

# Course Syllabus

**1. Course title : Soil pollution and remediation techniques**

**2. Course code: SPRT424010**

**3. Credit units: 2 (2/0/4)** (2 units of theory/ 0 units of practice, experiment/ 4 units of self- study)

Duration: 10 weeks (3 hours of theory + 0 hour of practice + 6 hours of self-study per week)

**4. Course intructors:**

1/ Tran Thi Kim Anh

2/ Nguyen Ha Trang

**5. Course requirements :**

Preresiquisite courses : None

Previous course : General Environment

Parallel course : None

**6. Course Description :**

The course provides students with basic knowledge of geological structure, soil ecology, soil pollutants, soil self-cleaning process and its limitations, prevention techniques, contaminants removal from soil by physical, chemical, biological, phyto redimention...

**7.Course Goals**

Goals	Goal description	Programme expected learning outcomes ELOs
<b>G1</b>	Knowledge of soil environment, soil degradation and pollution affecting the society; preventing and improving method.	ELO3
<b>G2</b>	Evaluating the causes of soil pollution and proposing appropriate improving methods.	ELO4
<b>G3</b>	Communicating in English for describing the soil environmental issues.	ELO11
<b>G4</b>	Conceiving ideas of soil environment improvement, proposing, designing soil redimentation methods.	ELO12, ELO13

## 8. Course learning outcomes (CLOs):

CLOs		CLOs description (After accomplishing this course, students are able to: )	Programme ELOs
<b>G1</b>	CLO1	Apply knowledge of soil structure and soil formation to address soil environment issues.	ELO3
	CLO2	Apply physical and chemical parameters of soil environment in the process of soil degradation and pollution assessment.	ELO3
<b>G2</b>	CLO3	Evaluate the soil degradation, advantages and disadvantages of preventing and improving methods for soil pollution.	ELO4
	CLO4	Assess the causes and sources of pollution to treat soil contamination.	ELO4
<b>G3</b>	CLO5	Read English documents for describing soil degradation and pollution phenomena.	ELO11
<b>G4</b>	CLO6	Practise the role and responsibility of an environmental engineerer in soil environment toward the society.	ELO12
	CLO7	Conceive ideas of soil environment improvement in soil degradation and pollution.	ELO13

## 9. Learning Resources

### - Text book :

1. Ibrahim A. Mirsal, Soil Pollution Origin, Monitoring & Remediation, Springer-Verlag Berlin Heidelberg, 2008.

### - References :

2. R. E. White, Principles and Practice of Soil Science, The soil as a natural resource. 4<sup>th</sup> Ed., Blackwell Publishing, 2006.
3. Le Van Khoa, Nguyen Xuân Cu, Le Duc, Tran Khac Hiep, Tran Cam Van, Dat va Moi Truong, NXB Giao Duc – 2003.
4. Ku. Jeff, *Practical Design Calculations for Groundwater and Soil Remediation*, CRC Press LLC, 1999 Vietnam environmental protect law, HCM Tonghop Publisher, 2015.

## 10. Student Assesement :

- Grading scale : 10
- Assesement plan :

Type	Content	Timeline	Assesement Method	CLOs	Rate (%)
<b>Assignments</b>					<b>10%</b>
Ex#1	Calculate physical parameters: humidity, soil texture, soil water.	Week 3	Exercise in class	CLO1, CLO2	5
Ex#2	Calculate the dimension tank or chemical need to treat soil pollution.	Week 9	Exercise in class	CLO1, CLO2	5

Mid-term test					40%
Ex#3	Determine soil structure, texture, physical and chemical parameters of soil.	Week 5	Subtest	CLO1, CLO2	20%
Ex#4	Assess the phenomenon of soil degradation, pollution then give the solution to improve the soil environment.	Week 8	Subtest	CLO3, CLO4, CLO5, CLO6, CLO7	20%
Final test					50%
	The content covers all of course outcomes (Soil environment, degradation, pollution and redimendation methods). - 60 minutes duration.	School calendar	<i>Writing test/ Multi choice</i>	CLO1, CLO2, CLO3, CLO4, CLO5, CLO7	50%

