



# FIG WORKING WEEK 2023

28 May - 1 June 2023 Orlando Florida USA

Protecting  
Our World,  
Conquering  
New Frontiers

Presented at the FIG Working Week 2023,  
28 May - 1 June 2023 in Orlando, Florida, USA

## Past, Present and Future of the Land (geo) Surveying Education at Technological University Dublin (12049)

TS08F. BLENDED LEARNING: GOOD PRACTICES AND LESSONS  
LEARNED

Eugen Nicolae and Alain Chenux (Ireland)



Organized By



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*Protecting Our World, Conquering New Frontiers*



BOLTON STREET TECHNICAL INSTITUTE.

Bolton Street 1911



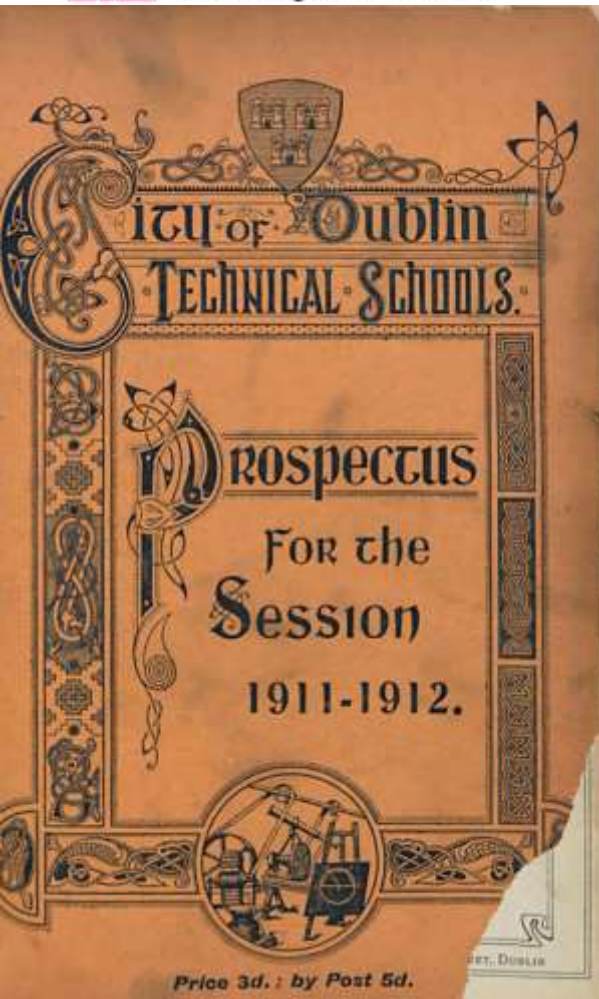
Bolton Street 2023



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TIME TABLE—continued.

	No. of Room.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
<b>MATHEMATICS.</b>						
Mathematics, Stage 3	B 4	7.30—9.35	..	..	..	7.30—8.30
Mathematics, Stage 5	B 4	..	..	7.30—9.35	..	8.35—9.35
Mathematical Physics, Elementary	B 3	..	7.30—9.35	..	..	..
Advanced	B 2	..	..	..	7.30—9.35	..
<b>MECHANICAL ENGINEERING.</b>						
Engineering, Junior	.. A 3	..	7.30—9.35	..	..	..
Technical Drawing, Class A.	A 3	7.30—9.35	..	..	..	..
Technical Drawing, Class B.	A 3	..	..	7.30—9.35	..	..
Practical Geometry, ..	A 3	..	..	..	..	7.30—9.35
Machine Drawing, ..	A 3	..	..	..	7.30—9.35	..
Applied Mechanics, Elem.	B 4	..	7.30—8.30	..	..	..
Heat Engines, Elem.	B 4	..	8.35—9.35	..	..	..
Surveying ..	C 10	..	8.30—9.35	..	..	..
Aeroplane Modelling	.. C 10	7.30—9.35	..	7.30—9.35	..	7.30—9.35

**SURVEYING.**

Teacher :  
**M. O'SULLIVAN.**

**Tuesday, 8.30 to 9.35.**

Arrangements for practical work are to be made at suitable times.

**CHAIN SURVEYING.**—Setting out eight angles with the chain, and the Optical Square. The chaining of lines on sloping ground by stepping, and by aid of the Abney level. Keeping the Field Book. Plotting the Survey. Area from plan and from Field Book notes.

