

18 APR 2018 CC/ 28 MAY 2018 UC

DEPARTMENT OF CHEMICAL ENGINEERING
College of Engineering
University of the Philippines Diliman, Quezon City

COURSE SYLLABUS
ChemE 144 Chemical Engineering Research II

A. Course Catalogue Description

1. **Course Number:** ChemE 144
2. **Course Title:** Chemical Engineering Research II
3. **Course Description:** Research project implementation and assessment.
4. **Prerequisite:** ChemE 143 Chemical Engineering Research I
5. **Semester Offered:** First Semester
6. **Course Credit:** 2u
7. **Number of Hours:** 6h
8. **Meeting Type:** laboratory
9. **Course Goals:** To discuss how to properly implement an experimental design from an approved research proposal in accordance with a risk assessment study; to disseminate their findings in written reports and oral presentations, and to prepare post-project reports (waste management, financial, inventory).

B. Rationale

This is the second part of the undergraduate research series, where students implement the research proposal they have drafted in ChemE 143 Chemical Engineering Research I and prepare waste management, financial and inventory reports after concluding a project.

C. Course Outline

1. Course Outcomes (CO)

Upon completion of the course, students must be able to:

- CO 1.** prepare experimental setups;
- CO 2.** interpret data gathered from experiments;
- CO 3.** write a scientific journal article, research poster, and bachelor's thesis;
- CO 4.** present a completed scientific research in a public forum;
- CO 5.** perform risk assessments of planned activities in observance of good housekeeping; and
- CO 6.** prepare financial and laboratory inventory reports.

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Course Outcomes and Relationship to Program Learning Objectives

Course Outcomes	Program Learning Objectives*				
	A	B	C	D	E
Prepare experimental setups					
Interpret data gathered from experiments					
Write a scientific journal article, research poster, and bachelor's thesis					
Present a completed scientific research in a public forum					
Perform risk assessments of planned activities in observance of good housekeeping					
Prepare final reports, including financial and laboratory inventory reports					

- * **A** Equip students with strong technical education in chemical engineering necessary to succeed in their chosen careers and to become responsive citizens.
B Develop the students' ability to effectively communicate technical information to any audience.
C Train students to function in multidisciplinary teams, manage projects, and take leadership roles in their respective fields.
D Engage students in research, innovation, and life-long learning to identify opportunities, and address issues and challenges in their respective spheres of influence.
E Instill in students a strong commitment to the ethical practice of their profession; to health, safety, and environment; and to service to society.

2. Course Content

Laboratory Topics	No. of Hours
Laboratory methods in chemical engineering 1. Setting up of laboratory experiments 2. Laboratory risk assessment 3. Waste management reports	6
Laboratory experimental runs 1. Preparation of materials and equipment 2. Implementation of DOE 3. Data gathering 4. Data treatment 5. Parametric analysis 6. Modelling/optimization	60
Consultations	12
Progress report/laboratory seminar	12
Final report/laboratory seminar	6
Undergraduate research colloquium	
Total number of units	96

3. Course Coverage

Week	CO	TOPIC	ESSENTIAL/ KEY QUESTIONS	Suggested Teaching and Learning Activities	Suggested Assessment Tools
1	1, 5	Laboratory methods in chemical engineering 1. Setting up of laboratory experiments 2. Laboratory risk assessment 3. Waste management reports	Are there any necessary modifications from the proposed methodology? Which of the chemicals to be used pose hazardous risks to the health and safety of the students performing the experiments? How are these risks going to be managed? How are the chemical wastes generated from the experiments going to be managed?	lecture, laboratory tour	risk assessment report, waste management report
2-7; 9-14	2	Laboratory experimental runs 1. Preparation of materials and equipment 2. Implementation of DOE 3. Data gathering 4. Data treatment 5. Parametric analysis 6. Modelling/optimization	What are the expected results from the experimental runs? How are the output variables affected by changing the input variables?	laboratory experiment	oral report
2-7; 9-14	3	Consultations	What are the challenges experienced from performing the experiments? Are modifications to the objectives and/or methodology necessary based on the observed outcomes?	consultation session	consultation report
8,15	3, 4	Progress report/ laboratory seminar	What are the challenges experienced from performing the experiments? Are modifications to the objectives and/or methodology necessary based on the observed outcomes?	oral presentation	oral report

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Week	CO	TOPIC	ESSENTIAL/ KEY QUESTIONS	Suggested Teaching and Learning Activities	Suggested Assessment Tools
16	3,4,6	Final report/ laboratory seminar	What are the challenges experienced from performing the experiments? Are modifications to the objectives, methodology and/or timetable necessary based on the observed outcomes?	oral presentation	oral report, thesis manuscript, journal article manuscript, colloquium presentation, laboratory clearance

4. Course Requirements

1. Oral report
2. Risk assessment report
3. Waste management report
4. Consultation report
5. Thesis manuscript
6. Journal article manuscript
7. Colloquium presentation
8. Laboratory Clearance

REFERENCES:

1. Department of Chemical Engineering (2015). *Laboratory Safety Manual*. University of the Philippines Diliman.
2. Lazic, Z. R. (2004). *Design of Experiments in Chemical Engineering: A Practical Guide*. Weinheim, Germany: Wiley-VCH Verlag GmbH & Co. KGaA.
3. Montgomery, D.C. (2017). *Design and Analysis of Experiments* 9th Ed. NY: John Wiley and Sons