



## Course Specifications: Heat and Mass Transfer MPE271

### 1. Basic Information

<b>Program Title</b>	Biomedical Engineering
<b>Department offering the Program</b>	Biomedical Engineering
<b>Department Responsible for the Course</b>	Mechanical power engineering
<b>Course Title</b>	Heat and mass transfer
<b>Course Code</b>	MPE271
<b>Year/ Level</b>	Level 200
<b>Credit Hours</b>	3
<b>Specialization</b>	Major
<b>Requirements</b>	MPE172
<b>Authorization data of course specification</b>	

<b>Teaching Hours</b>	<b>Credit</b>	<b>Lectures</b>	<b>Tutorial</b>	<b>Practical</b>
	3	2	1	1.5

### 2. Course Aims:

No.	Aims
1	Apply knowledge of engineering concepts to solve fundamental thermal problems.
6	Acquire modern technical awareness and identify patents, regulatory environment, and quality control issues of the thermal problems.

### 3. Intended Learning Outcomes (ILOs):

#### A. Knowledge and Understanding:

No.	Knowledge and Understanding
A <sub>1</sub>	Identify the concepts and theories of mathematics and sciences, concerning the thermal systems related to the heat and mass transfer problems.

#### B. Intellectual Skills

No.	Intellectual Skills
B <sub>1</sub>	Select appropriate mathematical and computer-based methods for modeling and analyzing heat and mass transfer problems.
B <sub>2</sub>	Analyze appropriate solutions for heat and mass transfer problems based on analytical thinking.

#### C. Professional Skills

No.	Professional Skills
C <sub>1</sub>	Apply integrally knowledge of mathematics, science, information technology, design, business context and engineering practice to solve heat and mass transfer problems.
C <sub>2</sub>	Merge the engineering knowledge, understanding, and feedback in a professional manner to improve the thermal systems and designs like designing a heat exchanger.

#### D. General Skills

No.	General Skills
D <sub>1</sub>	Collaborate effectively within multidisciplinary team.

### 4. Course Contents:

No.	Topics	Weeks
1	Introduction to thermodynamics.	1-2
2	Modes of heat transfer	3-4
3	conduction	5-6
4	convection , radiation	7,9
5	Fins	10-11
6	Heat exchangers	12-13
7	Natural convection	14

### 5. Teaching and Learning Methods:

No.	Teaching Method
1	Lectures
2	Case Studies
3	Discussion Sessions

### 6 Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
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1	Extra discussion sessions	To communicate better with them
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### 7. Student Evaluation

#### 7.1 Student Evaluation Methods:

No.	Evaluation Method	ILOs
1	Mid Term Examination	A <sub>1</sub> , B <sub>1</sub>
2	Semester work	A <sub>1</sub> , B <sub>2</sub> , C <sub>1</sub> , C <sub>2</sub> , D <sub>1</sub>
3	Final Term Examination	A <sub>1</sub> , B <sub>1</sub>

#### 7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8
2	Semester work	Every week
3	Final Term Examination	15

#### 7.3 Weighting of Evaluations:

No.	Evaluation Method	Weights
1	Mid Term Examination	15%
2	Semester work	35%
3	Final Term Examination	50%
Total		100%

### 8. List of References

No.	Reference List
1	Kreith, Frank. "Heat and Mass Transfer Mechanical Engineering Handbook." (1999).
2	Bergman, Theodore L., Frank P. Incropera, and Adrienne S. Lavine. <i>Fundamentals of heat and mass transfer</i> . John Wiley & Sons, 2011.
3	.Sissom LE, Pitts D. <i>Schaum's Outline of Heat Transfer</i> , 2nd Edition. McGraw-Hill Education; 2011
4	Lecture notes.

### 9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Sound System
5	Wireless Internet

### 10. Matrix of Knowledge and Skills of the Course:

No.	Topic	Aims	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
1	Introduction to thermodynamics	1	A <sub>1</sub>			
2	Modes of heat transfer	1,6	A <sub>1</sub>			
3	conduction	1,6	A <sub>1</sub>	B <sub>1</sub>	C <sub>1</sub>	
4	convection , radiation	1	A <sub>1</sub>	B <sub>1</sub>		
5	Fins	1	A <sub>1</sub>	B <sub>1</sub> , B <sub>2</sub>	C <sub>2</sub>	D <sub>1</sub>
6	Heat exchangers	1	A <sub>1</sub>	B <sub>1</sub> , B <sub>2</sub>	C <sub>2</sub>	D <sub>1</sub>
7	Natural convection	1,6	A <sub>1</sub>	B <sub>1</sub>		

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**Head of Department: Assoc. Prof. Hossam Eldeen Salah**

**Date of Approval**