



UNIVERSITI TEKNOLOGI MARA

CMT324: HEAT TRANSFER

<b>Course Name (English)</b>	HEAT TRANSFER <b>APPROVED</b>
<b>Course Code</b>	CMT324
<b>MQF Credit</b>	3
<b>Course Description</b>	The syllabus introduces topics on the different kinds of heat transfer i.e. conduction, convection and radiation in different cases, types of heat exchangers and lastly introduction on boiling and condensation.
<b>Transferable Skills</b>	Transfer skill of heat transfer in understanding theories, solving authentic problems, express and articulate scientific ideas effectively.
<b>Teaching Methodologies</b>	Lectures
<b>CLO</b>	CLO1 Explain the principle of heat transfer. CLO2 Relate the heat transfer law to produce systematic solution in heat transfer problem. CLO3 Demonstrate the effective writing in area of heat transfer for specific application.
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Introduction to heat transfer</b> 1.1) Definition 1.2) Unit and dimension 1.3) Heat transfer modes 1.4) Real life application	
<b>2. One-Dimensional, steady-state heat conduction</b> 2.1) Definition 2.2) Rate equation for conduction 2.3) Conduction for slab/ plane wall in series 2.4) Composite medium 2.5) Conduction for slab/plane wall in parallel 2.6) Conduction for cylinder and sphere 2.7) Critical radius of insulation	
<b>3. Convection</b> 3.1) Definition for free and forced convection 3.2) Rate equation for forced convection 3.3) Physical significance of dimensionless numbers. 3.4) External flow forced convection 3.5) Forced convection flow over bodies 3.6) Internal Flow forced convection 3.7) Forced convection flow inside ducts 3.8) Overall heat transfer coefficient for clean and dirty conditions	
<b>4. Heat Exchangers</b> 4.1) Theory and definition 4.2) Classification of heat exchangers 4.3) Temperature distribution in heat exchangers 4.4) Heat exchanger analysis 4.5) The LMTD method for single pass heat exchanger 4.6) Correction method for cross-flow and multi-pass heat exchangers 4.7) $e - NTU$ method for heat exchanger analysis 4.8) Fouling factor 4.9) Heat exchanger optimization	

**5. Boiling and Condensation**

- 5.1) Introduction to boiling and condensation
- 5.2) Type of condensations
- 5.3) Condensation on vertical tubes
- 5.4) Condensation on horizontal tubes and arrays
- 5.5) Type of boiling regions
- 5.6) Nucleate boiling calculations

**6. Radiation**

- 6.1) Theory and definition
- 6.2) Radiation properties
- 6.3) Blackbody and real body radiation
- 6.4) Shape factor for surface radiation
- 6.5) Radiation exchange between two surfaces

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Group Assignment	30%	CLO3
	Online Quiz	Quiz	20%	CLO1
	Test	OnlineTest 1	25%	CLO2
	Test	Online Test	25%	CLO2

Reading List	<b>Reference Book Resources</b> <ul style="list-style-type: none"> <li>• Yunus, A. Cengel, Heat Transfer 2003, <i>A Practical Approach</i>, 2 Ed., McGraw- Hill, 2003</li> <li>• Holman, J.P. 1997, <i>Heat Transfer</i>, 8 Ed., Mc Graw-Hill, 2001</li> <li>• Bejan, A., <i>Modern Heat Transfer</i>, Wiley, New York,1993</li> <li>• Incropera , P., Frank. 2002, <i>Introduction to Heat Transfer</i>, 4 Ed., New Jersey: John Wiley and Sons, 2002</li> </ul>
Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources