MODULE SPECIFICATION

Part 1: Information			
Module Title	Mechanical Services		
Module Code	UBLMPB-30-3	Level	Level 6
For implementation from	2019-20		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Architecture and the Built Environment
Department	FET Dept of Architecture & Built Environ		
Module type:	Standard		
Pre-requisites	Applications of Mathematics in Civil and Environmental Engineering 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: See Learning Outcomes

Outline Syllabus: This is an indicative list of what the syllabus will contain. Subjects will not necessarily be taught in this order nor be of equal weighting:

Advanced comfort cooling and air-conditioning systems – system characteristics and classification; psychrometric performance; cooling loads and part-load operation; mixed-mode systems; sustainable cooling using earth-tube, night cooling.

Advanced heating systems – intermittent heating and plant sizing; weather compensation and optimisation control; embedded coil systems; pressurised M/HPHW systems; community and district heating.

Applications of heat transfer and heat recovery – heat transfer; heat exchangers; ‘pinch’ technology; heat recovery technologies; heating/cooling coil performance; evaporative cooling and heat rejection.

Rotodynamic machines – pump and fan characteristics; Euler’s and the ‘Fan Laws’; system matching; series/parallel operation; compressor performance; capacity control; noise control.

Refrigeration – single and multi-stage vapour-compression refrigeration cycles, refrigerants, Carnot efficiency and coefficient of performance, compressors, heat pumps, vapour-absorption refrigeration cycles and applications, capacity control.

Commissioning – design and management issues; measurement of flow, pressure, temperature; flow balancing and regulation; testing and verification; Codes of Practice and 'soft-landings' strategies.

It is intended that, in the teaching and assessment of this module, the above six categories will be given broadly equivalent weighting, i.e nominally 50 learning hours and 5 credits of assessment.

Teaching and Learning Methods: Scheduled learning Weekly lectures to introduce topics define the scope of learning required and provide initial conceptual development. Lectures are followed by two hour-long supervised tutorial/seminar sessions to reinforce and further develop concepts introduced in the lecture and provide feedback.

Supervised tutorials provide guidance in applying quantitative methods required for problem-solving drills, and provide feedback on work completed in laboratory exercises undertaken largely independently, under the supervision of laboratory demonstrators.

Some seminar sessions are included to give students the opportunity to discuss relevant issues and articulate personal perspectives.
Independent learning Directed independent learning in this module includes time engaged with essential reading, completion of tutorial exercise drills, preparation for and subsequent analysis of laboratory investigations, preparation for, and completion of, summative assignment

Activity (hrs)
Contact time: lectures, tutorial & labs (72)
Assimilation and development of knowledge (148)
Exam preparation (40)
Coursework preparation (40)
Total study time (300)

Part 3: Assessment

Being a technical module where students are required to demonstrate key analytical and problem solving skills under time constraints, an unseen exam is deemed to be an appropriate assessment tool for the controlled element.

Students undertake a number of laboratory based investigations during the year using UWE's dedicated facilities. A formal write up of a number of these investigations will demonstrate the attainment of the learning outcomes and promote high standards in technical writing ability.

Assessment:

Component A, Examination of 3 hours duration – 'unseen' questions relating to topics from across the module content

Component B: Coursework Lab experiment reports taking account of the likely inclusion of graphical, quantitative and computer-generated outputs. The assignment requirements will include reporting of specified outcomes for some of the practical laboratory investigation undertaken as part of the course

Formative feedback and preparation for assessment in both components will be undertaken in the programme of scheduled tutorials and seminars.

First Sit Components	Final Assessment	Element weighting	Description
Report - Component B		25 %	Technical report (1500 words)
Laboratory Report - Component B		25 %	Laboratory Report (1500 words)
Examination - Component A	✓	50 %	Examination (3 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		25 %	Technical report (1500 words)
Laboratory Report - Component B		25 %	Laboratory report (1500 words)
Examination - Component A	✓	50 %	Examination - 3 hours

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
Analyse complex engineering plant and systems to solve problems relating to engineering specifications and performance indices	MO1
Describe and appraise procedures for commissioning and managing building services plant and systems	MO2
Discuss practical issues related to achieving effective and energy efficient control of mechanical service systems and evaluate options	MO3
Experimentally investigate the performance of engineering systems, and report outcomes in appropriate forms	MO4
Critically review current research and innovation in the application of mechanical services in buildings	MO5
Discuss best practice regarding the specification of performance criteria to achieve sustainable building services plant and equipment.	MO6
Applicate the design principles behind the theory of room acoustics and evaluate the impact of noise mitigation due to building services.	MO7

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72

	Total Scheduled Learning and Teaching Hours:	72
	Hours to be allocated	300
	Allocated Hours	300
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ublmpb-30-3.html	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: