

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Heat Transfer 2</b>		Module Delivery
Module Type	<b>Core</b>		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>UOMU0206062</b>		
ECTS Credits	<b>6</b>		
SWL (hr/sem)	<b>180</b>		
Module Level	UGIII	Semester of Delivery	
Administering Department	Fuel and Energy Techniques Engineering Department	College	Engineering Technical college
Module Leader	Sameer Saad Raheem	e-mail	<a href="mailto:Sameer.Saad.Raheem@uomus.edu.iq">Sameer.Saad.Raheem@uomus.edu.iq</a>
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Msc in Mechanical Engineering
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	<b>Heat Transfer 1</b>		Semester
			Five

Co-requisites module	None	Semester	
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### Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. To Analyze heat transfer by radiation using shape factors and networks.</li> <li>2. To Use LMTD and NTU-Effectiveness methods to predict the size and performance of heat exchangers.</li> <li>3. To Design of heat exchangers.</li> <li>4. To Design heat exchanger equipment.</li> <li>5. To Define and solve problems in boiling and condensation heat transfer.</li> <li>6. To Design the furnace and understand the radiation heat transfer.</li> <li>7. To Solve problems in heat transfer applications</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Ability To Analyze heat transfer by radiation using shape factors and networks.</li> <li>2. Ability To Use LMTD and NTU-Effectiveness methods to predict the size and performance of heat exchangers.</li> <li>3. Ability To Design of heat exchangers.</li> <li>4. Ability To Design heat exchanger equipment.</li> <li>5. Ability To Define and solve problems in boiling and condensation heat transfer.</li> <li>6. Ability To Design the furnace and understand the radiation heat transfer.</li> <li>7. Ability To Solve problems in heat transfer applications</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><u>Fins</u> Fins Types, Types of Temperature distribution along fins, Annular fine calculation, application[15 hrs.]</p> <p><u>Heat exchangers</u> Types of heat exchangers. Logarithm mean temperature difference (LMTD). Single pass and multipass heat exchangers; plate heat exchangers; heat exchangers effectiveness; Design of heat exchanger using NTU. Fouling factors and Wilson's plot. [15 hrs.]</p> <p><u>Cooling Of Electronic Equipment</u> Manufacturing Of Electronic Equipment, The Chip Carrier [10 hrs.]</p>

	<p><u>Printed Circuit Boards</u></p> <p>Cooling Load Of Electronic Equipment, Conduction Cooling [12 hrs.]</p> <p><u>Conduction In Chip Carriers [12 hrs.]</u></p> <p>Conduction In Printed Circuit Boards</p>
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<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises are</p> <ol style="list-style-type: none"> <li>1. Teamwork</li> <li>2. Visualization</li> <li>3. Inquiry-Based Teaching</li> <li>4. Student-led Classroom</li> <li>5. Implementing Technology in the Classroom</li> <li>6. Auditory strategies</li> <li>7. Reading &amp; Writing</li> </ol>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	74	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	5
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	106	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	180		

<b>Module Evaluation</b> تقييم المادة الدراسية	
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		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b>	
المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Fins Definitions Types Of Fins
<b>Week 2</b>	Heat Transfer from Finned Surfaces Fin Equation
<b>Week 3</b>	Annular Fine Calculation, Application Pin Fine Calculation, Application
<b>Week 4</b>	Fin Efficiency Types Of Temperature Distribution Along Fins
<b>Week 5</b>	Heat Exchangers Definitions Types Of Heat Exchangers
<b>Week 6</b>	The Overall Heat Transfer Coefficient
<b>Week 7</b>	Fouling Factor Fouling Factors And Wilson's Plot.
<b>Week 8</b>	Analysis of Heat Exchangers Logarithm Mean Temperature Difference (LMTD)
<b>Week 9</b>	Heat Exchanger Effectiveness

<b>Week 10</b>	Design of Heat Exchanger Using NTU THE EFFECTIVENESS–NTU METHOD
<b>Week 11</b>	Selection of Heat Exchangers Heat Exchangers Design Considerations
<b>Week 12</b>	Cooling Of Electronic Equipment Manufacturing Of Electronic Equipment
<b>Week 13</b>	The Chip Carrier Printed Circuit Boards
<b>Week 14</b>	Cooling Load Of Electronic Equipment Conduction Cooling
<b>Week 15</b>	Conduction In Chip Carriers Conduction In Printed Circuit Boards
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Lab 1: calculation of thermal conductivity
<b>Week 2</b>	Lab 2: calculation of heat transfer series wall
<b>Week 3</b>	Lab 3: calculation of thermal contact resistance
<b>Week 4</b>	Lab 4: heat transfer in very long fin
<b>Week 5</b>	Lab 5: estimation of heat transfer coefficient in fins
<b>Week 6</b>	Lab 6: steady two dimensional in plate
<b>Week 7</b>	Lab 7: forced convection from cylinder in cross flow

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Hollman J.P., Heat Transfer, McGraw Hill	yse

	Kern D.Q., Process Heat Transfer, McGraw Hill.	
<b>Recommended Texts</b>	Heat-transfer- [YUNUS A. CENGEL]	yes
<b>Websites</b>	<a href="https://www.udemy.com/topic/heat-transfer/">https://www.udemy.com/topic/heat-transfer/</a>	

<b>Grading Scheme</b> مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A</b> - Excellent	امتياز	90 - 100	Outstanding Performance
	<b>B</b> - Very Good	جيد جدا	80 - 89	Above average with some errors
	<b>C</b> - Good	جيد	70 - 79	Sound work with notable errors
	<b>D</b> - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	<b>E</b> - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 – 49)</b>	<b>FX</b> – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F</b> – Fail	راسب	(0-44)	Considerable amount of work required
<b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				