

DETAILED COURSE OUTLINE

1. Course name: Project Work - Wastewater Treatment Course code: PWWT415110

2. Number of Credits: 1 credits

Total time: 10 weeks 1(0:1:2)

3. Course lecturers:

1 / Major responsibility: MSc Hoang Thi Tuyet Nhung

2 / List of another lecturers:

2.1 / PhD. Tran Thi Kim Anh

2.2 / PhD. Nguyen My Linh

4. Prerequisites:

Prerequisite subjects: None

Previous subjects: None

5. Course description:

After project work, students are equipped with the knowledge and skills in the selection of technological process, doing the computational analysis and design of the units in the domestic and industrial wastewater treatment systems. Moreover, students can draw the technical drawings for the wastewater treatment plant.

Course goals

| Goals | Goal descriptions <i>(Course's contributions to student)</i> | Expected learning outcome |
|--------------|---|----------------------------------|
| G1 | Recommend wastewater treatment processes and technological units in accordance with national emission standards for specific wastewater in Vietnam. | ELO3, ELO6 |

| | | |
|-----------|--|--------------|
| G2 | Practise skills such as collecting documents, planning, calculating and drawing technical drawings | ELO7 |
| G3 | Draw technical drawings for the process and wastewater treatment units; propose the operation modes for this system. | ELO15, ELO16 |

6. Course learning outcomes

| Course expected learning outcome | | Descriptions (After accomplishing this course, students are able to:) | Expected learning outcome |
|---|-------|--|----------------------------------|
| G1 | CELO1 | Propose the technological process of wastewater treatment system in accordance with the objectives. | ELO3 |
| | CELO2 | Synthetic wastewater treatment units in accordance with the proposed process. | |
| | CELO3 | Compare the environmental indicators of the wastewater treatment system with the environmental standards, construction standards, in accordance with the demand of enterprise and society. | ELO6 |
| G2 | CELO4 | Document collecting and information treating skills to solve the problems. | ELO7 |
| | CELO5 | Practise planning skill, accurate manual, meticulousity in the calculation and technical drawing works. | |
| G3 | CELO6 | Deploy technological wastewater treatment processes and detail the treatment units with technical drawings. | ELO15 |
| | CELO7 | Explain the operation modes of the treatment and management systems. | ELO16 |

7. Learning Materials

- Books, essential textbook:

- References:

- [1]. WEF & ASCE (1992) Design of Municipal Wastewater Treatment Plants, Vol.1, WEF
- [2]. Raymond D. Letterman (1999) Water quality and Treatment, American water work association, McGraw-Hill, Inc.
- [3]. Ronald L.Droste, Theory and Practice of Water and Wastewater Treatment, Jonh Wiley and Sons, 1997
- [4] Lam Minh Triet, **Domestic and industrial wastewater treatment**, HCMC National University Publisher.
- [5] Trinh Xuan Lai, **Industrial wastewater treatment**, Construction Publishing House, 2009.
- [6] Tomonori Matsuo, **Advances in water and wastewater treatment technology**, Elsevier Science B.V., 2001.
- [7] Udo Wiesmann, **Fundamentals of Biological Wastewater Treatment**, WILEY-VCH, 2007.
- [8] Ruth E Weiner and Robin A. Matthews, **Environmental Engineering**, Elsevier Butterworth-Heinemann, 2003.
- [9] Nicholas P. Cheremisinoff, **Biotechnology for waste and wastewater treatment**, Noyes Publications, 1996.
- [10] Simon Judd và Bruce Jefferson, **Membranes for Industrial Wastewater Recovery and Re-use**, Elsevier Ltd, 2003.
- [11] Construction standards, Standards of Vietnam.

