Course Syllabus

1. **Name of Curriculum**
   Bachelor of Science (Food Science & Technology), Mahidol University International College

2. **Course Code:** ICFS 441 **Course Title:** Food Engineering I

3. **Number of Credits:** 4 (Lecture/Lab) (3-2)

4. **Prerequisite(s):** ICPY 210, ICMA 215

5. **Type of Course:** Required

6. **Trimester / Academic Year:** 1st trimester / 2003-04

7. **Course Description**

   Introduction to engineering operations in food processing, process control, and instrumentation. Engineering principles including material and energy balances, thermodynamics, fluid flow, heat transfer, refrigeration, and psychometrics as applied to foods.

8. **Course Objectives**

   1. Students should have an in-depth knowledge of fluid mechanics.
   2. Students should be able to apply fluid mechanics to the area of food engineering.
   3. Students should know the various types of equipment used in the food industry.
   4. Students should know how to perform design calculations for basic equipment such as pumps, mixers, and filters.

9. Course Outline

Week	Topics				Instructor
	Lecture/Seminar	Hour	Lab	Hour	
1	Introduction to Food Processing Engineering, Dimensions, Unit Systems	4			Dr. Koo-amornpattana
2	Fluid Flow Theory; Statics and Dynamics, Bernoulli's Equation	4			Dr. Koo-amornpattana
3	Properties of Fluids: Density, Viscosity, Surface Tension	4			Dr. Koo-amornpattana
4	Energy loss in flow; friction in pipes, pressure drop through equipment	6			Dr. Koo-amornpattana
5	Measurement of pressure in a fluid. Measurement of velocity, pumps and fans: positive displacement pumps, jet pumps	6			Dr. Koo-amornpattana
6	Pumps and Fans (continued): air-lift pumps, propeller pumps and fans, centrifugal pumps and fans	4			Dr. Koo-amornpattana
7	Midterm Examination	2			
8	Agitation, mixing calculations and selection	4			Dr. Koo-amornpattana
9	Mechanical separations: sedimentation, centrifugal separations	4			Dr. Koo-amornpattana
10	Mechanical separations: filtration, sieving	4			Dr. Koo-amornpattana
11	Size Reduction: Grinding and Cutting, Emulsification	2			Dr. Koo-amornpattana
	Total	44			

10. Teaching Methods

1. Lecture
2. Class exercises

11. Teaching Media

1. Textbooks
2. Handouts
3. Powerpoint Presentations

12. Course Achievement

Assessment made from the set-forward criteria: students receiving 80% or higher will receive a grade A.

13. Course Evaluation

Components	%
Class participation	5
Quizzes	5
Midterm Exam	40
Final Exam	50
Total	100

14. References

1. Earle, R.L. 1983. "Unit Operations in Food Processing, 2nd Ed. Pergamon Press, Oxford.
2. Toledo, R.T. 1991. "Fundamentals of Food Processing Engineering" 2nd Ed. Van Nostrand Reinhold, New York.
3. Coulson, JM, and Richardson, J.F. 1996. "Chemical Engineering Vol. 1", 5th Ed. Butterworth Heinemann Press, Oxford.

15. Instructor

TBA

16. Course Coordinator

Dr. Wanida Koo-Amornpattana