

# Course Syllabus

- 1. Course title :** Cleaner Production& Sustainable Development
- 2. Course code:** CLPR124610
- 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 instructors:**  
1/ Ma. Nguyen Thi Tinh Au  
2/ Dr.Tran Thi Kim Anh
- 5. Course requirements :**  
Preresiquisite courses : None  
Previous course : General Environment  
Parallel course : None
- 6. Course Description :**

The course refers to the methodology and practical methods for implementing cleaner production technologies, clean production and sustainable design, especially the managerial, economical and technical measures, take precautions to prevent and reduce waste causing environmental pollution.

## 7.Course Goals

Goals	Goal description	ProgrammeExpected learning outcome (ELOs)
G1	Expertise in the field of cleaner production, energy auditing	ELO3
G2	Ability to apply the principles and technical solutions to implement cleaner production	ELO4
G3	Team working skills and reading specialized documents in English	ELO9, ELO11
G4	Consulting and implementing of cleaner production in manufacturing enterprises	ELO13

## 8. Course learning outcomes: ( CLOs)

CLOs		CLOs description (After accomplishing this course, students are able to: )	Programme ELOs
G1	CLO1	Develop methodology of Cleaner Production	ELO3
	CLO2	Propose technical solutions in CP	
G2	CLO3	Select opportunities for cleaner production	ELO4
	CLO4	Calculate the material and energybalance	
G3	CLO5	Having teamwork skills	ELO9
	CLO6	Read specialized documents in English	ELO11
G4	CLO7	Implementof cleaner production in manufacturing enterprises	ELO13

## 9. LearningResources

- Text book :
  1. Lectures on Cleaner Production (internal circulation), Department of Environmental Technology
- References :
  2. Nguyen DinhHuan, Cleaner Production, University of Technology, DaNang University, 2005
  3. Guide Handbook: Cleaner Production in industries, Ministry of Industry and Trade, Vietnam

## 10. Student Assesement :

- Grading scale : 10
- Assesement plan:

Type	Content	Timeline	Assesement Method	CLOs	Rate (%)
<b>Assignments</b>					<b>25</b>
Ex#1	Some concepts of cleaner production	Week 1	subtest	CLO1 CLO2	5
Ex#2	The methods to implement cleaner production	week 2	Result evaluation	CLO1 CLO2	5
Ex#3	Exercises about the opportunities of cleaner production	Week 3	Result evaluation	CLO2 CLO3 CLO5	5
Ex#4	Calculate the material and energybalance	week 5	Result evaluation	CLO4 CLO6	5
EX#5	Calculate economic efficiency	week 7	Result evaluation	CLO4 CLO6	5
<b>Essay</b>					<b>25</b>

	Students learn about the cleaner production opportunities in several industries (paper industry, beverage industry, cement industry, aquatic manufacturing...)	week 3-8	Report file	CLO1 CLO2 CLO3 CLO4 CLO5 CLO6 CLO7	
<b>Final test</b>					<b>50</b>
	The content covers all of course outcomes. - 60 minutes duration.	School calendar	Writing Test	CLO1 CLO2 CLO3 CLO4 CLO7	50

### 11. Course content

Week	Content	CLOs
1	<b>Chapter 1: Introduce to Cleaner Production(3/0/6)</b>	
	<b>A/ Teaching content in classroom (3)</b> + Approach and the concept of cleaner production + Benefits of cleaner production + The implementation of cleaner production principles + The implementation of cleaner production techniques + Summary of Steps of CP in the industrial companies + The application of cleaner production in Vietnam <b>Summary of teaching methodology:</b> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Group discussion</li> <li>• Slide presentation (Powerpoint)</li> </ul>	CLO1, CLO2, CLO3, CLO4, CLO5
	<b>B/The contents of home self-study (6)</b> The processes of industrial management Applying cleaner production in the world and in Vietnam	
2-5	<b>Chapter2: Methodology of Cleaner Production(12/0/24)</b>	

	<p><b>A/ Teaching content in classroom (12)</b></p> <ul style="list-style-type: none"> <li>+ Methodology of Cleaner Production</li> <li>+ The technical solutions to implement cleaner production</li> <li>+ Balance of material and energy</li> <li>+ The barrier in the process of cleaner production</li> </ul> <p><b>Summary of teaching methodology:</b></p> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> <li>• Exercise</li> </ul>	<p>CLO2, CLO3, CLO4, CLO5, CLO6, CLO7</p>
	<p><b>B/The contents of home self-study (24)</b></p> <ul style="list-style-type: none"> <li>+ Exercise</li> <li>+ CP application in some industrial fields.</li> </ul>	
6	<p><b>Chapter 3: Establishing the CP monitoring system (3/0/6)</b></p>	
	<p><b>A/ Teaching content in classroom (3)</b></p> <ul style="list-style-type: none"> <li>+ The baseline data</li> <li>+ Monitoring Indicators</li> <li>+ How to collect data</li> <li>+ Analysis data</li> </ul> <p><b>Summary of teaching methodology:</b></p> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Group discussion</li> <li>• Slide presentation (Powerpoint)</li> </ul>	<p>CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7</p>
	<p><b>B/The contents of home self-study (6)</b></p> <ul style="list-style-type: none"> <li>+ How to collect baseline data on the industries</li> </ul>	
7-9	<p><b>Chương 4: Energy Audit (9/0/18)</b></p>	
	<p><b>A/ Teaching content in classroom (9)</b></p> <ul style="list-style-type: none"> <li>+ History of energy usage</li> <li>+ The concepts of energy audits</li> <li>+ Energy management in the industrial enterprise</li> <li>+ Use efficiency and save energy (boiler)</li> </ul> <p><b>Summary of teaching methodology:</b></p> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> <li>• Exercise/ Group discussion</li> </ul>	<p>CLO3, CLO4, CLO5, CLO6, CLO7</p>

	<b>B/The contents of home self-study (18)</b> Efficient energy use in the refrigeration equipment and other equipment	
10	<b>Chapter 5: Design for sustainable production (3/0/6)</b>	
	<b>A/ Teaching content in classroom (9)</b> + What is sustainable design? + Why industry and society make D4S +Steps of D4S <b>Summary of teaching methodology:</b> <ul style="list-style-type: none"> <li>• Speech</li> <li>• Slide presentation (Powerpoint)</li> <li>• Group discussion</li> </ul>	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7
	<b>B/The contents of home self-study(6)</b> + Learn more about D4S	

**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.Dateoffirstapproval:**August1<sup>st</sup>,2012

**14.Approved by:**

Dean

Head of Department

Compiler

A/Prof.Nguyễn Văn Sức MSc Nguyen Thi Minh Nguyet Nguyen Thi Tinh Au

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

<b>1<sup>st</sup>time:</b> Date: 2015 - Update content and structure of the programme adjusted in: Teaching content and assessment method	Instructor:  Head of Department:  Dr. Trần Thị Kim Anh
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