COURSE SYLLABUS – ChE 332

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO*	*CREDITS*				
			Th.	*Pr.*	*Tr.*	*Tu.*	*Total*
Heat Transfer	ChE332	هـ كم ٣٣٢	3	--	--	1	3

Pre-requisites:	ChE 331	
Course Role in Curriculum	*Required or Elective:*	Required
	A pre-requisite for:	ChE 435

Catalogue Description:
Modes of heat transfer, steady and unsteady state conduction in different co-ordinates, convective heat transfer with and without phase change. Correlations for forced and natural convection. Analogy between momentum and heat transfer. Heat transfer applications.

***Textbooks*:**
Frank P. Incropera, David P. DeWitt, Theodore L. Bergman, Adrienne S. Lavine, Fundamental of Heat and Mass Transfer Publisher: John Wiley & Sons; 6th Edition, (2012)

***Supplemental Materials*:**
Yunus A. Cengel, Afshin Ghajar, Heat and Mass Transfer: Fundamental and Applications, Publisher: McGraw-Hill, 4th Edition (2010)

***Course Learning Outcomes*:**

By the completion of the course the student should be able to:

1.	**Describe** the meaning of the terminology and physical principles of heat transfer.
2.	**Apply** the three modes of heat transfer to heat transfer problems.
3.	**Use** of the appropriate thermophysical properties or their correlations.
4.	**Solve** heat transfer problems using heat equation.
5.	**Apply** the different heat transfer analogies and correlations.
6.	**Choose** the initial and boundary conditions in heat transfer.
7.	**Analyze** external and internal systems.
8.	**Analyze** free convection heat transfer.
9.	**Interpret**different regimes of boiling and heat transfer in two phase system.
10.	**Design** different types of Heat Exchangers using NTU method.
11.	**Propose** the shell and tube heat exchanger according to the TEMA standards

***Topics to be Covered*:**		***Duration in Weeks***
1.	Introduction	2.5
2.	General heat conduction equation	2.0
3.	Heat transfer from extended surfaces	1.5
4.	External flow convection heat transfer	1.0
5.	Internal flow convection heat transfer	1.0
6.	Free convection heat transfer	1.0
7.	Boiling and condensation	1.5
8.	Heat exchangers and design oriented problems	3.5

Key Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	**an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability**	√
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	**a recognition of the need for, and an ability to engage in life-long learning**	√
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Key Student Outcomes assessed in the course: (c) and (i)

Class Schedule:

- Lecture: three 1.0 hour sessions per week
- Tutorials: one 3.0 hours session per week

Instructor:	Dr. Aqeel Taimoor
Last updated :	January 2015