SYLLABUS:

Date / Revision 23 May 2015 / 02 May 2017 / PP
Faculty Life Sciences (LS)
Study Program Food Technology (FTE)

SUBJECT: Food Manufacturing Capstone Design

1 Basic Information

1.01	**Subject Name**	**Food Manufacturing Capstone Design**
1.02	**Semester**	6
1.03	**Level**	*1*
1.04	**SKS**	4
1.05	**Mandatory / Curriculum**	*D-02*
1.06	**Subject Code**	FMCD
1.07	**Subject Code**	FTE- D-LS-117
1.08	**Year**	2017 (7)
1.09	**Quality Control**	Final Test, OFSE, see evaluation
1.10	**Limitations**	Min 12 and Max 32 students in one class
1.11	**Combined with**	None
1.12	**Pre-requisite**	Food Engineering, Chemistry, Analytical Chemistry, Physical Chemistry, Food Processing Technology, Microbiology, Enginering Economics, Unit Process Design
1.13	**Responsible**	Dr. Tutun Nugraha
1.14	**Revision**	15-05-2017/pp

2 Description of Subject

In this course, student learn to apply what they have learned so far,and apply it to an engineering design situation. Student will apply various fundamental knowledge to design a plant assigned to them such as energy balance, mass and energy balance, fluid mechanics etc. Furthermore, they will also use their knowledge on pipe flow diagram, sizing, as well as designing a process that is economicaly viable to be built. Thus they will also apply the principles that were given to them in Engineering Economics Class. Other aspects include consideration for environmental safety. Moreover, the course will also provide opportunity for the student to work in group. Eventually, student will also have to present their report which will give them training on good presentations in front of a panel.

PO Box 150, BSD CPA 15330
Tel. +62 85212318000
info@iuli.ac.id
www.iuli.ac.id
IULI – Eco Campus, The Breeze
Jl. BSD Grand Boulevard
BSD City 15345
Island of Java

3 Objectives

This course serves as one of the capstone of the curriculum in which students will learn to aply practically all knowledge that have learned since the beginning of the program. Students will select a type of products and they will design the process that is required to economically produce the products chosen. Technological consideration, marketing, economical as well environmental consideration will be applied in the project.

4 Competency

After having the course, students are expected to:

- Apply the engineering principles that they have learned previously to an engineering designs situations
- Select a project and learn the literature background information relevant to the projects to ensure proper design
- Perform engineering calculations to aid in the design of the project
- Look for new information to support the design and the calculations as related to the requirement of the project (constants fo equations, chemical reactions if relevant, quality objectives, market targets)
- Evaluate the economic feasibility of the projects
- Write technical report at the end of the project and present this project and defend the content of their own project
- Consider environmental feasibilityof the projects

5 Learning Approach / Methodology

- Lectures/ Class contact (time-tabled) supplemented with interactive questions and answers to build the projects;
- Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing;
- Student Study Effort: homework/assignment; preparation for test/quizzes/ examination.
- Writing assignments/preseantations

6 Evaluation

5.1	**Absence maximum**	25%
5.2	**Participation in Discussion**	5 Points
5.3	**Homework / Classwork**	5 Points
5.4	**Presentation /Simulation**	10 Points
5.5	**Daily Quiz**	20 Points
5.6	**Final Examination**	60 Points
	Total	100 Points

PO Box 150, BSD CPA 15330
Tel. +62 85212318000
info@iuli.ac.id
www.iuli.ac.id
IULI – Eco Campus, The Breeze
Jl. BSD Grand Boulevard
BSD City 15345
Island of Java

