Course Syllabus

2ⁿᵈ Semester, 2018

1. **Faculty:** Engineering   **Department:** Chemical Engineering

2. **Subject:** 01202524 Chemical Process Optimization   3 credits (3-0)

   Prerequisite -

   Section: 1   **Day and Time:** Thursday 10.30-12.00 pm, **Room:** E1410

   Tuesday 9.00-10.30 pm, **Room:** E1410

3. **Lecturer:** Dr. Chanin Panjapornpon

4. **Office hours for consultation with students**

   Everyday in office hours except Dr. Chanin's class time.

   Telephone: 02-7970999 Ext. 1230   **E-mail:** fengcnp@ku.ac.th

5. **Course Objectives**

   1. Understand and have ability to do programming languages.

   2. Be able to solve optimization problems by developing their own codes or using commercial software.

   3. Be able to formulate the objective function of the optimization problem and apply the suitable technique to solve whether linear or nonlinear problem.

6. **Course Description**

   Optimization problems arise in multiple areas of science and engineering. The problems of optimizations of chemical processes especially the petrochemical plants are intensively focused due to the operating and production costs. This course introduces numerical methods for continuous optimization, focusing on practical methods. The course will cover derivative-based methods for constrained and unconstrained multivariate optimization, including line-search and trust-region strategies; conjugate-gradient, Newton and quasi-Newton methods; linear programming (simplex and interior-point methods); quadratic programming; penalty, barrier and augmented Lagrangian methods; and sequential quadratic programming.

7. **Course Outline**

7.1 Introduction and Fundamental of Optimization

7.2 Introduction to MATLAB programming

7.3 Graphical Optimization

7.4 Root-finding

7.5 Linear Regression

7.6 Nonlinear Regression

7.7 Linear Programming

7.8 Nonlinear Programming/ Unconstrained Optimization

7.9 Nonlinear Programming/ Constrained Optimization

7.10 Optimization Toolbox from MATLAB

7.11 Global Optimization

8. Student-centered Teaching Method(s)

A combination of lecturing, discussion, computer laboratory, self and group study, presentation, term project assignment, and homework exercise with teaching assistants.

9. Teaching Aids/Materials

LCD projector and white board.

10. Evaluation

	Percent
Homework and class attention	10 %
Exam	
- Midterm	35 %
- Project presentation	15 %
- Final	40 %

11. Course grading

Grading will be on a curve and grade criteria of Faculty of Engineering, Kasetsart University

12. Textbooks and Readings

1. Venkataraman, P., *Applied Optimization with MATLAB Programming*, 1st ed., Wiley-Interscience, 2001.

2. Edgar, T.F. and D.M. Himmelblau, *Optimization of Chemical Processes*, McGraw-Hill, Boston, Massachusetts, 2001.

3. ชนินทร์ ปัญจพรผล 2559 "การหาค่าที่เหมาะสมเชิงปฏิบัติด้วยโปรแกรมแมทแลปสำหรับวิศวกรเคมี" ภาควิชา
   วิศวกรรมเคมี คณะวิศวกรรมศาสตร์ มหาวิทยาลัยเกษตรศาสตร์

13. Class Schedule

Week	D /M/Y	Lecture topics	Activity	Lecturer
1	14-18/01/2019	Topic 7.1	Lecture-Lab	Dr. Chanin
2	21-25/01/2019	Topic 7.2	Lecture-Lab	Dr. Chanin
3	28/1-1/02/2019		Kaset-Fair (25/1-2/02/2019)	Dr. Chanin
4	4-8/02/2019	Topic 7.3	Lecture-Lab	Dr. Chanin
5	11-15/02/2019	Topic 7.3	Lecture-Lab	Dr. Chanin
6	18-22/02/2019	Topic 7.4	Lecture-Lab (*Makha Bucha; **Mon 19/02/19**)	Dr. Chanin
7	25/2-1/03/2019	Topic 7.5	Lecture-Lab	Dr. Chanin
8	4-8/03/2019	Topic 7.6	Lecture-Lab	Dr. Chanin
9	9-17/03/2019	Topic 7.7	**Midterm Exam**	Dr. Chanin
10	18-23/03/2019	Topic 7.8	Lecture-Lab	Dr. Chanin
11	25-29/03/2019	Topic 7.8	Lecture-Lab	Dr. Chanin
12	1-5/04/2019	Topic 7.9	Lecture-Lab	Dr. Chanin
13	8-12/04/2019	Topic 7.10	Lecture-Lab (*Chakkri; **Mon 8/04/19**)	Dr. Chanin
14	15-19/04/2019		Lecture-Lab (*Songkran Fest.; **13-16/04/19**)	Dr. Chanin
15	22-26/04/2019	Topic 7.11	Lecture-Lab	Dr. Chanin
16	29/4-3/05/2019	Project Presentation	Lecture-Lab	Dr. Chanin
17	6-10/05/2019	Project Presentation	Lecture-Lab	Dr. Chanin
	13-17/05/2019		**Final Exam**	

Signature ....

(Dr. Chanin Panjapornpon)

January 14, 2019