

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Heat Transfer 2		Module Delivery
Module Type			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar
Module Code			
ECTS Credits	6		
SWL (hr/sem)	180		
Module Level		Semester of Delivery	
Administering Department	Fuel and Energy Techniques Engineering Department	College	Shatt Al-Arab University College
Module Leader	Ali Saaduldeen abdulhameed	e-mail	Ali.almusawi.iq@gmail.com
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc
Module Tutor	Ali Saaduldeen abdulhameed	e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Heat Transfer 1	Semester	Five
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To Analyze heat transfer by radiation using shape factors and networks. 2. To Use LMTD and NTU-Effectiveness methods to predict the size and performance of heat exchangers. 3. To Design of heat exchangers. 4. To Design heat exchanger equipment. 5. To Define and solve problems in boiling and condensation heat transfer. 6. To Design the furnace and understand the radiation heat transfer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To Solve problems in heat transfer applications 1. Ability To Analyze heat transfer by radiation using shape factors and networks. 2. Ability To Use LMTD and NTU-Effectiveness methods to predict the size and performance of heat exchangers. 3. Ability To Design of heat exchangers. 4. Ability To Design heat exchanger equipment. 5. Ability To Define and solve problems in boiling and condensation heat transfer. 6. Ability To Design the furnace and understand the radiation heat transfer. 1. Ability To Solve problems in heat transfer applications
Indicative Contents المحتويات الإرشادية	<u>Fins</u> Fins Types, Types of Temperature distribution along fins, Annular fine calculation, application[15 hrs.] <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.] <u>Cooling Of Electronic Equipment</u> Manufacturing Of Electronic Equipment, The Chip Carrier [10 hrs.] <u>Printed Circuit Boards</u> Cooling Load Of Electronic Equipment, Conduction Cooling [12 hrs.] <u>Conduction In Chip Carriers</u> [12 hrs.] Conduction In Printed Circuit Boards

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises are 1. Teamwork 2. Visualization 3. Inquiry-Based Teaching 4. Student-led Classroom 5. Implementing Technology in the Classroom 6. Auditory strategies Reading & Writing
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Student Workload (SWL)

الحمل الدراسي للطلاب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	74	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	106	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	180		

Module Evaluation

تقييم المادة الدراسية

		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)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fins Definitions Types Of Fins
Week 2	Heat Transfer from Finned Surfaces Fin Equation
Week 3	Annular Fine Calculation, Application Pin Fine Calculation, Application
Week 4	Fin Efficiency Types Of Temperature Distribution Along Fins
Week 5	Heat Exchangers Definitions Types Of Heat Exchangers
Week 6	The Overall Heat Transfer Coefficient
Week 7	Fouling Factor Fouling Factors And Wilson's Plot.
Week 8	Analysis of Heat Exchangers Logarithm Mean Temperature Difference (LMTD)
Week 9	Heat Exchanger Effectiveness
Week 10	Design of Heat Exchanger Using NTU THE EFFECTIVENESS-NTU METHOD
Week 11	Selection of Heat Exchangers Heat Exchangers Design Considerations
Week 12	Cooling Of Electronic Equipment Manufacturing Of Electronic Equipment
Week 13	The Chip Carrier Printed Circuit Boards
Week 14	Cooling Load Of Electronic Equipment

	Conduction Cooling
Week 15	Conduction In Chip Carriers Conduction In Printed Circuit Boards
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: calculation of thermal conductivity
Week 2	Lab 2: calculation of heat transfer series wall
Week 3	Lab 3: calculation of thermal contact resistance
Week 4	Lab 4: heat transfer in very long fin
Week 5	Lab 5: estimation of heat transfer coefficient in fins
Week 6	Lab 6: steady two dimensional in plate
Week 7	Lab 7: forced convection from cylinder in cross flow

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hollman J.P., Heat Transfer, McGraw Hill Kern D.Q., Process Heat Transfer, McGraw Hill.	yes
Recommended Texts	Heat-transfer- [YUNUS A. CENGEL]	yes
Websites	https://www.udemy.com/topic/heat-transfer/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.