



## **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:** 2021-22

**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:** Frenchay Campus, School for Higher and Professional Education

**Field:** Architecture and the Built Environment

**Module type:** Standard

**Pre-requisites:** Applications of Mathematics in Civil and Environmental Engineering 2021-22

**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:**

**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:** 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.

**Assessment components:**

**Examination (Online) - Component A (First Sit)**

Description: Online Examination (3 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO7

**Report - Component B (First Sit)**

Description: Technical report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO5, MO6

**Laboratory Report - Component B (First Sit)**

Description: Laboratory Report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO4

**Examination (Online) - Component A (Resit)**

Description: Online Examination - 3 hours

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

**Laboratory Report - Component B (Resit)**

Description: Laboratory report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested:

**Report - Component B (Resit)**

Description: Technical report (1500 words)

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested:

**Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Building Services Engineering {Top-Up} [Aug][PT][SHAPE][2yrs] BEng (Hons) 2019-20

Building Services Engineering {Top-Up} [Aug][FT][SHAPE][1yr] BEng (Hons) 2019-20

Building Services Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Architecture and Environmental Engineering [Sep][FT][Frenchay][4yrs] BEng (Hons)  
2018-19

Architecture and Environmental Engineering [Sep][SW][Frenchay][8yrs] - Not  
Running MDes 2017-18