

Building Services II

Module Information

2022.01, Approved

Summary Information

Module Code	5500ICBTBS
Formal Module Title	Building Services II
Owning School	Civil Engineering and Built Environment
Career	Undergraduate
Credits	15
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
International College of Business and Technology

Learning Methods

Learning Method Type	Hours
Lecture	45
Off Site	6
Tutorial	15

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	This module introduces the fundamental concepts and principles of pumps, water supply systems, waste water and sanitary conveyance systems and the application of these to engineering problems in the built environment.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Recognise the pumping system, fans and blowers.
MLO2	2	Describe the function, operation of pumps and pumping systems, fans and blowers and compressors and compressed air systems.
MLO3	3	Describe the basics of water supply systems, operation and maintenance of water supply systems.
MLO4	4	Describe the basics of waste water and sanitary conveyance systems.

Module Content

Outline Syllabus	<p>Pumps and Pumping Systems Introduction to pumps; Pump classification: positive displacement pumps - working principle, components; dynamic pumps - working principle, components; Pumping system characteristics : Centrifugal pumps - resistance of the system, pump performance curves, pump best operating point, pump suction performance (NPSH); Assessment of pumps: pump performance evaluation, difficulties in pump assessment; Energy efficiency aspects: pump selection, start/stop control of pump, flow rate control through speed variation, using variable speed drives (VSD), pumps in parallel to meet varying demand, Impeller trimming; Fans and Blowers Introduction to Fans and Blowers; Classification of fans: Centrifugal fans, Axial fans; Characteristics of Centrifugal and Axial fans; Classification of blowers: Centrifugal blowers, Positive-displacement blowers; Fan laws; Assessment of fans and blowers: fan efficiency, fan performance, Methodology of fan performance assessment, Difficulties in assessing the performance of fans and blowers; Energy efficiency aspect: Fan selection, Reducing system resistance, Best Efficiency Point (BEP), Controlling fan air flow; Related maintenance; Compressors and Compressed Air Systems Introduction: Components of Compressed Air Systems; Classification of compressors: Positive displacement compressor - Reciprocating and Rotary compressors; Dynamic Compressors; Assessment of compressors and compressed air systems: Capacity of compressor Compressor Efficiency - Isothermal efficiency, Volumetric efficiency; Performance Assessment of Distribution Losses In the compressed air system - Pressure losses, Leak quantification; Energy efficiency aspect: Location of Compressor, Air intake temperature, Pressure drops, Elevation, Inter and After-Coolers; Pressure setting - Reducing delivery pressure, Compressor modulation by optimum pressure setting, Minimizing leakage, Condensate removal; Components of Water Supply System Sources of water, water treatment, water supply mechanisms, storage facilities, water distribution Basics on Planning and Estimating Components of Water Supply Basic Planning Principles of Water Supply System, Calculate Daily requirement of Water, Estimate Components of Water Supply System Basics on Water Pumping and Distribution Basics on Water Pumping, Pipeline Distribution Networks, Type of Pipe Materials, Type of Valves for Water Flow Control, Types of Pipe Fittings, Basics About Laying of Distribution Pipelines, Installation of Water Meters, Regulatory Requirements Wastewater Collection Wastewater Collection Systems, Regulatory Requirements, Design and Construction of Collection Systems, Storm water management Storm water management systems, regulatory requirements, design and construction of collection systems</p>
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Examination	70	2	MLO2, MLO4
Report	Assignment	30	0	MLO1, MLO3

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Alison Cotgrave	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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