

Souphanouvong University

No \_\_\_\_\_/.....

Place, Date \_\_\_\_/\_\_\_\_/\_\_\_\_

## Course Syllabus

### 1 Program

Title of the study programme: **M.Sc. on Agriculture and Environmental Forestry**

### 2 Course details

Course name: Chemistry-Environment and Management

Course code: **103 1105**

Number of credits (hours/week): 3 (3-2-4); 4 hours per week but two classes per week, a total of 96 hours. 32 hours Lecture and Practice 16 hours, assignment 48 hours.

Course type (tick the appropriate box):  Required,  Elective,  Other, if other please explain:

Prerequisites courses: General Environment, Chemistry, Environmental chemistry.

Semester, in which the course is taught: *tick the appropriate box below*

Year 1		Year 2	
Semester 1	Semester 2	Semester 1	Semester 2
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3 Responsible unit

#### 3.1 Department:

Names and affiliations of lecturer(s): **Lecturer:** Mr. Anousith VANNAPHON. **Affiliation:** Department of Forest Resource, Faculty of Agriculture and Forest Resource. Souphanouvong University.

### 4 Course description

The course provides an overview of chemistry - environment and management. It is an environmentally important course where students will learn about chemicals that pollute the environment, such as air pollution and air pollution control, air quality monitoring, water pollution and water pollution management, waste management, soil pollution, environmental toxicology, Pollution analysis, control and management.

## 5 Course objectives

*The course improves students' knowledge and skills about the principles of Chemistry - Environment and Management acquired on the course of prerequisites. Students shall have comprehensive techniques for practising and testing samples of environmental chemistry, as well as analysis, research and management of air pollution; water pollution and soil pollution as part of impact assessments, and how to manage the effects of chemicals on the environment. At the course end, students will apply practical methods that inform prudent protect the environment and support environmental sustainability, economic growth, and social development.*

**Knowledge:** - Students obtain solid knowledge to design, implement and analyze, research and experiments that address the impact of pollutants on the environment. Students understand and can explain the relationship between situations and factors that impact the chemical balance in the environment. The course focuses on air pollution control, air quality monitoring, water pollution, water pollution management, waste management, soil pollution, Environmental Toxicology and poverty reduction, and economic appraisal that includes sustainability measures at least cost. Students will practice assessment methods at the project and strategic levels (waste management addresses the sustainable tourism sector in particular). At the course end, students will apply practical methods that inform prudent protect the environment and support environmental sustainability, economic growth, and social development.

### **Skills:**

The knowledge in this program explores a wide diversity of chemistry, helping you to develop subject knowledge and transferable skills in a supportive learning environment. Environmental Science emphasizes the role and importance of Chemistry-Environment and Management understanding and practical skills in the analysis and management of environmental problems.

In Chemistry-Environment and Management course, students will develop an Environment foundation of theory and practical skills, building to cover advanced concepts and contemporary issues in chemistry in later years. students will learn to use chemistry in problem-solving and to present their theories and findings confidently and imaginatively. Students also have the opportunity to reflect on their interests and learn how to pursue their own research, as well as gain experience with scientific instruments and techniques.

### **Social knowledge and skills:**

Chemistry-environment is one of the subjects perceived as difficult by most students. These findings are spot on to a certain extent. And from our teaching experiences, we've come to realize

that our students grasped more by engaging themselves in asking and answering questions, presentation of both class and lab work, and group work among other class activities. Communication skills are further honed when we actively encourage active participation, interaction, and questioning concepts in order to truly understand concepts, while working on that class assignment or lab report, you will get to share as well as listen to other people's observations and opinions before arriving at a conclusion. This improves your listening skills as well as your negotiation skills, it is true that working in a group can be difficult and requires patience. People learn differently, we have fast learners and slow learners, but how do we make sure we move together? By communicating, life ahead is a lot easier with good communication skills. Learning objectives of particular modules.

## 6 Course teaching methods

This course will employ mixed approaches for teaching including lectures, practices, and a group discussion relating to any issue concerned.

## 7 Teaching plan

Week	Content	Method/activity	Hours
1-2	<b>Chapter 1 Introduction</b> <ol style="list-style-type: none"> <li>Causes of pollution</li> <li>Relationship of air, water, soil, forest and organisms.</li> <li>The chemistry of pollutants</li> <li>A substance used to determine the concentration of a toxin.</li> </ol>	- Lecture - Propose topic to all students for writing final report (suggested titles)	2
	Each group identifies and characterizes a system of chemistry -environment and management	- Group discussion with knowledge and experiences in a chemistry -environment	2
	Group work with Extreme events from Chemistry-Environment	Assignment	4
3-4	<b>Chapter 2: Air Pollution Impact on forestry</b> <ol style="list-style-type: none"> <li>Atmosphere</li> <li>Thermal or Temperature Inversion</li> <li>Specs are involved in reactions that take place in the atmosphere.</li> </ol>	- Lecture - Group discussion with any issues relating to government documents for Air Pollution	2
	Practice using tools for analysis of Air Pollution	Practice and report	2
	The role of the Air Pollution Association Majority of official documents	- Group discussion with any issues relating to	2



