



**THE SURVEY**  
**ASSOCIATION**

**TSA Surveying Course**  
**with ProQual Level 3 Diploma in Engineering Surveying**

**COURSE DETAILS**

Held at:

**The Survey School**  
**Waterworks Road**  
**Worcester WR1 3EZ**

**Telephone: 01905 26329**  
**Email: [office@surveyschool.org.uk](mailto:office@surveyschool.org.uk)**

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**Website:** [www.tsa-uk.org.uk](http://www.tsa-uk.org.uk) Reg No: 1452116 VAT Reg No: 243 0710 04

## TSA Surveying Course with ProQual Level 3 Diploma in Engineering Surveying

The TSA Surveying Course has been created specifically for the development of new entrants into the Geomatics industry, or those with experience but no formal training.

It is now run alongside the ProQual Level 3 Diploma in Engineering Surveying.

### **IT IS INTENDED TO BROADEN THE STUDENT'S PRACTICAL EXPERIENCE AND TO SUPPLEMENT THE THEORETICAL EXPERIENCE GAINED FROM THEIR EMPLOYER.**

Emphasis is placed on the provision of technical knowledge to enable the execution of surveying tasks within the workplace.

The overall aim is to enhance the contribution each student will make to their Employer's organisation, and for the students to achieve a recognised qualification and become competent Survey Technicians.

Graduation (passing all six blocks) from the course will fulfil 100% of the academic requirement for those wishing to upgrade from Student to Technical membership of Chartered ICES. The student also requires 3 year's relevant experience, a detailed CV, detailed experience report, 1 years' worth of CPD reports and a completed Principal Sponsor Form.

Completing the TSA Surveying Course, plus proof of two years of relevant experience (which can include pre-course experience) also meets the RICS eligibility requirements to apply for Associate (AssocRICS) assessment.

The TSA Course is now run alongside the ProQual Level 3 Diploma in Engineering Surveying. This provides a successful candidate with a recognised qualification and standard which is recognised by CSCS. Although this will be registered and billed separately, it requires minimal additional effort for a candidate completing all six blocks.

#### **Concept**

- The course is broken down into six two-week blocks spread over two years
- As both the course and student's experience progress, a broader spectrum of subjects is covered in greater depth
- Theory is taught as an aid to understanding the principles behind the practical application
- Mathematical skills are taught as appropriate to the practical applications in each block

#### **Course material**

The material produced is intended for course use and as an aide memoir to the subjects covered. It is also a reference for general surveying; it is not meant to be a substitute textbook or an exhaustive coverage of the subject.

#### **Technology**

Surveying technology is constantly changing and new hardware and software solutions are regularly being introduced to the work place. It is the aim of this course to inform students of the latest developments and to outline what is now possible and what will soon be possible. Recent developments in GNSS, SUAV's and in Laser scanning are typical examples.

It is neither practical nor desirable to demonstrate every different type of Total Station, GNSS system or software solution. The aim of the course is to illustrate, using modern industry standard instruments and programs, how to achieve the survey aims set out in each of the blocks.

To demonstrate first principles, basic equipment will be used with methods that ensure the student understands what is happening and is not just a button presser with no understanding of the workings of the black box.

#### **Aims and Outcomes**

Students will be encouraged to share their experiences and methods of working which will contribute to the body of knowledge and be of mutual benefit to all the students

Set out below are the main aims and expected learning outcomes of the six blocks. These complement the initial course overview and the individual block synopsis.

## Block Details

### 01 INTRODUCTION TO SURVEYING AND COMPUTATIONS

**Aim:**

To teach basic measurement skills for the control of a small topographical survey. Have an appreciation of scale and specification and to convey an understanding of numerical and mathematical techniques, which underpin surveying, and in particular basic trigonometry. Gaining sound principles from the understanding of historical measurement methods. Understand and know how to apply identify the relevant Health & Safety precautions required.

**Outcome:**

1. To be able to use a total station, level and tape with confidence and carry out basic collimation and two peg tests.
2. Have a good knowledge of observing, booking and calculation techniques.
3. Be able to deal with problems using a mathematical approach and a hand held calculator.
4. Have a clear understanding of scale, accuracy, precision and checking.
5. Understand Health & Safety requirements relevant to a typical topographical land survey.
6. Write a spreadsheet to calculate and adjust levelling.

