Liverpool John Moores University

Title:	ADVANCED SURVEYING
Status:	Definitive
Code:	**6028BEUG** (102808)
Version Start Date:	01-08-2016
Owning School/Faculty:	Astrophysics Research Institute
Teaching School/Faculty:	Astrophysics Research Institute

Team	Leader
Nick Eden	Y

Academic Level:	FHEQ6	**Credit Value:**	12	**Total Delivered Hours:**	63
Total Learning Hours:	120	**Private Study:**	57		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Off Site	24
Tutorial	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Unseen: essay and computational questions	60	3
Report	AS2	Assignment and report on fieldwork.	40	

Aims

To develop further the use of total station surveys and software packages, more rigorous statistical methods for survey adjustments, to introduce GPS as a means of constructing maps and to introduce data bases for Graphical Information Systems (GIS).
To introduce global datum and coordinate systems and their use in map projections,

and further consider orientation and positioning by satellite techniques.
To consider the management of control networks and the specification of surveying work.
To outline the basic principles of terrestrial and aerial photogrammetry and remote sensing.
To introduce the use of surveying techniques for precise measurement.

Learning Outcomes

After completing the module the student should be able to:

1 Obtain field and office data to produce digital ground models (DGMs) and enhance the data base so formed using computer aided design (CAD) packages; use GIS packages.
2 Apply the principle of least squares to the adjustment of survey observations.
3 Use Global Navigational Satellite Systems (GNSS) and associated datum and coordinate systems to establish control points and obtain maps using the various types of projections available.
4 Process aerial/terrestrial photographs and recognise features from satellite imagery.
5 Evaluate the specification for a survey operation and propose measures for the effective and safe management of survey operations including control networks.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	2	3	4	5	
REPORT	1	2	3	4	5

Outline Syllabus

Survey software: the field measurements and coding systems to produce DGMs using a range of computer software packages. The use of CAD to enhance the drawings produced, and compute longitudinal and cross sections and volumetrics. The GIS packages available and the formation of data bases within them.
Error theory: the adjustment of survey measurements using the principle of least squares; error ellipses and the use of computers to adjust survey data.
Global systems: the use of global datum and coordinate systems, transformations between systems, satellite techniques using GPS.
Map projections: the various map projections available, the Transverse Mercator Projection (TMP) as used with Airy's Spheroid for the UK National Grid system. Global geodetic systems and their relationship to national mapping.
Remote sensing: an introduction to aerial and terrestrial photogrammetry, measurements on the photographs, recognition of features on remote sensing images.
Establishment and management of geodetic control networks.
Surveying techniques for the measurement of structural and geotechnical

movement.

Learning Activities

Lectures, tutorials, practical fieldwork.

Notes

A detailed study of advanced land surveying techniques including the production of digital ground models, enhanced CAD drawings and design, adjustments of observations using the principle of least squares, satellite surveying using Global Navigational Satellite Systems, map projections and basic remote sensing and photogrammetrical methods and the use of GIS in Civil Engineering.