| NONG LAM UNIVERSITY  FACULTY OF ENVIRONMENT AND NATURAL RESOURCES | SOCIALIST REPUBLIC OF VIETNAM  Independence - Freedom - Happiness |
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**COURSE DETAILED OUTLINES**

**UNDERGRADUATE EDUCATION PROGRAM**

**Major: Environmental Engineering Level: Undergraduate**

1. **General information of the course**

* Name in Vietnamese: Quản lý và Xử lý chất thải rắn đô thị
* Name in English: Urban Solid Waste Management and Treatment
* Module: 212333
* Number of credits: 3
* Conditions for participating in the course

*+ Prerequisite: none*

*+ Prior study:*

Department: Environmental Technology

* Duration: 15 weeks
* Semester: 2 (second year)

The course belongs to the knowledge block:

| Fundamental □ | | Fundamental specialized □ | | Specialized 🗹 | |
| --- | --- | --- | --- | --- | --- |
| Mandatory □ | Optional □ | Mandatory □ | Optional □ | Mandatory | Optional 🗹 |

* **Teaching language**: English Vietnamese 🗹

1. **Information of lecturer**

* Name: Huynh Ngoc Anh Tuan
* Position, title, degree: Lecturer, M.Sc
* Phone, email: 0917.720.900, huynhngocanhtuan@hcmuaf.edu.vn
* Time and place of work: Office hours, Department: Environmental Technology
* Address: Nong Lam University, quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh city, Vietnam
* The main research orientations: Environmental Engineering
* Information about tutors/lecturers who teach together (if any) (full name, phone number, email):

**III. Course description**

Solid waste management and treatment course includes the following contents:

* Generation, composition and nature of solid waste
* Current solid waste collection and transportation
* Solid waste treatment methods
* Calculation of a system of solid waste collection and transportation, sanitary landfills

IV. **Course goals and Expected Learning Outcomes**

Course goals

After completing the course, students are able to:

• The ability to identify, analyze and then select solid waste management and treatment processes according to different types of waste and environmental conditions.

• Design management systems, landfills, and solid waste collection routes.

The course contributes to the following Output Standards of the training program according to the following levels:

| Module | Subject | Learning outcomes (PLO) dedication degree | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 212333 | Solid Waste Management and Treatment | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| H | H | H | H | H | S | H | S | H | N | S | H | H | H | S | H |

* Note:

*N: none supporting*

*S: small supporting*

*H: high supporting*

* Course learning outcomes (*according to Bloom measurement scale*) :

| **Symbol** | **Course learning outcomes**  **Completing this module, students can implement** | **PLOs** |
| --- | --- | --- |
| **Knowledge** | | |
| CLO1 | Expert knowledge in the field of solid waste management and treatment: concept, classification, origin, composition, nature of waste and effects on the environment; collection system and management and treatment methods have been applied at present. | PLO1, PLO2, PLO3, PLO4, PLO5, PLO6, PLO 13, PLO 14 |
| CLO2 | The ability to identify, analyze and then select solid waste management and treatment processes according to different types of waste and environmental conditions |
| CLO 3 | Design management systems and landfills as well as solid waste collection routes. |
| **Skills** | | |
| CLO 4 | Teamwork and communication skills, presenting to solve a situation on solid waste management and treatment | PLO7, PLO 15, PLO 16 |
| CLO 5 | Applying learned knowledge to real life with specific conditions to propose appropriate management and treatment systems. | PLO8, PLO 9, PLO 11, PLO 12 |
| **Attitude and moral qualities** | | |
| CLO 6 | Have a high sense of responsibility and autonomy at work | PLO15, PLO16 |

**V. Teaching and learning methods**

1. Teaching methods

* *Combine lectures, slides and videos presentation*
* *Q & A (questions and answers)*
* *Give teaching materials, homework and assignment*

1. Learning methods

* *E-learning and self-learning (students read the materials and watch video tutorials)*
* *Students present assigned topics in class and do the discussion*
* *Students write reports about the assigned topics*

1. **Tasks of students**

* *Attendance: Students must attend at least 80% of the class period, ask for permission before being absence*
* *Prepare for the lesson: Students do homework and the assignment at home, prepare the presentation slides and questions to participate the discussions in class*
* *Attitude: Students actively participate in the discussion, ask questions and answer the questions*

1. **Evaluation and grade scale**
2. Grade scale: 10
3. Evaluation plan and weight

**Table 1. Matrix assesses the course learning outcomes of the module** *(percentage points according to the academic regulations of NLU)*

| **Course learning outcomes** | **Attendance** | **Presentation** | **Final exam (60%)** |
| --- | --- | --- | --- |
| **(10%)** | **(30%)** |
| CLO1 |  | x | x |
| CLO2 |  | x | x |
| CLO3 |  | x | x |
| CLO 4 |  | x |  |
| CLO 5 |  | x |  |
| CLO 6 | x |  |  |

**Table 2. Framework of evaluation criteria *(Rubric)***

1. Class attendance **(10 %)**

| Criteria | Percent (%) |  | **Level** | |  |
| --- | --- | --- | --- | --- | --- |
| Excellent | Good | Average | Poor |
| *7-10* | *7-5* | *5-4* | *> 4* |
| Class attendance | 100 | Attend <80% of the class period | Attend 70-80% of the class period | Attend 40-70% of the class period | Attend >40% of the class period |