7 Text Book and Reference

1	**Main Text Book:** • Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers", 5th Ed., McGraw-Hill •
2	**Supplement Textbooks:** • Warren McCabe, Julian Smith, Peter Harriott, "Unit Operations of Chemical Engineering", 7th Edition • Food Processing Principles and Applications, Stephanie Clark, Stepahnie Jung, Buddhi Lamsal, Wiley, 2nd Ed. Wiley-Blackwell • Fellows P. 2000. Food Processing Technology, Principles and Practice 2nd Dition. CRC Press. • Brennan JG. 2006. Food Processing Handbook. Wiley-VCH • Hui YH. 2007. Handbook of Food Products Manufacturing. John Wiley & Sons, Inc • Garcia M, Tamara F, Eric G. 2010. Potential Applications of Nanotechnology in the Agro-food Sector. Ciênc. Tecnol. Aliment. Campinas, 30(3): 573-581 • Hariyadi P. 2008. The food-canning Industry in Indonesia: Need for Safety Assurance Regulation and Quality Optimization. Food Manufacturing Efficiency. 2(1): 45-48 • Zubaidah IK, Carmen MS, Bona S , Asti N, Indra MP , Deudeu L, Cecep MN. 2016. Potential Use of Gamma-Irradiated Ethnic Ready-to-Eat Foods to Improve the Nutritional Status of Landslide Victims. http://www.mdpi.com/journal/foods • Asep N, Hendrix T. 2016. Traditional Food for Small and Medium Enterprises (SMEs). Advances in Economics, Business and Management Research, volume 15. Atlantis Press • [Kemendag] Kementerian Perdagangan.2009. Indonesian Herbal: The Traditional Therapy. Trade Research & Development Agency. Jakarta

8 Content / Topics of Lecture

Week	Content/ Topics of Lecturing	Text Book Chapter	Remark
1	**Introductionary class & overview of the projects** ● Provide overview to the students concerning the course requirements ● Allow students to understand working in a project as a team, as members or as a chief engineers ● Students learn the assigned projects	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 1 and 2	1 x 4 x 50 minutes
2,3	**Process Design** ● Students learn the various paths in the production process ● Students learn to search for information in the literature and learn to extract information from literature ● Students learn the skill of presentation and the writing of technical report	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 3	2 x 4 x 50 minutes

PO Box 150, BSD CPA 15330
Tel. +62 85212318000
info@iuli.ac.id
www.iuli.ac.id
IULI – Eco Campus, The Breeze
Jl. BSD Grand Boulevard
BSD City 15345
Island of Java

4,5	**Flow chart development & initial economic evaluation** ● Students learn to understand the process as a whole and translate it into a flow chart that leads to an efficient productionline ● Students learn to apply various fundamental knowledge regarding various unit operations in pharma eng. Process and choose best possible system ● Students learn to understand the implication of the choices of the process design to the economic feasibilty of the projects	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 3, 4	2 x 4 x 50 minutes
6,7	**Calculating and designing mass & Energy balances** ● Students learn to apply the knowledge of mass and energy balances that they have learned in class into a real project design	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 3, 4 Ref Book: McCabe Ch. 14	2 x 4 x 50 minutes
8	**Midterm Break**		
9, 10	**Unit Process Specifications** ● Students applied the fundamental knowledge of each of the unit operations and relate this information to the process being considered ● The result is a list of equipment that are ready to be given to the purchasing department	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 3, 4, 5 Ref Book: McCabe Ch. 10, 12, 13, 14, 15	2 x 4 x 50 minutes
11,12	**Utility and Lay out of the factory** ● Students learn to integrate the design of the process into the design of the layout of the factory ● Various knowledge to evaluate the needs of utility and energy requirements are also applied at this point of the project ● Students learn to search related information from vendor and contacting vendor for information mining	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 2, 3, 5	2 x 4 x 50 minutes
13	**Product quality and Safety** ● Students learn to understand the importance of product and operational safety ● Students learn to apply the knowledge of GMP into their design	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 2	1 x 4 x 50 minutes

PO Box 150, BSD CPA 15330
Tel. +62 85212318000
info@iuli.ac.id
www.iuli.ac.id
IULI – Eco Campus, The Breeze
Jl. BSD Grand Boulevard
BSD City 15345
Island of Java

14	**Economic analysis of the project for profitability and BEP (Break Even Point)** ● Students learn to apply the knowledge they obtain in the engineering economics to conclude the project and show that they can design a project that is economically feasible	Peters, Max S., Klaus D. Timmerhaus, Ronald E. West, "Plant Design and Economics for Chemical Engineers" Chapter 6, 7, 8, 12, 13, 14,1 5	1 x 4 x 50 minutes
15	Wrap-up: Team Presentation/defense and Discussion		1 x 4 x 50 minutes
16	**Final Examination**		

PO Box 150, BSD CPA 15330
Tel. +62 85212318000
info@iuli.ac.id
www.iuli.ac.id
IULI – Eco Campus, The Breeze
Jl. BSD Grand Boulevard
BSD City 15345
Island of Java