

Teaching of Surveying in JBM Accredited Degree Programmes

Context

Geomatics is a discipline that integrates the collection, processing, analysis, presentation and management of spatial information. It is thus an all embracing term that includes the subjects of land surveying, setting-out, geodesy, photogrammetry, engineering surveying, hydrographic surveying, mine surveying and cartography together with the recently developed disciplines of geospatial information systems and remote sensing.

The geomatics subjects most commonly taught as part of a JBM accredited degree programme are 'land surveying' and 'setting-out', commonly referred to collectively as 'Surveying', as will be done in the remainder of this guideline.

The JBM has confirmed that Surveying continues to be a core component of its accredited programmes at both CEng and IEng level. For MEng and BEng(Hons) programmes there is an expectation that the fundamentals of Surveying are covered in a programme even when it is not one of the five core subjects. Surveying is a compulsory core unit for IEng degree programmes.

Surveying is one of a few subjects where practical skills are covered in a degree programme, offering both hands-on and teamworking skills, and employers have an expectation that all student engineers and graduates will have a basic knowledge of the subject together with some practical competence.

The purpose of this guideline is to outline the minimum coverage that the JBM would expect to see under the surveying subject heading of a degree programme. Individual departments are obviously free to develop any of the geomatics subject areas to a level considered suitable for their own programmes.

Aims

Through their studies of Surveying in one or more modules, the JBM expects students to gain:

- an understanding of the significance and limitations of spatial information and dimensional control for civil engineering design and construction;
- an understanding of the means by which spatial information is collected, processed and used in practice; and
- theoretical knowledge and practical skills necessary for employment as a junior engineer involved with surveying or setting-out on a construction project.

Knowledge and Understanding

On successful completion of the module(s) students should have a knowledge and understanding of:

- the use of spatial information in design and construction projects;
- the means of obtaining spatial information including specification of surveys, procurement and administration of surveys;
- surveying instruments commonly used on construction projects;
- basic techniques used for survey control, detail surveys and setting-out;
- practical surveying and setting-out procedures;
- observational errors and dimensional control;
- information and services provided by the Ordnance Survey;
- survey standards and specifications;
- the use of survey data in design practice including receipt, manipulation and checking of data prior to use; and
- health and safety regulations in the context of data collection and setting out on site.

Intellectual Abilities

On successful completion of the module(s) students should be able to:

- explain the principles and techniques involved in establishing control, detail surveying and setting-out on site;
- specify principles and methods used to measure spatial elements (i.e. coordinates, directions, distances, height differences);
- outline the nature of observational errors and apply error propagation;
- explain the role of standards and specifications in surveying and setting-out;
- perform relevant survey calculations;
- explain the use of spatial information in design and construction projects; and
- outline the means of obtaining spatial information in practice.

Practical Skills

On successful completion of the module(s) students should be able to:

- demonstrate practical skills necessary to use surveying instruments commonly employed on construction projects for surveying and setting-out;
- use relevant data processing and survey adjustment software;
- present field records and derived data in a clear professional manner; and
- use survey data effectively in design work.

General Transferable Skills

On successful completion of the module(s) students should be able to:

- work as a team member; and
- present technical information in a variety of ways (oral, written, graphical).

Method of Teaching, Learning and Assessment

Delivery of the module(s) should preferably be through a mixture of lectures, tutorials and practical work. The practical aspect of the module(s) is considered to be very important and should be through regular practical sessions and/or (preferably) a residential field course.