### 02 CONTROL AND DETAIL SURVEYING

**Aim:**

To be able to carry out a small topographical survey in the urban or rural environment with an appreciation for the requirements of specification, scale and the presentation of features in both plan and height. To understand the requirements of monitoring surveys. Be able to confidently compute and adjust a Traverse by a variety of methods. Calculate triangles of any shape. Create contours and sections across the survey. Understand the importance of prism constants and atmospheric correction in distance measurement.

**Outcome:**

1. To be able to use modern Total stations and digital levels in an applied manner.
2. Know how to acquire, compute, analyse and present survey data both by hand and by computer software.
3. The able to compute a triangle using both the sign or and cosine rules.
4. Be able to utilize traversing, polar radiation, Stadia tachometry and chain surveying methods.
5. Be able to survey and plot a simple topographical section.
6. Interpolate contours manually and by computer.
7. Use a digital level observe and present a monitoring survey report
8. Carry out a test for prism constant and apply atmospheric corrections to distances.



## 03 PROJECTIONS, GRIDS AND GNSS

Aim:

To have an understanding of basic projections, grids and the shape of the earth, and how working on a curved earth effects surveying. To be able to understand the equipment and methods used in GNSS and photogrammetry. Have a knowledge of other types of intersection and resection survey calculation, and to know how they can be applied manually, in the instrument and graphically.

Outcome:

1. To be able to use GNSS and digital surveying equipment in an applied manner.
2. Know how to provide survey data for other users.
3. Solve problems and choose the best surveying method for solving these problems.
4. Be aware of the capability and limitations of photogrammetry and GNSS surveying.
5. Be able to observe and compute intersection and resection.
6. Use co-ordinates in both a local plane grid and the OS National grid with scale factor
7. Identify points suitable for photo control and plan a theoretical photography sortie.

## 04 SPECIALIST SURVEYS - MEASURED BUILDING, LASER SCANNING, HYDROGRAPHIC, AND UNDERGROUND SURVEYING

Aim:

Develop understanding of the role of laser scanning in measured building surveys. Introduce practical laser scanning workflows and procedures. Provide an overview of inshore hydrographic surveys, including harbour, lake, and river environments. Develop understanding of the principles of surveying underground features, including associated risks and access implications. Highlight the additional health and safety considerations associated with building, underground, and water-based surveys.

Outcome:

1. Carry out a simple measured building survey, both uncontrolled and fully controlled.
2. Present survey data accurately in plan, elevation, and section, including calculated floor areas.
3. Understand the principles of laser scanning and point cloud data requirements.
4. Undertake a practical laser scanning workflow exercise.
5. Demonstrate theoretical understanding of inshore hydrographic surveys and river cross-sections.
6. Demonstrate understanding and appreciation of surveying underground features.
7. Identify and assess additional health and safety risks associated with working within buildings, underground environments, and on or near water.

## 05 CONSTRUCTION AND ENGINEERING SURVEYS

Aim:

To acquire and apply specific detailed survey knowledge to the engineering and construction industry in both surveying and setting out, with an appreciation of the different constraints and pressures in a dynamic environment. Be able to conduct simple engineering surveying and setting out tasks with confidence and have the ability to make, and check calculations and the points set out. Understand the role of tolerances. Be able to upload and download survey and setting out information from the Total station.

Outcome:

1. Set out Locations for buildings, structures, roads and drainage.
2. Set out grids, gradients circular curves and vertical curves by co-ordinates, "bearing and distance" and reference line offset methods.
3. Use a tape, level and staff and total station for setting out and checking work.
4. Use both the internal programs on the total station and hand calculations for this.
5. Conduct "As Built surveys" and compare them against the original design.

## 06 SURVEY MANAGEMENT, COMPUTER PROCESSING & SURVEYING UNDERGROUND UTILITIES

Aim:

To understand the planning behind survey tasks, dealing with the survey team, the client and the public. To be able to read and produce a job specification and a job report and estimate the time for a topographic survey. To consider the organization and management of a commercial survey company.

Be able to observe and calculate of volumes.

To appreciate and practice the use of computer solutions in the manipulation and presentation of three dimensional and attributed data for GIS and Industrial metrology.

