3A1 Engineering Surveying [5 credits]

Lecturer(s): Asst. Prof. John Gallagher [j.gallagher@tcd.ie]

Module organization

<table>
<thead>
<tr>
<th>Semester</th>
<th>Start week</th>
<th>End week</th>
<th>Associated practical hours</th>
<th>Lectures</th>
<th>Tutorials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Per week</td>
<td>Total</td>
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<tr>
<td>2</td>
<td>1</td>
<td>11</td>
<td>18</td>
<td>3</td>
<td>33</td>
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Total contact hours: 62

Module description, aims and contribution to programme

Engineering surveying is a single semester module that will help you gain a foundation understanding of the principles of surveying, intermediate knowledge of the methods and procedures used on site, and hands-on familiarity with a full range of surveying instruments and equipment.

This module will give students the ability to design and manage surveying projects in a wide range of contexts and environments. Students will gain an appreciation of the importance of accuracy and precision when translating detailed plans when setting out any civil engineering project. This will include addressing the challenges faced for surveyors working in different construction environments, and consider the impact of design changes during project development.

This practical work will be grounded by mathematical theory of analyzing for possible errors that may occur in both surveying instrumentation and the methods used.

Learning outcomes

On completion of this module the student will be able to:

1. Design and organize a survey, including estimation of probable errors
2. Carry out reconnaissance of an area to establish best possible methods to be used
3. Perform instrument checks to ensure they meet specifications
4. Carry out basic surveying techniques
5. Map survey coordinates using GIS software
6. Analyse, report and where appropriate distribute the survey errors

Module content

The module covers the following topics

- Linear Measurement
- Levelling
- Angular Measurement
- Total Stations
- Setting Out
- Horizontal & Vertical Curves
- GPS
- Mapping and Modelling using mapinfo
**Teaching strategies**

During the practicals the students work in teams to carry out basic engineering tasks that would be encountered in a surveying team. These tasks are designed to enable hands-on work with the range of surveying equipment and accessories covered during the lectures:

- Levels: Level survey
- Theodolites: Theodolite traverse
- Totals Stations: Total station traverse, detail survey
- GPS Survey: Using a GPS to conduct a survey
- GIS assignment

Each practical requires submission of a report containing tabular result, sketch, error reporting, and commentary on the methods used.

**Assessment**

The assessment for this module will consist of three parts:

Part 1: The written exam comprises 70% of the year assessment.

Part 2: Practical reports for each practical demonstration will assess your understanding and allow you to demonstrate your professional writing skills. These assessments contribute to 15% of the final module grade. Each assessment should include sections on (i) the scope and purpose of the practical, (ii) results and analysis, and (iii) conclusions.

Part 3: A practical laboratory exam is carried out at the end of the year to assess individual familiarity with basic instruments, level, theodolite and total station. This assessment will contribute to the final 15% of your module grade.

**Required textbook**

*Uren & Price, Surveying for Engineers, Palgrave Publ.*

**Other Relevant textbooks**

*W. Schofield, Engineering Surveying, 5th Ed., Elsevier Publs Banister, Raymond & Baker*


**Further information**

School of Engineering weblink.