	Introduction to chemistry	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	1. Learning introduction to radiochemistry: isotopes and radionuclides. 2. Practicing to solve problems/exercise 3. Participating in class and group discussion. 4. Practicing to develop a scientific attitude.	1. Answer to question during lecture 2. Exercise 3. Course works. 4. Questions for Formal Exam- 1	1. The accuracy to explain the introduction to radiochemistry: isotopes and radionuclides.	10
2	LLO-2 The students will be able to explain the properties of atomic nucleus.	The properties of atomic nucleus.	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	1. Learning the properties of atomic nucleus. 2. Practicing to solve problems/exercise 3. Participating in class and group discussion. 4. Practicing to develop a scientific attitude.	1. Answer to question during lecture 2. Exercise 3. Course works. 4. Questions for Formal Exam- 1	1. The accuracy to explain the properties of atomic nucleus.	

3	LLO-3 The students will be able to explain types of radioactivity : alpha decay, beta decay	Types of radioactivity : alpha decay, beta decay	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	1. Learning types of radioactivity : alpha decay, beta decay. 2. Practicing to solve problems/exercise 3. Participating in class and group discussion. 4. Practicing to develop a scientific attitude.	1. Answer to question during lecture 2. Exercise 3. Course works. 4. Questions for Formal Exam- 1	1. The accuracy to explain types of radioactivity : alpha decay, beta decay.	
4	Formal Exam - 1							
5	LLO-4 The students will be able to explain types of radioactivity: gamma transitions, positron emission.	Types of radioactivity: gamma transitions, positron emission.	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	1. Learning types of radioactivity: gamma transitions, positron emission.. 2. Practicing to solve problems/exercise 3. Participating in class and group discussion. 4. Practicing to develop a scientific attitude.	1. Answer to question during lecture 2. Exercise 3. Course works. 4. Questions for Formal Exam- 2	1. The accuracy to explain types of radioactivity: gamma transitions, positron emission..	
6-7	LLO-5 The students will be able to explain rate of radioactive decay.	Rate of radioactive decay	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study:	1. Learning rate of radioactive decay. 2. Practicing to solve problems/exercise 3. Participating in class and group discussion.	1. Answer to question during lecture 2. Exercise 3. Course works.	1. The accuracy to explain rate of radioactive decay	

				1 x 2 x 60 min	1. Practicing to develop a scientific attitude.	Questions for Formal Exam-2		
8	Midterm exam (Formal Exam-2)							
9, 10	LLO-6 The students will be able to explain nuclear reaction and nuclear reactor	Nuclear Reaction and Nuclear Reactor	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	1. Learning nuclear reaction and nuclear reactor. 2. Practicing to solve problems/exercise 3. Participating in class and group discussion. 4. Practicing to develop a scientific attitude.	1. Answer to question during lecture 2. Exercise 3. Course works. Questions for Formal Exam-3	1. The accuracy to explain nuclear reaction and nuclear reactor	
11	LLO-7 The students will be able to explain interaction of radiation with matter.	Interaction of radiation with matter	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	1. Learning interaction of radiation with matter. 2. Practicing to solve problems/exercise 3. Participating in class and group discussion. 1. Practicing to develop a scientific attitude.	1. Answer to question during lecture 2. Exercise 3. Course works. Questions for Formal Exam- 3	1. The accuracy to explain interaction of radiation with matter.	
12	Formal Exam - 2							
13	LLO-7 The students will be able to explain application of	Application of radiochemistry	Lectures, discussion, questions and answers, course	Lecturing: 1 x 2 x 50 min	1. Learning application of radiochemistry. 2. Practicing to solve problems/exercise	1. Answer to question during lecture	1. The accuracy to explain application of radiochemistry	

	radiochemistry		works Resources: handout, LCD, computer	Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	3. Participating in class and group discussion. 1. Practicing to develop a scientific attitude.	2. Exercise 3. Course works. Questions for Formal Exam- 4		
14 -15	LLO-7 The students will be able to presenting application of radiochemistry	Application of radiochemistry	Lectures, discussion, questions and answers, course works Resources: handout, LCD, computer	Lecturing: 1 x 2 x 50 min Course work: 1 x 2 x 60 min Independent study: 1 x 2 x 60 min	4. Learning and presenting application of radiochemistry. 5. Practicing to solve problems/exercise 6. Participating in class and group discussion. 1. Practicing to develop a scientific attitude.	4. Answer to question during lecture 5. Exercise 6. Course works. Questions for Formal Exam- 4	1. The accuracy to explain presenting application of radiochemistry	
16	Final Exam (Formal Exam-4)							