**COPYING PLANS.**—Enlarging and reducing.

**COMPASS SURVEYING.**—Traversing with the Compass and Chain. Closing the Traverse by distributing the error. Use of the Circumferentor.

**BOX-SEXTANT.**—Construction and adjustment of the horizon glass. How to use the Box Sextant in Traversing and in Triangulation.

**THEODOLITE SURVEYING.**—The construction: the adjustment, temporary and permanent of the Theodolite. How to use the Theodolite in traversing, and to make a Theodolite survey from a given base line. Measuring base line accurately. Plotting of Theodolite Survey.

**LEVELLING.**—The Dumpy Level. Its construction. The adjustment, temporary and permanent of the Dumpy Level. Method of keeping the Level Book. Setting out of drains at definite slopes. Construction of Contour Maps. Curve Ranging.



## COURSE IN LAND SURVEYING AND LEVELLING.

The Course is intended to give a sound theoretical and practical knowledge of Surveying, to give facility in the use of the various instruments, in plotting surveys, and in making finished plans. It will be found of service to Engineers' and Architects' assistants, Auctioneers, Land Agents, and others, as well as for the examinations of the Surveyors' Institute, the Institution of Civil Engineers, the Auctioneers' Institute, etc. It also covers much of the work required for the various foreign examinations for surveyors.

The course will comprise *eighteen* lectures and *ten* practical demonstrations—some devoted to field work, and some to office work. The dates and places for the field work will be announced in class as the course proceeds.

All apparatus and instruments for field work are provided by the Schools, but students must provide their own plotting scales, survey book, level book, drawing instruments, and materials.

### PROGRAMME AND TIME TABLE

OF THE  
SCHOOL OF ARCHITECTURE

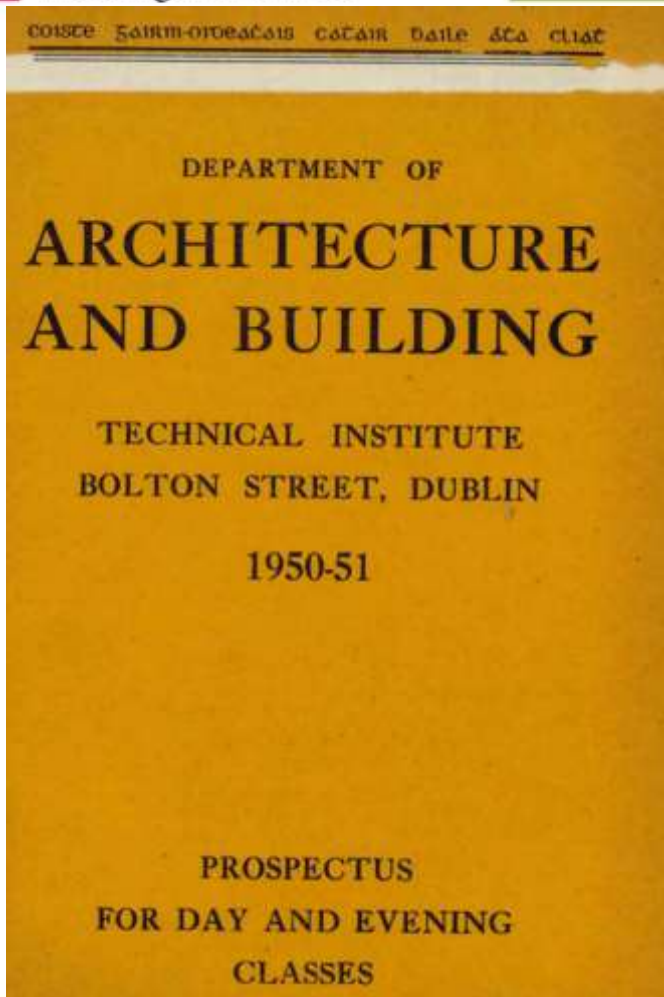
AND  
BUILDING TRADES

FOR THE  
SESSION 1923-24.

