MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

16294 (ME218 sem1; ME219 sem2) ENERGY SYSTEMS 1

Module Registrar: Mr C Johnstone cameron.johnstone@strath.ac.uk	**Taught To (Course): Cohorts for whom class is compulsory / elective.**		
Other Lecturers Involved: Dr Daniel Costola	**Credit Weighting: 10 (ECTS 5)**	**Semester: 1 & 2**	
Assumed Prerequisites: None	**Compulsory/ Elective class**	**Academic Level: 2**	**Suitable for Exchange: Y**

Alternative codes and credit values for those taking only one semester:
Semester 1: ME218 Energy Systems 1a [5 Credits]
Semester 2: ME219 Energy Systems 1b [5 Credits]

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	**Total**
20							40	40	100

Educational Aim

This module aims to impart a practical understanding of the heat transfer and fluid mechanics processes underpinning the energy systems we depend on to service the environment we live in and their impact on this. Systems investigated, which include: Energy demand characterisation and energy supply technologies to meet demands; built environmental control systems and new energy solutions developed to mitigate the wider environmental impact; and costs associated with implementation. Demand technologies and analysis methodologies investigated include active and passive Heating Ventilation and Air Conditioning Systems (HVAC), heat recovery systems, heat pumps, embedded clean energy supply technologies, solar and wind together with system performance quantification and demand-supply analysis methods.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 identify the need and environmental performance envelope to be adopted within a user occupied environment.

LO2 evaluate the environmental conditions and energy demands to be maintained and correlate these to appropriate system selection.

LO3 demonstrate awareness of the energy requirements and costs for maintaining environmental conditions at specific levels.

Syllabus

The module will teach the following:

Quantification of the environmental conditions to be maintained. Appraise performance envelopes of active and passive HVAC technologies. Evaluate the energy performance of systems for the different operating conditions. Investigate options for reducing energy used while maintaining specific environmental parameters and system functionality. Processes to be adopted for converting energy more efficiently and cleanly. Correlate these efficient processes to the development and implementation of new, clean technologies being developed and applied within the built environment. Assessment methodologies and tools for undertaking systems performance analysis.

Assessment of Learning Outcomes

Criteria
For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1/LO2/LO3

Each LO requires an understanding of the fundamentals of the energy flow within the built environment, the heat and fluid transfer mechanisms employed by engineering systems to control and regulate energy and environmental parameters, and how these are applied to investigate built environment energy performance.
C1- Demonstrate an understanding of how the laws of thermodynamics and fluid mechanics are applied to the built environment. How these laws are used to investigate engineering cycles through calculations of how environmental properties vary during the cycle, together with the rate of change of energy conversion and transfer.
C2- For a given energy system, demonstrate the ability to select correct energy equations representative of system state and performance and perform calculations to determine how the resulting environmental properties change during a process of control and the resulting variations in the rate of energy transfer.
C3- Be able to perform calculations of heat and fluid transfer and work done for various environmental processes, demonstrating an understanding of how different assumptions are required to determine correct energy and environmental performance for a given energy system.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback
(within Assessment and Feedback Policy at: https://www.strath.ac.uk/professionalservices/staff/policies/academic/)

Please state briefly how these are incorporated in this module.
Students will receive individual Coursework marks 3 weeks after the submission date. The subsequent lecture will review the assignment topics. Feedback identifying positive and negative aspects of overall class response (with respect to the Criteria above) will be given in class. Following this, individual students requiring further feedback will arrange a personal meeting with the lecturer.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams *(individual weightings)*

Examination				**Coursework**		**Practical**		**Project**	
Number	Month(s)	Duration	***Weighting***	Number	***Weighting***	Number	***Weighting***	Number	***Weighting***
				1 (sem1) 1 (sem2)	50% 50%				
*				LO1; LO2; LO3		*		*	

* ***L/Os:*** *Indicate which Learning Outcomes (L01, L02, etc) are to be assessed by exam/coursework/practical/project as required.*

Coursework / Submission deadlines (*academic weeks*):
Semester 1 week 10 and semester 2 week 10.

Resit Assessment Procedures:
Submission of alternate ^^coursework prior to commencement of the July/August exam diet.

^^Students must contact the module Registrar for details as soon as results confirm that a resit is required.

PLEASE NOTE:
Students must gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-assessed prior to the July/August exam diet. This re-assessment will consist entirely of a coursework. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading

No set texts used or recommended for the class. Relevant course material will be provided during lectures or on Myplace through the Reading List.

Additional Student Feedback
(Please specify details of when additional feedback will be provided)

Date	Time	Room No
		Check Myplace for details

Session: 2024/25

Approved:

Programme Lead / Director Signature: Dr A McLaren

Date of Last Modifications: 05/07/2024

(MAE template updated July 2024)

MODULE TIMETABLE

Module Code:	**16294 (ME218/ME219)**	**Module Title:**	**Energy Systems I**

Brief Description of Assessment:

2 Assignments addressing specific course topics. 1 Assignment each for ME218 and ME219.

Assessment Timing

Indicated on the table below are the start/submission dates for each assignment/project and the timing of each exam/assessment.

Please note: Timings could change during unforeseen periods of disruption; this should only be used as a guide.

Semester One	W&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Course work Set	Choose an item. Choose an item.	Choose an item. Choose an item.	Course work Submit	Choose an item. Choose an item.	Choose an item.

Semester Two	C&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Course work Set	Choose an item. Choose an item.	Choose an item. Choose an item.	Course work Submit	Choose an item. Choose an item.	Choose an item.