جامعة الإسراء
ISRA UNIVERSITY

COURSE Syllabus*According*

Course Name: Heat Transfer Lab

Course Number: 04083243

General Course Information:

Course title	Heat Transfer Lab
Course number	04083243
Credit hours	(0 Hr Theory, 1 Hr practical)
Contact hours	-
Prerequisites/corequisites	Heat Transfer 04083242
Academic Program	Renewable Energy Engineering
Program code	REE
Awarding institution	Isra University
Faculty	Engineering
Department	Renewable Energy Engineering
Level of course	3rd Year
Academic year /semester	2nd 2021-2022
Awarded qualification	B. Sc.
Other department(s) involved in teaching the course	-
Language of instruction	English
Date of production/revision	29 Mar 2022

Course Coordinator:

Coordinator'sName: Dr. Ismail Hdaib
Office No.: 4210
Office Phone: 2486
Office Hours: Su. 13.00 – 14.00
Email: ismail.hdaib@iu.edu.jo

Other Instructors:

Instructor'sName:
Office No.:
Office Phone:
Office Hours:
Email:

Course Description *(English/Arabic)*:

English	Heat Transfer Lab. (1 semester hour) Laboratory course. Applying Conduction, Convection and Radiation concepts to practical applications.
Arabic	مختبر انتقال الحرارة. (1 ساعة فصل دراسي) مقرر مختبر. تطبيق مفاهيم التوصيل والحمل والإشعاع على التطبيقات العملية.

Text Book: ***Author(s), Title, Publisher, Edition, Year, Book website.***

1. Heat Transafer Laboratory Experiments Manual.

References: ***Author(s), Title, Publisher, Edition, Year, Book website.***

Fundamentals of Heat and Mass Transfer - Frank P. Incropera, David P. DeWitt, Theodore L. Bergman, Adrienne S. Lavine - 6th-Edition - Wiley (2006)

Course Educational Objectives (CEOs):

1.	Perform Steady State Conduction (Linear and Radial) Types to investigate thermal conductivity.
2.	Estimate Heat Transfer coefficients in Free and Forced Convection, and correlate with theoretical values.
3.	Demonstrate the Heat Exchangers Types, applications and results.
4.	Illustrate Boiling Heat Transfer application through Boiling Heat Transfer Unit.
5.	Demonstrate Theoretical and Practical Aspects of Condensation.

Intended Learning Outcomes (ILO's):

	Intended Learning Outcomes (ILO's)	**Relationship to CEOs**	**Contribution to PLOs**
A	**Knowledge and Understanding:**		
B	**Intellectual skills:**		
C	**Subject specific skills:**		
C1	Conduct experiments on conduction, convection and radiation of heat; collect data, perform analysis and interpret results to draw valid conclusions through standard test procedures	1, 2, 3,	1, 3, 7
C2	Determine thermal properties and performance of heat exchanger	4,5	1, 3, 7

Weekly Schedule *(please chose the type of teaching)*

■ *(**3 hrs** Face – To - Face)*

□ *(**2 hrs** Face – To - Face**+1 hr** Asynchronous)* **(Hybrid)**

□ *(**3 hrs** Online)*

Week	First Hour (……..)	Second Hour (……..)	Third Hour (……..)	Ach. ILOs	Ach. PLOs	Descriptors*
1	Temperature Measurement and Calibration	Temperature Measurement and Calibration	Temperature Measurement and Calibration	A1	1,2	K
2	Linear Conduction Heat Transfer and Thermal Conductivity.	Linear Conduction Heat Transfer and Thermal Conductivity.	Linear Conduction Heat Transfer and Thermal Conductivity.	A1	1,2	K
3	Radial Conduction Heat Transfer and Thermal Conductivity.	Radial Conduction Heat Transfer and Thermal Conductivity.	Radial Conduction Heat Transfer and Thermal Conductivity.	A1,A2	1,2	S
4	Combined Convection - Radiation Heat Transfer (Free and Forced and Emissivity Effects)	Combined Convection - Radiation Heat Transfer (Free and Forced and Emissivity Effects)	Combined Convection - Radiation Heat Transfer (Free and Forced and Emissivity Effects)	A1,A2	1,2	S
5	Flat Plate Heat Exchanger	Flat Plate Heat Exchanger	Flat Plate Heat Exchanger	A1,A2	1,2	S
6	Concentric Tube Heat Exchanger	Concentric Tube Heat Exchanger	Concentric Tube Heat Exchanger	A2	1,2	S
7	Counter Current and Co-Current Flow Heat Exchangers	Counter Current and Co-Current Flow Heat Exchangers	Counter Current and Co-Current Flow Heat Exchangers	A2	1,2	S
8	Overall Heat Transfer Coefficient and Log-Mean Temperature Difference for Counter Current and Co-Current Flows.	Overall Heat Transfer Coefficient and Log-Mean Temperature Difference for Counter Current and Co-Current Flows.	Overall Heat Transfer Coefficient and Log-Mean Temperature Difference for Counter Current and Co-Current Flows.	A2	1,2	S
9	Revision & Midterm Exam	Revision & Midterm Exam	Revision & Midterm Exam		1,2	C
10	Effect of changes in Hot and Cold Fluid Flow rate on the Temperature Efficiencies and overall Heat Transfer Coefficients	Effect of changes in Hot and Cold Fluid Flow rate on the Temperature Efficiencies and overall Heat Transfer Coefficients	Effect of changes in Hot and Cold Fluid Flow rate on the Temperature Efficiencies and overall Heat Transfer Coefficients	A1,A2 ,B1	1,2	S
11	Boiling Heat Transfer	Boiling Heat Transfer	Boiling Heat Transfer	A1,A2 ,B1	1,2	S
12	Film and Dropwise Condensation Heat Transfer	Film and Dropwise Condensation Heat Transfer	Film and Dropwise Condensation Heat Transfer	A1,A2 ,B1	1,2	K
13	Revision	Revision	Revision	A1,A2 ,B1	1,2	C
14	Final exam	Other Fuel Cells.	Other Fuel Cells.	A1,A2 ,B1	1,2	C

* **K: Knowledge, S: Skills, C: Competency**

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- **(3 hrs Face – To - Face)**
- **(2 hrs. Face – To - Face +1 hr Asynchronous) (Hybrid)**
- **(3 hrs Online)**
- **Course Videos**
- **Practice Labs**
- **Discussion Forums**
- **Quizzes**
- **Other Interactive online activites**

Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Reports, & Quizzes)**20%**
- Midterm**30%**
- Final Exam **50%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to Online Compiles such as:**
  Access to the IU E-Learning Platform at: https://elearn.iu.edu.jo/

Assessment Tools implemented in the course:

Final Exam
Midterm Exam
Quizzes
Practice Labs
Discussion Forums

Program Learning Outcome (PLOs):

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (_____) program will demonstrate		Bloom Taxonomy Levels*
a	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	1
b	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	3
c	An ability to communicate effectively with a range of audiences.	3
d	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	4
e	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	2
f	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	2
g	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	3

***Bloom Taxonomy Levels**

Level#	1	2	3	4	5	6
Level Name	Knowledge	Comprehension	Application	Analysis	Evaluation	Synthesis

Responsible Persons and their Signatures:

Course Coordinator	**D. Ismail Hdaib**	**Completed Date**	**29 / 3 / 2022**
		Signature	

Received by (Department Head)	**D. Zakarya Al Omary**	**Received Date**	**29 / 3 / 2022**
		Signature	