

Teknik Pengolahan Pangan

Course Brief Description:	The purpose of this course is to provide students with knowledge and analytical and problem-solving skills necessary to analyze processes applied in food processing operations. Topics that will be covered in this course include the concepts and principles applied in food engineering, mass and energy balances, fluid flows, psychometric chart, heat and mass transfer, drying, evaporation, refrigeration, and food freezing.
Course Learning Objectives:	At the end of the lesson, students are expected to be able to: [1] Explain food processing techniques in each operating unit to get optimal results. [2] Applying the principles of physics and engineering to food processing. [3] Complete calculations either manually or by using a computer program.
Related Expected Learning Outcomes (ELOs):	<ul style="list-style-type: none">• ELO-3: Apply knowledge of mathematics, sciences, and engineering principles in agricultural fields.• ELO-4: Use quantitative analysis, information technology and critical thinking in agricultural engineering profession.• ELO-5: Use techniques, skills, and modern tools necessary for agricultural engineering practices.• ELO-7: Ability to design simple equipment, components, or processes needed in agricultural engineering operations.• ELO-8: Demonstrate capacity in operating agricultural engineering related business either as producer or service provider.
Teaching Method	<ul style="list-style-type: none">• Lecture and in-depth discussion• Tutorial• Independent assignment
Grading Policy	<ul style="list-style-type: none">• Quiz and Assignment : 20%• Exam : 80%
Reference	<ul style="list-style-type: none">• Singh, R. P. and Dennis R. Heldman. 2009. Introduction to Food Engineering 4th ed. Academic Press. San Diego.
Lecturer Name	<ul style="list-style-type: none">• Dr. Ir. Supratomo, DEA• Prof. Dr. Ir. Salengke, M.Sc• Prof. Dr. Ir. Mursalim

Course Outline

Lecture	Topic
1	INTRODUCTION
	Food processing operations unit
	Unit system
2 - 3	MASS AND ENERGY BALANCE
	The law of conservation of mass
	Block diagram
	Energy conservation law
	Energy equilibrium block diagram
	Mass-energy equilibrium
4 - 5	FOOD REOLOGY
	The concept of Viscosity
	Newtonian and non-newtonian fluids
	Power law equation
	Fluid transportation
6 - 7	TRANSIENT CONDUCTION HEAT TRANSFER
	Transient conduction process
	Lumped System Analysis
	One-dimensional transient conduction
	Heisler diagram
8	MID-TEST
9 - 10	EVAPORATION
	The theory of evaporation
	Types of evaporators
	Single effect evaporator
10 - 11	PSYCHROMETRY
	Properties of dry air and water vapor
	Properties of a mixture of air and water vapor
	Psychrometry diagram
12 - 13	FOOD DEHYDRATION
	Basics of food drying
	Water balance
	Water activity
	Types of food dryers
14 - 15	FOOD COOLING
	Basics of cooling
	Properties of refrigerants
	Refrigeration system components
	Pressure-enthalpy diagram
16	FINAL-TEST