### SYLLABUS.

*Surveying with the Chain*: object in making a survey—apparatus used: chain arrows, rods, etc.—testing chain for length—measures of length and area. *Simple Surveying Operations*: ranging a line, fixing position of a point relative to a line, setting out a perpendicular to a line, connecting points invisible from one another—optical square. *Chaining*: duties of leader and follower—chaining on slopes—stepping—clinometer. *Simple Surveys*: stations—main lines—triangles, well and ill conditioned—offsets—offset rod—methods of dealing with fields, town plots and small estates of regular or irregular outline, obstacles, such as buildings, lakes, rivers. *Booking the Survey*: forms of field book—methods of entering the notes—conventional signs. *Magnetic Compass and Magnetic Bearings*: variation of the compass—prismatic compass. *Traversing with Chain*: setting out curves. *Levelling*: instruments employed; level—construction of telescope—level staff—Abney level—clinometer—aneroid barometer. *Simple and Compound Levelling*: bench marks—datum line—curvature of earth—refraction. *Methods of booking levels*: rise and fall methods—collimation method—reduction of levels and method of checking—check levels. *Sections*: cross sections and longitudinal sections—working sections. *Plotting Sections*: horizontal and vertical scales—information required on the plotted section. *Principles of Contouring, Permanent Adjustments of Level*: office work—scales—meaning of representative fraction—scales used on ordnance plans—plotting scales. *Materials required*, such as brushes, colours, instruments—plotting the field notes—mode of procedure—styles of writing and printing—north points—colouring—ornament generally—preparation of finished plans. *Copying Plans*: tracing—heliography—enlarging and reducing—pantograph. *Mensuration of areas*—method of triangles—method of ordinates—Simpson's rule—planimeter—computing scale.

An examination in the theory and practice of surveying will be held at the close of the course, and certificates will be awarded to successful students.



**EVENING COURSE IN SURVEYING AND LEVELLING**

Class No.	Subject	Day	Hour	Room	Teacher	No. of Syllabus
207	FIRST YEAR : Surveying and Levelling <sup>1</sup> ...	Wednesday	7.30-9.30	B 18	W. O'Brien	132
215	SECOND YEAR : Surveying and Levelling <sup>1</sup> ...	Thursday	7.30-9.30	B 29	W. O'Brien	133

Note:<sup>1</sup> Fieldwork on Saturday afternoons during late Spring and early Summer.



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DEPARTMENT OF  
**ARCHITECTURE  
AND BUILDING**

TECHNICAL INSTITUTE  
BOLTON STREET, DUBLIN

1950-51

PROSPECTUS  
FOR DAY AND EVENING  
CLASSES

132, 133, 134—SURVEYING AND LEVELLING I, II, III

62

(a) *Chain Surveying*

Use of 100 ft. and 66 ft. chain; use of surveyor's tape; ranging a line; ranging past obstacles; chaining on level and sloping ground; fixing points relative to a chain line; selection of stations and survey lines; booking a chain survey; causes of error, precautions, checks; permissible error; plotting the chain survey.

(b) *Theodolite Surveying*

Construction of the theodolite; temporary and permanent adjustments; reading horizontal and vertical angles; ranging a straight line; triangulation survey; selection of stations; finding the distance between inaccessible points; determination of heights with a theo-

dolite; booking the survey; causes of error, precautions, checks; permissible error; plotting the survey.

(c) *Levelling*

Construction of the surveyor's level; three and four screw levelling plates; the staff; temporary and permanent adjustments; continuous levelling; selection of datum; appropriate lengths of sight; selection of change points; checking by closing circuit; levelling on a steep slope; reading the level of an overhead point; booking and reducing levels by rise-and-fall and by collimation method; causes of error; precautions, checks; permissible error; plotting sections and contours.

(d) *Areas and Volumes*

Calculation of areas; use of planimeter; calculation of earthwork quantities.

(e) *Ordnance Maps*

Scales; use and interpretation of ordnance sheets; conventional signs; ordnance datum; benchmarks; spot levels; contours.