		government documents for Pollution	
	Personal work with essay onto any issues regarding any role to combat Air Pollution	Assignment	2
5-6	<b>Chapter 3: Air pollution control</b> 1. Controlling pollution from on-site sources. 1.1. Pollution control 1.2. Pollution gas pollutions 2. Control of toxins caused by moving sources. 3. Controlling pollution from cars.	- Lecture - Group discussion	2
	- Each group must review each system and each component depends on Air pollution control and Controlling pollution	- Lecture - Group discussion on to issues and Air pollution control in agriculture and forestry and analyze the problem	2
	Individual and teamwork with own presentation for critical thinking for addressing the above problem	Presentation, Q&A	4
7-8	<b>Chapter 4: Air quality monitoring</b> 1. Measurement of air pollution 2. General procedures for air pollution detection. 3. Important for air pollution sampling. 4. Air pollution sampling method 5. Preparation of samples for standardization. 6. Analysis of air pollution.	- Lecture - Group discussion - Sharing experiences with Air quality monitoring in the big city impact on Agriculture and forest	2
	- Check for previous work - Create form interview and test forms with farmers.	- Lecture - Group discussion - Sharing experiences with Air quality monitoring in the big city impact on Agriculture and forest	2
	Each group Air Quality Monitoring System – Research	Assignment	4
	<b>Chapter 5: Water chemistry in nature</b> 1. Physical and chemical properties of water 2. Type of water 3. Drainage of gas in water.	- Lecture - Group discussion, group assignments with any issues concerned	2



9-10	4. Alkalinity 5. Acidity 6. Hardness 7. Organic in natural water		
	Analyze the water in the field	Practical in the field	2
	- Checking a full report - Checking a result of chapter 4 - Analyze the problem and constraints of each group team area study	Assignment	2
	Individual and teamwork with own presentation for critical thinking for addressing the above problem	Presentation, Q&A	2
11-12	<b>Chapter 6: Wastewater management</b> 1. Wastewater management processes 2. Chemical processes 3. Biological processes 4. Physical and chemical processes 5. Water hardness management	Lecture - Group Discussion - Select topic of world case study for doing report - Describe, Q&A, discuss and experiment	4
	- Each group spend 1 hour capturing the factors influencing environmental pollution and presenting briefly - Check a full report and create PowerPoint for the presentation - Lecture - Group Discussion - Use any paper concerning student field - Present a result of data collection	Assignment	4
13	<b>Mid-term exams</b>	Exams	4
14-15	<b>Chapter 7: Water analysis in advancer</b> 1. Collection of toxic samples in water 2. Toxic analysis method in water 3. Analysis using technologies	Check a full report and create PowerPoint for the presentation - Lecture - Group Discussion - Use any paper concerning student field	2
	Analyze the water in the lab	Laboratory	2
	Each group spend 1 hour capturing the factors influencing Water chemistry in nature and presenting briefly - Present a result of data collection	<b>Assignment</b>	4
	<b>Chapter 8: Soil chemistry impact on agriculture and forest</b> 1. Soil nature. 2. Soil analysis to study soil pollution. 3. Distribution of toxins in the soil.	Lecture - Group Discussion - Select the topic of world case study for doing a report	2



16-17	4. Effects of pollution on ecosystems and health. 5. Controlling, managing and disposing of soil pollution and garbage.	- Describe, Q&A, discuss and experiment	
	Each group spend 1 hour capturing the factors influencing chemistry - environment, and management and present briefly - Check a full report and create PowerPoint for the presentation - Lecture - Group Discussion - Use any paper concerning student field - Present a result of data collection	<b>Assignment</b>	<b>4</b>
	Analyze the soil chemistry in lab	Laboratory	<b>2</b>
18-19	<b>Chapter 9: Soil pollution in agriculture and forest</b> 1. Types of toxins in the soil 2. Sochi technology in the management of soil contaminants. 3. Basic methods for reusing plastic sheets. 4. Hydrophobic reactions 5. The use of chemicals to remove choline.	Lecture - Group Discussion - Select the topic of world case study for doing a report - Describe, Q&A, discuss and experiment	<b>2</b>
	Analyze the soil pollution in field	field	<b>2</b>
	Check a full report and create PowerPoint for the presentation - Lecture - Group Discussion - Use any paper concerning student field - Present a result of data collection	<b>Assignment</b>	<b>4</b>
20	<b>Chapter 10: Environmental Toxicology</b> 1. How toxins enter the body. 2. Excretion of toxins in the body 3. Risk assessment 4. Types of toxins 5. Toxicity measurement 6. How to select experimental animals and Toxin sampling.	Lecture - Group Discussion - Select the topic of world case study for doing a report Describe, Q&A, discuss and experiment	<b>2</b>
	Individual and teamwork with own presentation for critical thinking for addressing the above problem	Assignment	<b>2</b>



