

Heat Transfer and Thermodynamics

Module Code:	CPE5003-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Chemical Engineering
Subject Area:	Chemical and Process Engineering
FHEQ Level:	FHEQ Level 5
Module Leader:	Professor Adrian Kelly

Additional Tutors:
Dr Michael Honnor

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	48
Tutorials	18
Laboratory	6
Directed Study	124
Examinations DO NOT USE	4

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

To review Thermodynamics as the science of energy conversion; to apply the subject to the analysis of simple processes; to introduce the concept heat transfer; to review mechanisms of heat transfer; to apply the principles of heat transfer to the design of simple heat exchangers.

Outline Syllabus

1. Heat Transfer 1.1 Mechanisms of heat transfer 1.2 Composite wall heat transfer 1.3 HT in Cylindrical coordinates (pipes etc) 1.4 Composite Spherical Annulus HT 1.5 Forced Convection
2. Heat exchanger design 2.1 Shell and Tube HE design 2.2 Plate HE design 2.3 HE networks
3. Second Law of Thermodynamics 3.1 Entropy via temperature - entropy diagrams. 3.2 Reversible and irreversible processes: principle of increasing entropy. 4. Flow processes 5. Cycles

Module Learning Outcomes

On successful completion of this module, students will be able to...

- 1 Apply the fundamental principles of thermodynamics and heat transfer and to the analysis of simple processes.
- 2 Measure and evaluate energy balances.

Apply the principles of heat transfer to the design of heat exchangers.
- 3 Better manage, present and interpret data.

Solve problems systematically using the scientific method.

Learning, Teaching and Assessment Strategy

The basic subject matter is established in lectures and example classes, supplemented by laboratory practicals in relevant areas of thermodynamics, energy balances and heat transfer.

The 'Directed Study' is the number of hours students need to spend on average, in their own time, researching deeper into the subject matter. This would also include reading about the unit operations used in the laboratory and preparing the lab reports.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Laboratory Report	Thermodynamics - 500 wds	0-500 words	15%	No
Summative	Laboratory Report	Heat Transfer - 500 wds. Moderated by peer review	0-500 words	15%	Yes
Referral	Examination - closed book	Supplementary	2 hours	100%	No

Summative	Examination - closed book	Semester 2 - Thermodynamics	1.5 hours	35%	No
Summative	Examination - closed book	Semester 1 - Heat Transfer	1.5 hours	35%	No

Legacy Code (if applicable)

ENG2311L

Reading List

To view Reading List, please go to [rebus:list](#).