### 11. Course content

Week	Content	CLOs
1-2	<b>Chapter 1: General geology and soil formation (6/0/12)</b>	
	<b>A/ Teaching content in classroom (6)</b> + Definition of soil environment + Soil formation process + Physical and chemical of soil environment <b>Summary of teaching methodology:</b> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> </ul>	CLO1, CLO5
	<b>B/ The contents of home self-study (12)</b> + Extra knowledge about soil environmental issues	CLO1, CLO5
3-4	<b>Chapter 2: Ecological composition of soil environment (6/0/12)</b>	
	<b>A/ Teaching content in classroom (6)</b> + Soil structure, texture and energy + Composition of gas and water phases in soil, metabolism in soil environment <ul style="list-style-type: none"> <li>2.2.1. Gas phase</li> <li>2.2.2. Water in soil</li> <li>2.2.3. Colloid</li> <li>2.2.4. Soil solution</li> </ul> + Biological composition in soil	CLO2, CLO5

	<p><b>Summary of teaching methodology:</b></p> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> </ul>	
	<p><b>B/ The contents of home self-study (12)</b></p> <p>+ Extra knowledge about soil air and water, bio-composition ...</p> <p>+ Differentiate the grain level and structure of different soil types</p>	CLO2, CLO5
5-6	<p><b>Chapter 3: Soil degradation and prevention and conservation methods (6/0/12)</b></p>	
	<p><b>A/ Teaching content in classroom (6)</b></p> <p>+ Soil degradation</p> <p>    Soil acidity</p> <p>    Soil salinity</p> <p>    Soil desertification</p> <p>    Soil erosion</p> <p>+ Prevention and conservation methods</p> <p><b>Summary of teaching methodology:</b></p> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> <li>• Group discussion</li> </ul>	CLO2, CLO5
	<p><b>B/ The contents of home self-study (12)</b></p> <p>+ Extra knowledge about soil degradation in Vietnam</p>	CLO2, CLO5
7-8	<p><b>Chapter 4: Soil pollution and prevention methods (6/0/12)</b></p>	
	<p><b>A/ Teaching content in classroom (6)</b></p> <p>+ Soil pollution</p> <p>    Soil pollution by agricultural waste</p> <p>    Soil pollution by industrial waste</p> <p>    Soil pollution by oil and effects of oil pollution</p> <p>    Soil pollution due to natural and biological factors</p> <p>+ Self cleaning ability of soil environment</p> <p>+ Land use planning methods to prevent soil pollution</p> <p>+ Methods to prevent soil pollution</p> <p><b>Summary of teaching methodology:</b></p> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> </ul>	CLO3, CLO4, CLO5

	<b>B/ The contents of home self-study (12)</b> + Extra knowledge about soil pollution and land planning in Vietnam	CLO3, CLO4, CLO5
9-10	<b>Chapter 5: Soil pollution and prevention methods (6/0/12)</b>	
	<b>A/ Teaching content in classroom (6)</b> + Landfill + Prevention of contaminate spreading + Physical Method + Biological methods + Chemical methods + Stablization/ Solidafication + Thermal method <b>Summary of teaching methodology:</b> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> </ul>	CLO5, CLO6, CLO7
	<b>B/ The contents of home self-study (12)</b> + Extra knowledge about soil pollution and land planning in Vietnam	CLO5, CLO6, CLO7

**12. Learning ethics:**

The homework and projects must be implemented by the students themselves. If the copy is detected, the students will be evaluated with the zero of the processing grade and final exam.

**13.Date of first approval:** August 1<sup>st</sup>, 2012

**14.Approved by:**

**Dean**

**Head of Department**

**Compiler**

**Nguyen Văn Súc**

**Nguyen Thi Minh Nguyet**

**Tran Thi Kim Anh**

**15.Date and Up-to-date content**

<p><b>1<sup>st</sup> time:</b> Date: 2015 - Update content and structure of the programme adjusted in: + Update the content</p>	<p>Instructor:</p> <p><b>Head of Department:</b></p> <p><b>Tran Thi Kim Anh</b></p>
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