



Module Specification

Mechanical Services

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Part 1: Information

Module title: Mechanical Services

Module code: UBLMPB-30-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Architecture & Built Environ

Partner institutions: None

Delivery locations: Not in use for Modules

Field: Architecture and the Built Environment

Module type: Module

Pre-requisites: Applications of Mathematics in Civil and Environmental Engineering
2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

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.

Part 3: Teaching and learning methods

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)

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

MO1 Analyse complex engineering plant and systems to solve problems relating to engineering specifications and performance indices

MO2 Describe and appraise procedures for commissioning and managing building services plant and systems

MO3 Discuss practical issues related to achieving effective and energy efficient control of mechanical service systems and evaluate options

MO4 Experimentally investigate the performance of engineering systems, and report outcomes in appropriate forms

MO5 Critically review current research and innovation in the application of mechanical services in buildings

MO6 Discuss best practice regarding the specification of performance criteria to achieve sustainable building services plant and equipment.

MO7 Apply the design principles behind the theory of room acoustics and evaluate the impact of noise mitigation due to building services.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ublmpb-30-3.html) via the following link <https://uwe.rl.talis.com/modules/ublmpb-30-3.html>

Part 4: Assessment

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

Assessment:

Examination - (3 hours)'unseen' questions relating to topics from across the module content. 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.

Laboratory Report - 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. Reports taking account of the likely inclusion of graphical, quantitative and computer-generated outputs.

Report: Technical report relating to acoustics of a given space.

Resit Exam - a similar brief to that described above, with different questions.

Resit Lab Report - a similar brief to that described above, which may include some topic changes.

Resit Report (acoustics) - a similar brief to that described above, which may include some topic changes.

Assessment components:

Examination (Online) (First Sit)

Description: Online Examination (3 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO7

Report (First Sit)

Description: Technical report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO5, MO6

Laboratory Report (First Sit)

Description: Laboratory Report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO4

Examination (Online) (Resit)

Description: Online Examination - 3 hours

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO7

Report (Resit)

Description: Technical report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO5, MO6

Laboratory Report (Resit)

Description: Laboratory report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Building Services Engineering [SHAPE] BEng (Hons) 2023-24

Building Services Engineering [SHAPE] BEng (Hons) 2023-24

Building Services Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

Building Services Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons)
2020-21

Building Services Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons)
2020-21

Architecture and Environmental Engineering [Sep][FT][Frenchay][4yrs] BEng (Hons)
2020-21

Architecture and Environmental Engineering [Sep][SW][Frenchay][5yrs] BEng (Hons)
2019-20

Architecture and Environmental Engineering {Foundation} [Sep][FT][Frenchay][5yrs]
BEng (Hons) 2019-20

Building Services Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs]
BEng (Hons) 2019-20

Building Services Engineering [Sep][PT][Frenchay][5yrs] BEng (Hons) 2019-20

Architecture and Environmental Engineering {Foundation} [Sep][SW][Frenchay][6yrs]
BEng (Hons) 2018-19