

Pindah Panas

Course Brief Description:	This course will provide student with knowledge on the modes of heat transfer and skills on solving heat related engineering problems. The topics covered in this course include modes of heat transfer, conduction in one-dimension, convective heat transfer, natural and forced convective heat transfer, radiation heat transfer, and heat exchangers.
Course Learning Objectives:	At the end of the lesson, students are expected to be able to: [1] Explain the method of heat transfer both by conduction, convection and radiation [2] Complete the calculations related to the three heat transfer methods [3] Complete the calculation of a heat exchanger
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.
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"> • Çengel, Y. A. 1998. Heat Transfer: A practical Approach. McGraw Hill, Inc. Highstown, N.J. • 2. Holman, J. P. 2010. Heat Transfer 10th ed. McGraw-Hill. New York
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Course Outline

Lecture	Topic
I	BASICS OF HEAT TRANSFER
	Thermodynamics and Heat Transfer
	The First Law of Thermodynamics
	Heat Transfer Mechanisms

Lecture	Topic
II - IV	HEAT CONDUCTION EQUATION
	General Heat Conduction Equation
	One-Dimensional Heat Conduction Equation
	STEADY HEAT CONDUCTION
	Heat Conduction in a Plane Walls
	Heat Conduction in a Cylinder
	Heat Conduction in a Sphere
	Heat Transfer from Fins
V - VII	FUNDAMENTALS OF CONVECTION
	Physical Mechanism on Convection
	FORCED CONVECTION
	Laminar Flow
	Turbulent Flow
	NATURAL CONVECTION
	Natural Convection over Surfaces
Natural Convection inside Enclosures	
VIII	MID-TEST
IX - XI	THERMAL RADIATION
	Blackbody Radiation
	Radiative Properties
	The View Factor
	Radiant Exchange: Black Surfaces
Radiant Exchange: Gray Surfaces	
XII - XV	HEAT EXCHANGERS
	Types of Heat Exchangers
	The Overall Heat Transfer Coefficient
	The Log Mean Temperature Difference Method
	The Effectiveness–NTU Method
	Selection of Heat Exchangers
VIII	FINAL-TEST