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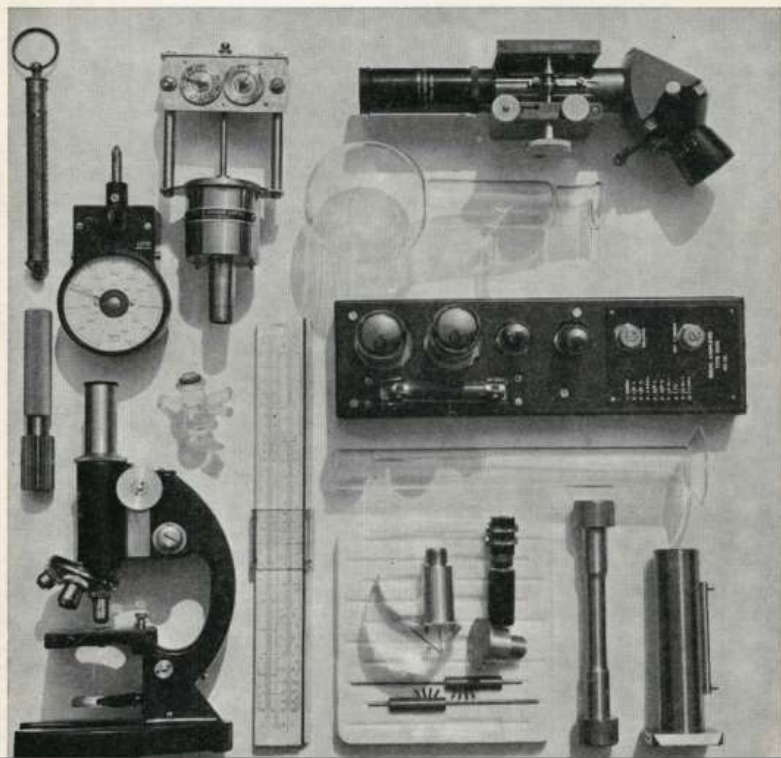
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## Prospectus

1967-68

**College of Technology**  
**Bolton Street**



### D/5. DIPLOMA COURSE IN LAND SURVEYING

An honours level course leading to a Diploma in Land Surveying. The course is of four years' duration and designed to prepare students for Associateship of the Royal Institution of Chartered Surveyors.

#### Subjects :

##### First Year

Pure Mathematics I.  
Applied Mathematics I.  
Physics I.  
Elementary Surveying and Cartography I.  
Geology I.  
Law of Property.  
Land Registration.  
Logic.

##### Fourth Year

Photogrammetry II.  
Control Surveys II.  
Field Astronomy II.  
Geodesy.  
Urban and Regional Planning.  
Computer Applications.  
Thesis on an aspect of Land Surveying.

##### Practical Experience

Students are required to gain practical experience during the extended summer vacations.

##### Second Year

Pure Mathematics II.  
Applied Mathematics II.  
Physics II.  
Elementary Surveying and Cartography II.  
Geology II.  
Surveying Instruments.  
Engineering Survey I.

##### Third Year

Mathematics and Theory of Errors.  
Cadastral Survey.  
Field Astronomy I.  
Control Surveys I.  
Photogrammetry I.  
Engineering Surveys II.  
Hydrographic Surveys.  
Least Squares and Survey Adjustment.  
Projection Computation.

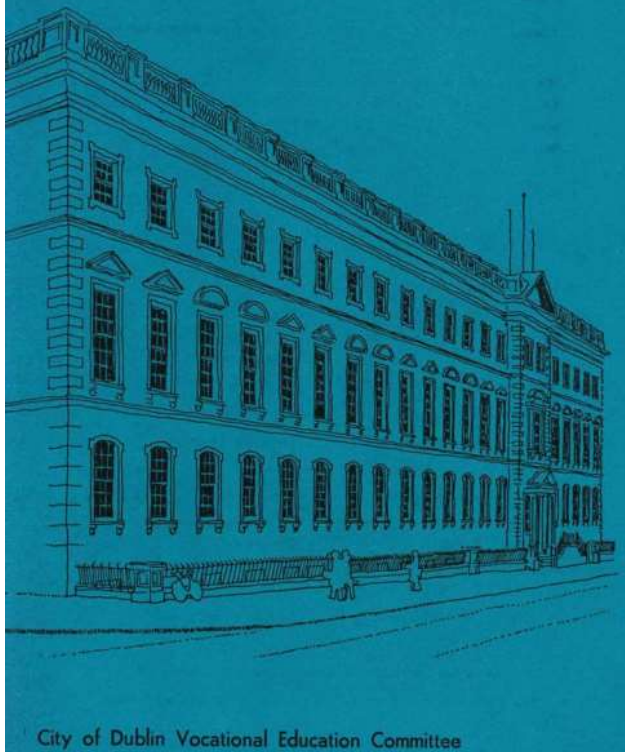
##### Entry Qualifications

- (a) The Secondary Schools Leaving Certificate with a minimum of two subjects at honours level.
- (b) The Matriculation Certificate of a recognised university.
- (c) The General Certificate of Education with a minimum of two subjects at Advanced level.