Be confident in presenting ideas to others and be able to see how to advance ones career by joining a professional body. Be aware of the requirements for a surveyor acting as an expert witness in a legal survey dispute and in providing information for the Land Registry.

To have a theoretical and practical understanding of undertaking underground utility surveys specifically to the PAS-128: 2022 Specification for underground utility detection, verification and location.

Outcome:

1. Be able to survey data for 3D models.
2. Observe and compute areas of land for sub divisions cut and fill volumes.
3. Be familiar with the methods required for complex data capture and presentation for GIS Systems.
4. Produce a method statement risk assessment and specification
5. Write a survey program assist in the planning and management of a survey project.
6. Give a short presentation to the class
7. Write a spread sheet to calculate and adjust a traverse.
8. Hear from speakers on GIS, industrial metrology and legal surveys.
9. Understand the specification of the PAS-128:2022 specification for surveying underground utilities
10. Carry out simple underground utility tracing using radio detection, ground penetrating radar, and visual inspection

## Assessment

During each block the students have assessed, class exercises which will accurately chart their achievement against the block aims. There is also a formal written examination taken by the student at the end of each block.

The results of these assessments will highlight both strengths and limitations, and are provided to the employer as a written report at the end of each block. Students are also able to discuss the results of the assessments, assignments, and their work in general during the block.

## Assignments

At the end of **Blocks 1 to 5**, the employer will receive details of the *work experience* assignment tasks.

Students must complete each assignment **before the start of the next block** and submit it **by 12:00 midday on the first Friday** of that block.

### Late submission policy:

- Submissions received after the deadline will incur a **10% grade deduction**.
- Failure to submit may result in removal from the course.

Marked assignments are an essential part of the programme. They reinforce concepts learned, develop technical skills, and contribute to overall competency. Employers and mentors are encouraged to assist and support students in completing this work where needed.

### Assignment Overview

#### Block 1 – Traverse Survey

- Observe and compute a **four-leg traverse** on a local grid.
- Level the traverse and compare trigonometrical heights with levelling results.
- Produce detailed station descriptions.

#### Block 2 – Control & Detail Survey

- Observe and compute a **triangle of control** by trilateration.
- Capture detail using:
  1. Chain survey
  2. Stadia radial detail with level and staff
  3. Total station measurements
- Combine all three datasets into a single drawing on a site survey grid.
- Add contours and prepare a long section across the survey area.

#### Block 3 – Intersection & Resection

- Fix two new stations by both **intersection** and **resection** from four known control stations.
- Compare and analyse the results from each method.

#### Block 4 – Building Survey

- Conduct a measured building survey of **two floors**.
- Produce:
  - Floor plans with net internal areas
  - One cross-section
  - One elevation

#### Block 5 – Housing Estate Set-Out

- Plan a theoretical housing estate on a given plot using a supplied site survey.
- Describe:
  - The method of surveying the plot
  - The process for setting out a new road with horizontal and vertical curves
  - How to set out a house, including drainage to the new road

## Graduation and Awards

At the end of the course there will be a Graduation and Award Ceremony with the presentation of prizes for the students in that year group.

The 6 exams make up for 40% of the final marks. The 6 sets of class work make up 20% of the final marks. The 5 assignments make up the final 40% of the final marks.

Student with an overall score of 85% or more gain a distinction, those with 75% or more a merit and the Pass mark is 50%.

There is a prize awarded to the best student of the year group by The Survey Association and Hexagon/Leica Geosystems.

A prize is also awarded for the best assignment, by the Chartered Institution of Civil Engineering Surveyors (ICES).

There is a third prize awarded by The Survey Association Vice President that recognises a student that has demonstrated exceptional determination and perseverance. This award honours a student who faced challenges but showed unwavering commitment and resilience, ultimately succeeding in completing the course.

## Fees

	<b>TSA Member</b>	<b>Non- Member</b>	<b>CICES Member</b>
<b>TSA Surveying Course</b>			
Cost per Block (exc. VAT)	£1,200.00	£1,595.00	£1,435.00
3 Blocks Paid in Advance (Discounted)	£3,300.00	£4,560.00	£4,107.00
<b>ProQual Level 3 Diploma*</b>			
Per Student (exc. VAT)	£565.00	£1,090.00	N/A
*Administered by CSTA Global Limited			

**All prices are net of VAT**