1. **Topic presentation (30%)**

*During the learning process, there will be topics reported, each subject has about 5-8 students to perform. Students who report on the topic will receive a maximum of 3 points*

| Criteria | Percent (%) |  | **Level** | |  |
| --- | --- | --- | --- | --- | --- |
| Excellent | Good | Average | Poor |
| *3* | *2* | *1* | *0* |
| Content | 30 | Fully present the required content on the topic, with additional relevant content contributing to the expansion of knowledge | Full presentation of the required content on the topic | Insufficient presentation of the required content on the topic | Presenting irrelevant content or content that is too sketchy, does not provide the necessary information. |
| Report form | 20 | The presentation is clear, easy to understand, and creative. Get comments/questions of interest | The presentation is clear and easy to understand. | Presented in a reading form, not generating interest from the audience | The presentation is too sketchy, the audience cannot understand the content |
| Answer the questions | 30 | Questions are answered fully, clearly, and satisfactorily | Answer 70% of questions. | Answer 25-50% of questions. | Can't answer any questions |
| Team work | 20 | Show collaboration among team members clearly. There is division of answers and reports among members | There is cooperation among team members but it is not obvious | There is no combination of members, one or more members prepare and report | The report is incomplete and has incorrect content. |

1. **Final exam (60 %)**

| Criteria | **%** | **Excellent 8 -10** | **Qualified 4 -7** | **Below required level <4** |
| --- | --- | --- | --- | --- |
| **Answer questions** | 100 | Answer the content in the article clearly and coherently. Know how to apply professional knowledge in practice. | Answer the problems presented in the article are not enough, lack of creativity | Unable to answer learned knowledge when prompted |

1. **Overall rating**

| Score | **10** | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **General assessment** | Completed the course with excellence | Completing the course well | Completing the course quite well | Completing the course with good grades | Completing the course with average grade | Completing the course with fair grade | Completing the course | Not achieved | | | |

VIII. **Textbooks and references**

* + *Textbook:*

[1]. Nguyễn Văn Phước, Quản lý và xử lý chất thải rắn, NXB Đại học Bách Khoa TpHCM, 2005.

[2]. Trần Hiếu Nhuệ, Quản lý chất thải rắn, Tập 1: Chất thải rắn đô thị, NXB Xây dựng - Hà Nội, 2000.

* + *References*

[3]. George Tchobanoglous, Hilary Theisen, Samuel Vigil, Integrated Solid Waste Management, McGraw-Hill Inc, 1993.

[4]. Michael D. LaGrega, Phillip L. Buckingham, Jeffrey C. Evans & The Environment Resources Management Group, Hazardous Waste Management, McGraw-Hill Inc, 1994.

[5]. Standard Handbook of Hazardous Waste Treatment and Disposal, McGraw-Hill Inc.

[6]. Tchobanoglous, G and F. L. Burton, Wastewater Engineering: Treatment, Disposal Reuse, 3rd ed, McGraw-Hill Inc, 1991.

**VIII. Detail content of module**

| Week | Content | LLOs | Teaching and learning activities | Evaluation activities | CLOs |
| --- | --- | --- | --- | --- | --- |
| 1-2  Chapter1 | General introduction | Professional knowledge in the field of solid waste management and treatment | - Lectures combined with video presentations  - Discussion | Diligence  Final exam | CLO1, CLO2, CLO3, CLO6 |
| 3-4  Chapter 2 | Origin, composition and properties of solid waste | CLO1, CLO2, CLO3, CLO6 |
| 5-6  Chapter 3 | Solid waste collection system | CLO1, CLO2, CLO3, CLO6 |
| 7-8  Chapter 4 | Waste transit station | CLO1, CLO2, CLO3, CLO6 |
| 9-11  Chapter 5 | Solid waste treatment technology | The ability to identify and analyze and select solid waste management and treatment processes according to different types of waste and environmental conditions. | CLO1, CLO2, CLO3, CLO6 |
| 12  Chapter 6 | Garbage landfill |  |  |  |
| 13- 15  SEMINAR |  | Ability to present and express ideas through large exercises | - Presentation  - Discuss | Diligence  Creative | CLO1, CLO2, CLO3, CLO4, CLO5, CLO6 |

1. **Organizational form of teaching**

| Content | Course management (hours) | | | | | Course management (hours) |
| --- | --- | --- | --- | --- | --- | --- |
| Theory | Exercise | Discussion | Practice | Self-learning |
| Chapter 1 | 5 |  |  |  | 5 | 10 |
| Chapter 2 | 5 |  | 2 |  | 5 | 12 |
| Chapter 3 | 5 |  |  |  | 5 | 10 |
| Chapter 4 | 5 |  |  |  | 5 | 10 |
| Chapter 5 | 5 |  | 1 |  | 5 | 11 |
| Chapter 6 | 5 |  |  |  | 5 | 10 |
| SEMINAR |  |  | 12 |  |  | 12 |
| Sum | 30 | 0 | 15 | 0 | 30 | 75 |

1. **The** **requirements of lecturer for the module**

* Classroom, workshop: rooms full of light and ventilation
* Teaching facilities: classrooms have projectors, micro

*HCMC, October 1st, 2018*

| **Dean** | **Head of Dept** | **Lecturer** |
| --- | --- | --- |
| Assoc. Prof. LE QUOC TUAN | Assoc. Prof. NGUYEN TRI QUANG HUNG | MSc. HUYNH NGOC ANH TUAN |