<b>21</b>	<b>Chapter 11: Chemical management to reduce environmental impact.</b> 1. Chemicals and hazards 2. Management of chemicals in agriculture 3. Management of impacts on Agriculture 4. The dangers of chemicals to agriculture	Lecture - Group Discussion - Select the topic of the world case study for doing a report Describe, Q&A, discuss and experiment	<b>2</b>
	Individual and teamwork with own presentation for critical thinking for addressing the above problem	Assignment	<b>2</b>
<b>22</b>	A case study in the field	field	<b>4</b>
<b>23</b>	Case study Presentation	Presentation, Q&A	<b>4</b>
<b>24</b>	<b>final exams</b>	<b>exams</b>	<b>4</b>

## 8 Material needs

### 8.1 Course equipment:

### 8.2 Tools used in the classes and practices as LCD and Projector, Temperature and Moisture meter, Air Quality, and PM 2.5 meter.

## 9 References

### 9.1 Compulsory reading list

#### 9.1.1. Books

1. Introduction to the Environmental Chemistry & It's Importance in 21st Century, November 2021 online at the [Link](#)
2. Global Environment Outlook - GEO-6: Healthy Planet, Healthy People online at the [Link](#)

#### 9.1.2. Assessment

1. Assessment of agricultural plastics and their sustainability: A call for action online at the [Link](#)
2. ENVIRONMENTAL CHEMISTRY online at the [Link](#)

#### 9.1.3. Journals

3. Advances in Chemical Pollution, Environmental Management and Protection online at the [Link](#)
4. Journal of Environmental Management online at the [Link](#)

### 9.2 Suggested reading list

1. Environmental Chemistry is multidisciplinary science involving chemistry, physics online at: [link](#)
2. Air Pollution: Everything You Need to Know online at: [Link](#)
3. Journal of the Air Pollution Control Association Online at: [link](#)
4. Air Quality Monitoring System – Research Gate online at: [link](#)
5. Water Chemical Composition Of Rivers, Lakes And Wetlands Online at: [link](#)
6. Wastewater Management - UN-Water Online at: [link](#)
7. An Introduction to Water Quality Analysis – ResearchGate Online at: [link](#)
8. Journal of Soil Science and Environmental .online at: [like](#)
9. Assessment of Soil Contamination with Potentially Toxic Online at [link](#)  
Environmental Toxicology and Chemistry (ET&C) - SETAC Online at [link](#)
10. Reduce the Adverse Impacts of Chemicals in the Environment Online at: [link](#)
11. INTRODUCTION TO ENVIRONMENTAL CHEMISTRY Dr. T. Geetha Assistant Professor Department of Chemistry St. Mary's College, Thrissur Online at [link](#)
12. Module I • Concept and scope of environmental chemistry – Segments of environment • Environmental pollution: Concepts and definition – Pollutant, contaminant, receptor and sink • Classification of pollutants - Global, regional, local, persistent and non-persistent pollutants Introduction to Environmental Chemistry – Dr. T. Geetha, St. Mary's College, Thrissur Online at: [link](#)
13. Environmental chemistry Environmental chemistry Chemistry, Physics Agriculture Medicine Biology Engineering Public health multidisciplinary science PDF at: [link](#)
14. Environmental chemistry • Environmental chemistry is the scientific study of the chemical and biochemical phenomena that occur in natural places. • Source, Reactions, Transport, Effect & fate of chemical species in environment • Effect of human activity • Effects on humans PDF at: [link](#)
15. World Environment Day (WED) • 5 June • First held in 1974 • Air Pollution - theme for 2019 PDF at: [link](#)
16. Atmosphere • Layer of gases - air -surrounds earth • Retained by earth's gravity • Major component – N<sub>2</sub>, O<sub>2</sub> • Minor components – ar, CO<sub>2</sub>, H<sub>2</sub>O PDF at: [link](#)
17. Atmosphere • Protects life –absorbs harmful solar radiation - ultraviolet rays (10 - 400nm) • Warming the surface through heat retention (greenhouse effect) • Reducing temperature extremes between day and night (the diurnal temperature variation) • Source of O<sub>2</sub>, CO<sub>2</sub>, moisture PDF at: [link](#)

## 10. Assessment of students

### 10.1 Description of assessment

Course assessment for students' grade, will collect the score from several criteria, such as class participation 10%, Activities with Q&A 10%, Report 20%, Midterm 20% and final term 40%.

### 10.2 Grade distribution and student assessment

#### Grading scale

Grade		Total score	Scale
Symbol	Verbal grade		





A	Excellent	90-100	4.00
B <sup>+</sup>	Very Good	85-89	3.5
B	Good	80-84	3.00
C <sup>+</sup>	Fairly Good	75-79	2.50
C	Fair	70-74	2.00
D <sup>+</sup>	Poor	65-69	1.50
D	Very Poor	60-64	1.00
F	Fail	59	0.00

*Place, Date ...../...../.....*