Fee £50 per annum.



College of Technology  
Bolton Street Dublin 1  
Prospectus 1976/77



City of Dublin Vocational Education Committee

## GEO-SURVEYING TECHNICIAN CERTIFICATE COURSE

This is a two year wholtime Technician Certificate course in Surveying with an optional third year for the award of a Diploma, which prepares students for careers in land and mining surveying in both public and private employment. Recognition of this course by the N.C.E.A. for the award of a National Certificate and Diploma is being sought.

### First Year

Mathematics and Statistics; Science including Electronics; Surveying Methods and Practice; Theory and Use of Instruments; Survey Drawing; Computer Programming; Liberal Studies.

### Second Year

Elements of Law and Administration; Geology; Land Survey; Mine and Engineering Survey; Elements of Hydrographic Survey; Mineral Technology; Engineering Economics; Introduction to Photogrammetry.

### Third Year

A specialisation selected from the following: Land Survey, Mine and Engineering Survey, Photogrammetry, Mineral Technology.

### Practical Experience

Field camps are conducted at the end of the first year and also at the end of the second year for those proceeding to the third year of the course. In addition students are required to gain field experience during the summer vacation.

### Entry Qualifications

Entry to the course is by selection following interview of those applicants holding the following qualifications:—

- (a) The Secondary Schools Leaving Certificate with passes in a minimum of five subjects including Mathematics and English, or
  - (b) A recognised equivalent.
- Preference will be given to applicants with good grades in Mathematics.


Tuition Fee £38.00 per annum payable on enrolment.




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undergraduate prospectus entry 2001  
full-time courses/cúrsaí fúlnaimseartha



## Geomatics FT112

### Course Description

This course prepares students for a career in Geomatics. Geomatics is a new term which collectively describes the many specialised activities related to surveying the earth's physical and man-made features. Geomatics is both science-based and engineering-based. It involves all aspects of the collection, management, analysis and visualisation of geo-spatial data for surveying and mapping. Geo-spatial data is data containing the geographic location of features on the earth's surface, together with attribute information describing what these features represent. It has many specialised fields of activity including land surveying, cartography, engineering and mine surveying, the use of satellites for positioning, and the production of computerised maps.

Both the career and the industry are highly technical and involve the use of an exciting range of surveying instrumentation, computers and software for measuring and processing geo-spatial data. DIT is the only third level institution in Ireland to offer a full-time degree in Geomatics. The department has well equipped laboratories and has the most advanced equipment to cater for all of the practical aspects of the course. Fieldwork plays an extremely important part of the course in all years.

The course covers a wide range of subjects designed to prepare graduates for a career in a growing industry with a diverse range of

job opportunities. A strong emphasis is given to mathematical, scientific and computer skills to complement the measurement science subjects. A significant proportion of the assessment is based on project work. In the final year, the student may specialise in one of the following options: Geographical Information Management; Geodetic Surveying; Land Management.

The curriculum is also designed to give the graduate an appreciation of the environment, business and management skills, and professional practice. Students are encouraged and facilitated by the department in obtaining vocational work experience in Ireland and abroad.

### Course Outline

#### First Year

Cartography, Survey Methods, CAD, Computer Studies, Instrumentation, Mathematical Methods, Science for Geomatics, Professional Development.

#### Second Year

Cartography, Engineering & Mine Surveying, Photogrammetry, Survey Methods & Instrumentation, Computer Studies, Mathematical Methods, Science for Geomatics, Statistics & Adjustment, Environmental Management, Professional Development.

#### Third Year

Cartography, Engineering & Mine Surveying, Geographical Information Systems, Land Administration, Photogrammetry & Remote Sensing, Geodesy, Mathematical Methods,

Statistics & Adjustment, Environmental Management, Business & Management Studies.

#### Fourth Year (Options)

##### Geographical Information Management Option

Business & Management Studies, Data Visualisation & Management, Geographical Information Systems, Application Development & Software Customisation, Dissertation.

##### Geodetic Surveying Option

Business & Management Studies, Geodesy, Photogrammetry & Remote Sensing, Geo-spatial Data Management, Dissertation.

##### Land Management Option

Business & Management Studies, Land Administration, Land Information Systems, Environmental Management, Dissertation.

### Duration

Four years full-time.

### Location

DIT Bolton Street.

