Liverpool John Moores University

Title:	Thermodynamics
Status:	Definitive
Code:	**6509USST** (126452)
Version Start Date:	01-08-2021
Owning School/Faculty:	Engineering
Teaching School/Faculty:	University of Shanghai For Science and Technology

Team	Leader
Geraint Phylip-Jones	Y
David Allanson	

Academic Level:	FHEQ6	**Credit Value:**	10	**Total Delivered Hours:**	41
Total Learning Hours:	100	**Private Study:**	59		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	22
Practical	6
Tutorial	11

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	2
Portfolio	AS2	Portfolio	30	

Aims

To introduce the essential principles of Thermodynamics and Fluid Mechanics

Learning Outcomes

After completing the module the student should be able to:

1	Critically analyse the operating characteristics of advanced gas turbine power plants
2	Critically analyse the operating characteristics of advanced vapour power cycles
3	Predict the behaviour of psychometric processes
4	Analyse and appraise the compressible flow of gases and vapours

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3	4
Portfolio	1	2	3	4

Outline Syllabus

Complex gas turbine power plant, multi-stage compression and expansion, exhaust gas heat exchangers and the application of free power turbines with gas generators.

Complex vapour power cycles, reheat, regenerative cycles with open and closed feed heaters. Combine heat and power vapour cycles with process steam bleed off. Use of Mollier chart for steam turbine expansion.

Psychrometry, psycrometric processes and the psychrometic chart. Psychrometic plant such as air conditioning and climate control.

1D Isentropic flows of gases and vapours. Stagnation properties and the use of isentropic flow tables. Normal shock waves and normal shock relationships and tables. Application to nozzles, diffusers and turbines.

Learning Activities

A combination of lectures tutorials and practical sessions

Notes

This module takes an in-depth look into the operation and thermodynamic cycle of engineering plant. The analysis of plant performance is delivered by lectures and tutorials which requires the student to have a fundamental understanding of the principles and how to apply them to practical situations.