CHE 0426
Track Specialization III

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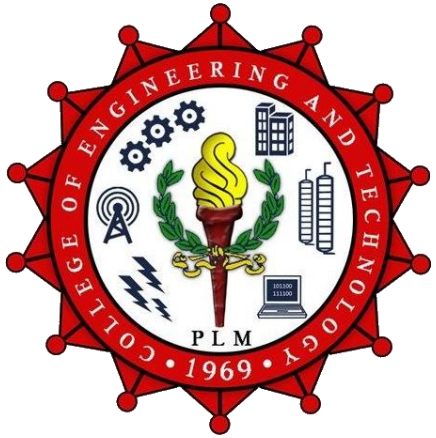
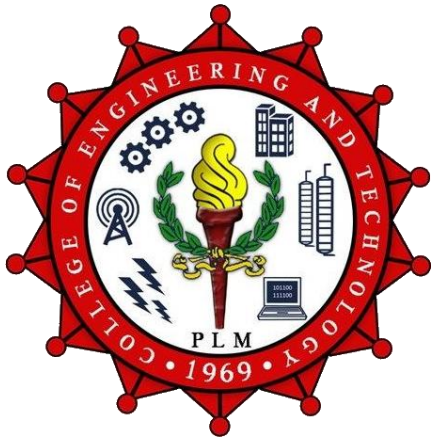
College Vision



The College of Engineering and Technology will be the premiere college in engineering and technology education, research and extension services

College Mission



Guided by this Vision, we commit ourselves:

1. To uphold excellence in the undergraduate and graduate level through curricular development, teaching, relevant researches and extension services to the community
2. To develop and nurture students to become professionally competent, community directed and God-centered individuals; and
3. To establish strong partnerships with the industry, alumni and other stakeholders.

Chemical Engineering Program Educational Objectives

Four years after graduation, the Bachelor of Science in Chemical Engineering (BS ChE) program shall produce:	Mission		
	1	2	3
1. Preferred Professionals (Karunungan) **Graduates that are practicing professionals, occupying leadership positions in their chosen fields or allied professions, guided by the values of academic excellence and integrity;**	√	√	√
2. Progress (Kaunlaran) **Graduates that exhibit progressive professional career through life-long learning; and**	√	√	√
3. Social Relevance (Kadakilaan) **Graduates that demonstrate social and environmental responsibility through community service.**	√	√	√

Track Specialization III – Chemical Process Optimization

Code: **CHE 0426**

3-unit lecture class (W 5-8PM GV 208)

Course Description:

This course is intended to teach students how to use optimization algorithms to improve the design and operation of chemical processes. The first part of the course emphasizes problem formulation, i.e., how one develops mathematical statements for the objective function (usually economic model) to be minimized or maximized and the equality and inequality constraints (the process model). Once the problem is formulated, the student should be able to select the optimization technique which is best suited to the problem characteristics. The second part of the course introduces applications of optimization in chemical process synthesis and planning problems

Course Learning Outcomes:

1. Be able to use economics to derive an objective function.
2. Be able to use principles of engineering to develop equality and inequality constraints
3. Learn how to think about and use optimization as a tool in process design and operation
4. Be proficient in the applications of optimization for optimizing and synthesizing important chemical processes

Course Schedule

WEEKS	TOPIC
	Orientation; discussion of course objectives and expected outcomes; discussion of course policies and grading system
1-2	Introduction and Single Variable Optimization
3-4	Unconstrained Optimization
5-6	Linear Programming
7	Theoretical Concepts of Nonlinear Programming
8	**Mid-term Examination**
9	Generalized Reduced Gradient Approach, Successive Quadratic Programming
10 - 13	Applications of Optimization (Optimization of various chemical and biochemical processes)
14	Chemical Process Optimization Hackathon
15	**Final Examination**

Grading System

The students will be graded according to the following:

- Midterm Examination 25%
- Final Examination 25%
- Machine Problem 40%
- Hackathon Quiz 10%

PASSING: 60% (ZERO BASED)

The following table is used in assigning final grades:

Transmutation Table:

98 - 100	1.00
95 – 97	1.25
92 – 94	1.50
89 – 91	1.75
86 – 88	2.00
83 – 85	2.25
80 – 82	2.50
77 – 79	2.75
75 – 76	3.00
Below 75	5.00

To be able to use the transmutation table above, the following is the computation from the zero-based grade:

(Zero-based grade x 0.625) + 37.5 = Final grade

Book References

- *Edgar, Himmelblau, and Lasdon* **"Optimization of Chemical Processes",** McGraw Hill (2001).
- *Rao* **"Engineering Optimization: Theory and Practice",** Wiley (2009).

Class Policies

Student's attendance

- Students are expected to attend weekly meetings for lecture discussion, graded recitation and case study presentation.
- Students are expected to maintain proper decorum during meetings.
- Students are expected to submit all necessary documents such as homework, machine problems and case studies based on the stipulated schedule as based on the guidelines below

Class Policies

Machine Problems

Machine Problems (MPs) are due at the beginning of class. Late assignments may be submitted for grading, but the following penalties will be assigned: 1 day late: 50% credit, 2 days late: 25% credit, 3 days late: 10% credit. MPs can be turned in early if a student expects to be absent.

Guidelines for MPs:

a. All MPs shall be written in Python notebook formal (*.ipynb*), with at least version 3.12

b. Top of the MPs code should contain:

- Student's Full name
- Student number
- Course code and Course Title
- Machine Problem Number
- A link to the Creative Commons BY-NC-SA (https://creativecommons.org/licenses/by-nc-sa/4.0/legalcode.en)
- Online repository link (optional)

Class Policies

Major Exams

- All major exams will be conducted face to face inside the campus and requires student's individual attendance. If a student log in late for any examination, the student must complete the examination at the same scheduled time as all other students.
- No make-up exams will be given except for legitimate medical excuses. Grace period for the make-up exam is one week after the student's submission of medical excuses.
- Cheating in a major examination will entail a failing mark for the given course.
- Cheating, dishonesty, and plagiarism in other works will entail a zero score for the said requirement.

Class Policies

Artificial Intelligence and Academic Integrity

The utilization of Artificial Intelligence (AI) within the curriculum is designed to support learning outcomes and address specific educational needs. To maintain academic standards, students are mandated to observe the following protocols:

- **Mandatory Disclosure**: Students must formally declare and provide proper citations for all AI-generated material included in their submissions.
- **Prohibition of Plagiarism**: The use of AI must not compromise academic integrity; all coursework must remain free of plagiarism.
- **Informed Consent**: Students are required to inform all data collection participants if AI technologies are employed as part of the research process.
- **Zero Tolerance for Misconduct**: The use of AI for illegal activities or to cause harm is strictly prohibited.

Any Questions?