### Entry Requirements

Leaving Certificate with passes in six subjects, at least two of which must be at grade C3 or higher on Higher Level papers, or equivalent qualifications. A minimum of grade B3 in Mathematics on the Ordinary Level paper is also required. The six subjects must include either Irish or English. Applicants who hold a recognised third level qualification in another discipline may also be considered for entry to the course subject to interview.



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## Geospatial Surveying (TU834)

## Student Information

Programme code: TU834

Qualification: BSc (Hons) Geospatial Surveying

Duration of programme: 4 years

Number of places: 40 approx.

Location: TU Dublin Bolton Street Campus

Programme Chair: Dr. Audrey Martin FSCSI



TU  
DUBLIN

## Geospatial Surveying Part- Time (TU089)

## Student Information

Programme code: TU089

Qualification: BSc (Hons) Geospatial Surveying

Duration of programme: 5 years Part Time

Number of places: 15 approx.

Location: TU Dublin Bolton Street Campus

Programme Chair: Eugen Niculae, FSCSI



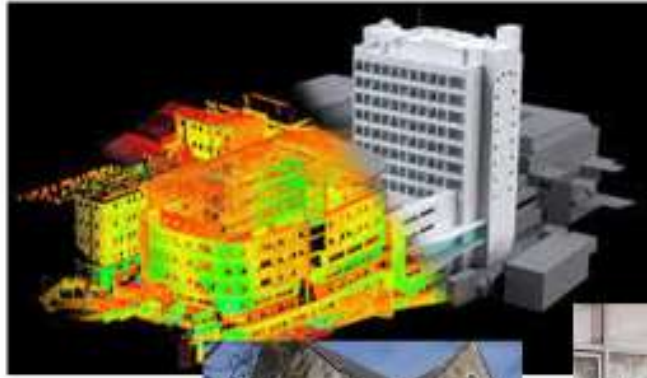
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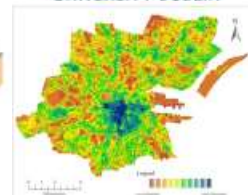
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Dun Laoghaire Harbour survey,  
2<sup>nd</sup> year  
week long field project







## MSc in GIS

School of Surveying and Construction Innovation  
[surveying@tudublin.ie](mailto:surveying@tudublin.ie)

