Module Code:	AUR537

Module Title:	Digital Technologies in Surveying

Level:	5	Credit Value:	20

Cost Centre(s):	GABE	JACS3 code: HECoS code:	K190 (ADT) K220 (CM) 100122 (ADT) 100149 (CM)

Faculty	FAST	Module Leader:	Louise Duff

Scheduled learning and teaching hours	48 hrs
Guided independent study	152 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
BSc (Hons) Architectural design and Technology	✓	☐
BSc (Hons) Construction Management	✓	☐

Pre-requisites

Module Aims
This module is designed to develop skills in using modern surveying equipment to carry out a range of typical site surveying procedures in the construction and built environment sector. The module provides an opportunity to develop an understanding of the principles of site surveying, as well as providing an understanding of the skills required to perform surveying calculations and control. This module will also provide an understanding of the software available to facilitate data exchange, for a range of uses in construction.

Intended Learning Outcomes
Key skills for employability

KS1   Written, oral and media communication skills
KS2   Leadership, team working and networking skills
KS3   Opportunity, creativity and problem solving skills
KS4   Information technology skills and digital literacy
KS5   Information management skills
KS6   Research skills
KS7   Intercultural and sustainability skills
KS8   Career management skills
KS9   Learning to learn (managing personal and professional development, self-management)
KS10   Numeracy

At the end of this module, students will be able to	Key Skills	
1	Understand the principles of site surveying - explain the use of electronic surveying instruments appropriate for differing surveying tasks	KS1	KS2
		KS6	KS4
		KS10	
2	Be able to use modern site surveying instruments and provide traverse and other control calculations for instruments which may include Total Stations, GNSS RTK rover, Scanners and Drones.	KS2	KS5
		KS3	KS10
		KS4	
3	Understand the software available for site surveying and demonstrate how survey data is exported to formats suitable for design packages and project management tools.	KS1	KS5
		KS4	KS6
		KS10	

Transferable skills and other attributes

- Students will be guided to utilise modern surveying equipment such as Total Stations, GNSS RTK rover, Scanners and Drones which may well have other applications;
- Students will understand the importance of accuracy checks;
- Students will appreciate the importance of surveying to various construction industry projects.

Derogations

None	

Assessment:

Indicative Assessment Tasks:

The assessments will be provided through coursework, forming a portfolio of evidence, relating to the undertaking of a group practical closed traverse topographical survey, using a variety of instruments. The practical assessment and portfolio will provide evidence of individual calculations demonstrating correction methods, accuracy, errors and appropriate data management.

Where group tasks are detailed, students will be provided with an individual marking criterion.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration or Word count (or equivalent if appropriate)
1	1, 2, & 3	Practical	100	4000 words

Learning and Teaching Strategies:

There will be a combination of approaches used:

A series of key lectures will provide the students with the necessary underpinning knowledge and appreciation of the theory of traverse surveys, corrections and errors.

Practical instruction sessions in the use of relevant equipment will encourage application of theory to practice and key lectures will impart relevant surveying theory and techniques.

Learners will in general work individually but group work will be required for practical surveying work.

IT workshops will be facilitated to explore and utilise computer software such as PIX4D, AutoCAD, Revit, etc.

Syllabus outline:

The lectures will include:
- Open, link and closed traverse for area control;
- Calculations for whole circle bearings;
- Coordinate systems;
- Grid references;
- Angular closing error and correction;
- Electronic plotting of traverse surveys;
- Practical use of electronic and laser instruments to include:
- Total Stations;
- Global Positioning Systems (GPS);
- Scanners and drone application to produce and check topographical survey.
- Raw data and translation for cartographic detail;
- Use of OS digital data;
- Drone and scanner technology and software.

Indicative Bibliography:

Essential reading

Uren, J. and Price, W. (2010), *Surveying for Engineers. 5th Ed.* Basingstoke: Palgrave Macmillan.

Irvine, W. (2005), *Surveying for Construction.* London: McGraw Hill.

Other indicative reading:

The equipment and software provider's websites, as indicated during the module.

Other sources:

Chartered Institute of Architectural Technologists www.ciat.org.uk

Chartered Institute of Building www.ciob.org.uk

Institute for Civil Engineering www.ice.org.uk

Royal Institute of British Architects www.architecture.com

Designing Buildings Wiki www.designingbuildings.co.uk

Other sources:

IHS Database www.ihsti.com