8. Student assessment

- Grade scale: 10

- Assessment plan:

| Assessment | Contents | Schedule of progress | Assesment methods | Expected Learning Outcome | Grading weight (%) |
|---------------|--|-----------------------|------------------------|---------------------------|--------------------|
| Skills | | | | | 20 |
| Exercise #1 | Planning and time management for doing project work. | All process | Attendance (roll call) | ELO7 | 10 |
| Exercise #2 | Calculating and solving problems skill. | 10 th week | questions | ELO6 | 10 |
| Report | | | | | 30 |
| Exercise #1 | Report full project work and all drawings of units. | 15 th week | Report | ELO3 ELO15 | 30 |

| | | | | | |
|--------------------------|--|--|-----------|--------------------------------|-----------|
| | | | | ELO16 | |
| Oral presentation | | | | | 50 |
| Exercise #1 | Present, protect the ideas and results of wastewater treatment design. | | Oral test | ELO3 ELO6 ELO15 ELO16 | 50 |

9. Detailed contents of course:

| Week | Contents | Expected Learning Course outcome |
|-------------|--|---|
| | Part 1: PROJECT IMPLEMENTATION GUIDELINES (0/3/6) | |
| 1 | <p>A/ Teaching content in classroom:</p> <ul style="list-style-type: none"> + Objectives and meaning of project work in the educational program) + Guide to collect information, document, use the information in project work + Guide to solve the requirement of project work + Work out the performance of project work <p>Summary of teaching methodology:</p> <ul style="list-style-type: none"> + Discussion + Guide to do project <ol style="list-style-type: none"> 1. Assignment task: Two students are in one group as well as one topic. This topic concerning the design of a specific wastewater treatment plant. 2. Requirement: Students find out the characteristic of the chosen wastewater, propose and design two suitable technological process for wastewater treatment plant. | CELO1 |
| | <p>B/ The contents of home self-study</p> <ul style="list-style-type: none"> - Students find out the characteristic of the chosen wastewater, | CELO1 CELO3 |

| | | |
|-----|---|-------------------------|
| | <p>propose and design two suitable technological process for wastewater treatment plant.</p> <ul style="list-style-type: none"> - Analyze advantages and disadvantages of each option. Select the best option. - Refer to the project work, dissertations. | CELO4 |
| 2-6 | <p>Part 2: CALCULATION OF UNITS IN WASTEWATER TREATMENT PLANT (0/15/30)</p> | |
| | <p>A/ Teaching content in classroom:</p> <ul style="list-style-type: none"> + Search all problems relate to project work + Describe the technological processes of the treatment + Computational analysis and design of wastewater treatment plant <p>Summary of teaching methodology:</p> <ul style="list-style-type: none"> + Discussion + Guide to do project <ul style="list-style-type: none"> • Guide to students how to make references, computational analysis wastewater treatment units • Revise the errors in the calculation, report • Troubleshooting | CELO2 |
| | <p>B/ The contents of home self-study</p> <ul style="list-style-type: none"> + Refer to the document, computational analysis work units + Refer to another project works, theses | CELO2 CELO4 CELO5 |
| 7-9 | <p>Part 3: TECHNICAL DRAWINGS (0/9/18)</p> | |
| | <p>A/ Teaching content in classroom:</p> <ul style="list-style-type: none"> + Instructions on how to present a technical drawing + Instructions on how to present a technological process drawing + Instructions on how to present a detailed technical drawing of wastewater treatment reactors <p>Summary of teaching methodology:</p> <ul style="list-style-type: none"> + Questions and responses + Discussion | CELO6 CELO7 |

| | | |
|----|---|---|
| | B/ The contents of home self-study + Completing the drawing, the report + Refer to another project works, theses + Prepare to project work's protection | CELO4 CELO5 CELO6 CELO7 |
| 10 | Part 4: PROJECT PROTECTION (0/3/6) | |
| | A/ Teaching content in classroom: + Student presents the knowledge of wastewater treatment technologies made + Questions and responses Summary of teaching methodology: + Questions and responses + Discussion | CELO1 CELO2 CELO3 CELO6 CELO7 |
| | B/ The contents of home self-study Review the knowledge which the students have not mastered | CELO5 |

10. Scientific ethics:

+ The copy of All the exercises and translated information from internet are banned. If this thing are detected, the process score of students will be zero; and in serious case, these students who joined this problem, will be banned from taking their final exam.

+ The students who have not completed the item 9, will be banned from taking their final exam, and will receive the school discipline.

+ In case of the detection of students who replace the others in the exam, all of them will be suspended or leaved the learning program.

11. Date of first approval:

12. Approval by:

Dean of the faculty

Head of department

Editorial Group

Hoàng Thị Tuyết Nhung

13. The process of updating course outline

| | |
|---------------------------------|--|
| <p>1st update content: Date</p> | <p>< Who updating needs to sign and write full name ></p> <p>Head of Department:</p> |
|---------------------------------|--|