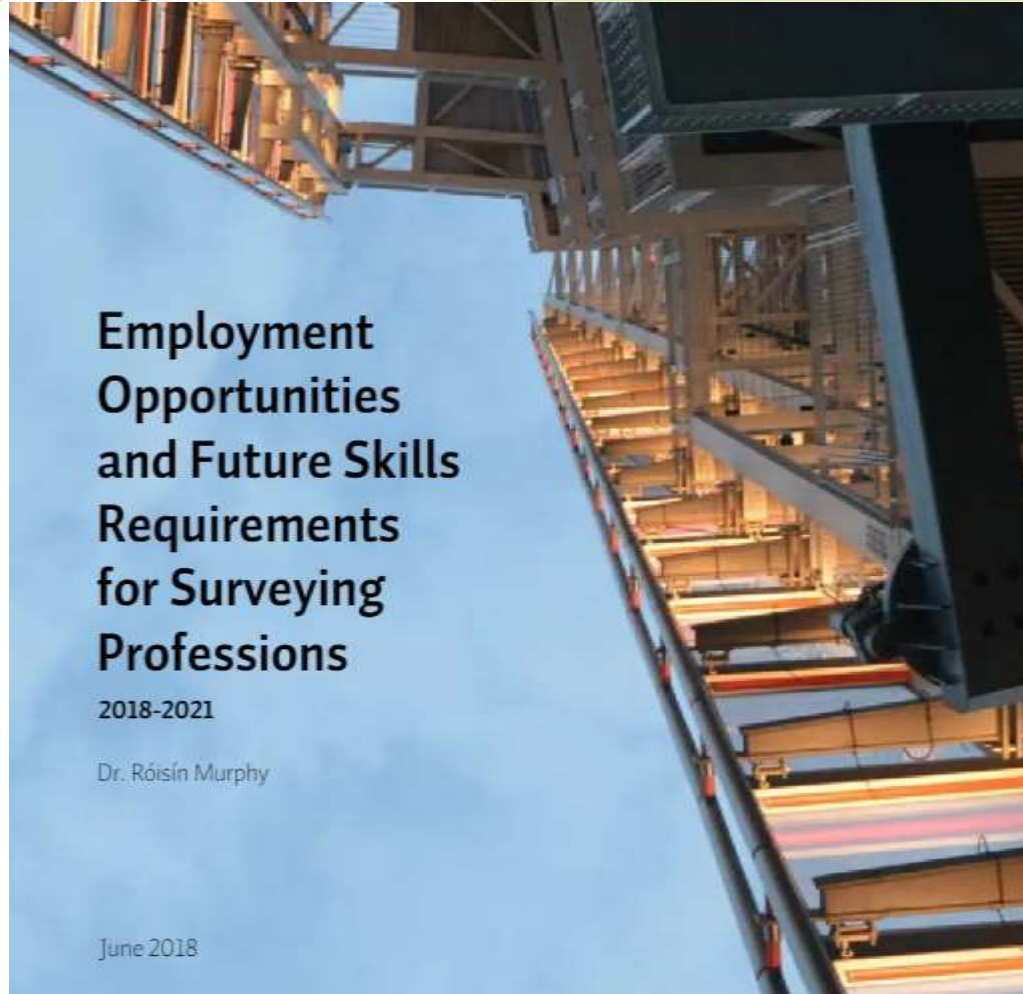
## MSc in GIS

School of Surveying and Construction Innovation  
[surveying@tudublin.ie](mailto:surveying@tudublin.ie)

<b>Title</b>	MSc in Geographic Information Science PostGrad Diploma in Geographic Information Science
<b>Part-time TU220</b>	2 years Programme; 1 day, 1 evening a week <a href="https://www.tudublin.ie/study/postgraduate/courses/geographic-information-science2/">https://www.tudublin.ie/study/postgraduate/courses/geographic-information-science2/</a>
<b>Full-time TU268</b>	1 year Programme 2 days, 2 evenings <a href="https://www.tudublin.ie/study/postgraduate/courses/geographic-information-science/">https://www.tudublin.ie/study/postgraduate/courses/geographic-information-science/</a>
<b>Campus</b>	City Campus Bolton Street
<b>Accreditation</b>	SCSI & RICS
<b>Programme Chair</b>	Alain Chenux E: <a href="mailto:alain.chenux@tudublin.ie">alain.chenux@tudublin.ie</a> T: 01 220 6526

- Conversion level 9 programmes since 2013
  - Entrance requirements: 2.2 level 8 honours bachelor degree
  - Most applicants from Engineering, Geography, Science, Geomatics, Archaeology, Planning, Environmental Science, Computing and Information Technology but also other discipline areas
  - Strong emphasis on IT, Spatial analysis and Web development
  - Modules delivered jointly to part-time and full-time
  - Modules can be taken individually CPD students
- Full employment for our graduates
  - Various sectors of activities – GIS consultancies, Local Authorities, Transportation, Engineering, Marketing... any company handling spatial data?
  - Lack of graduates in GIS highlighted by main stakeholders from industry (public and private sector)









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APPRENTICESHIP**  
[www.apprenticeship.ie](http://www.apprenticeship.ie)

**NEW NATIONAL  
APPRENTICESHIPS:  
MAKING AN INITIAL PROPOSAL**

- Two year programme
- Minimum 50% on the job learning
- Off the job learning in blocks of 6 weeks per semester
- Graduates gain a Level 6 qualification (on the National Framework of Qualifications), allowing graduate to become Associate Members of the SCSI/RICS
- Possibility to progress to Year 3 (FT or PT Programmes) to further their qualification



## KEY FEATURES OF APPRENTICESHIP IN IRELAND

- Industry-led – consortia of industry and education partners
- Lead to an award at Levels 5 to 10 on the National Framework of Qualifications (NFQ)
- Between 2-4 years in duration
- Minimum 50% on-the-job learning
- Flexible delivery – online, blended, off-the-job learning in increments/blocks
- The State funds off-the-job
- Apprentices are employed under a formal contract of apprenticeship
- The employer pays the apprentice for the duration of the apprenticeship\*



## School of Surveying and Construction Innovation

About Study Research Partnership People Contact Current Students

### OUR COURSES

We run a broad range of full- and part-time courses, at undergraduate and postgraduate levels, from Certificate to Ph.D., across all our disciplines.



## Thank You!

- Eugen Nicolae FSCSI FRICS
  - Eugen.Nicolae@TUDublin.ie
- Alain Chenux FSCSI FRICS
  - Alain.Chenux@TUDublin.ie