

Site Surveying

Module Information

2022.01, Approved

Summary Information

Module Code	4504ICBTCE
Formal Module Title	Site Surveying
Owning School	Civil Engineering and Built Environment
Career	Undergraduate
Credits	15
Academic level	FHEQ Level 4
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
Practical	15
Tutorial	15

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks

JAN-PAR	PAR	January	12 Weeks
SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	To understand the principles land surveying and setting out: methods of obtaining orientation, the subsequent field measurements for the purpose of producing site drawings and hence the calculation of land areas and earthwork of volumes, setting out points using line-of-sight and satellite techniques, alongside an understanding of the software available. To introduce methods of obtaining orientation and position by intersection and resection. To demonstrate how total stations and GNSS receivers, can capture data for use in software packages to produce contoured plans, sections, areas and volumes.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Demonstrate an understanding of the principles of site surveying.
MLO2	2	Use a range of levels, tapes and total stations to determine distances, heights, angles and coordinates.
MLO3	3	Operate surveying instruments.
MLO4	4	Use gathered data to produce contour plans, longitudinal and cross sections, and to determine areas of land and volumes of earthworks.
MLO5	5	Use standard computer software packages to post-process survey data and deliver appropriate spatially referenced information.

Module Content

Outline Syllabus	<p>The National Grid system of the Ordnance Survey and other coordinate systems. Standard maps and plans, scales and symbols. Linear measurement: errors in using steel tapes, change of standard length, semi-permanent adjustments to Electromagnetic Distance Measurement (EDM) instruments (for temperature, pressure, curvature of the Earth). Safety and Risk Assessment in surveying operations. Vertical Control: Set up, use and adjustment of levelling instruments. Ordnance. Bench Marks and weighting techniques. Accuracy checks. Ordnance Bench Mark (OBM), Temporary Bench Mark (TBM), levelling large areas (grid and radial methods), direct and indirect methods of contouring. Applications: Computation and drawing of contours, longitudinal sections and cross sections. Determination of areas of land and volumes of earthworks. Orientation and Position: Resection and intersection techniques. Setting out: Field positioning of spiral transition curves and parabolic vertical curves on highways; the underground transfer of bearings for tunnels and pipelines. Control of spread of error (working from the whole to the point), procedure for coordinated setting out, appropriate accuracy, procedures and practices for setting out ground works, upper floors, road construction, drainage and sewerage works, embankments and cuttings. Angular measurement: errors and methods for reducing errors, reduction of angular measurement, horizontal and vertical angles, computation of true horizontal length (from slope distance and angle of inclination). Distinction between open, link and closed traverse: traverse for area control, factors affecting choice of traverse stations, whole circle bearings, distinction between grid, true and magnetic north, coordinate system, Ordnance Survey (OS), grid references, angular closing error and correction, Bowditch correction for misclosure errors. Electronic and laser instruments: electronic reading levels, electronic logging of field data, laser construction levels, laser alignment levels, EDMs, Global Positioning Systems (GPS), digital terrain modelling. Raw data and translation for cartographic detail/setting out: levelling, plotting contours by graphic interpolation, plotting of cross-sections from contoured plans, area measurement (manual, mechanical, electronic methods), Setting out: computation of deflection angles, distances for coordinated setting out. Surveying computer software: software for capturing data in the field, dedicated software for setting out, built-in capabilities of total station instruments, commercial software and programmed spreadsheets to facilitate repetitive surveying calculations, Geographical Information Systems (GIS) and OS digital data.</p>
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Investigative Report	50	0	MLO2, MLO3, MLO4, MLO5, MLO1
Exam	Practical Exam	50	1	MLO1, MLO2, MLO3, MLO4, MLO5

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Karl Jones	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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