Part 1   Programme details

Current title and programme code	BSc (Hons) in Geographic Science DT112A/TU834 (Full-time), TU089 (Part-time)
Mode and duration of programme	Four years, full-time Five years, part-time
ECTS	240
TU Dublin award(s) sought	Bachelor of Science (Honours) in Geospatial Surveying (Level 8) Bachelor of Science in Geospatial Surveying (Level 7)
Classifications of award(s)	First Class Honours; Second Class Honours, First Division; Second Class Honours, Second Division; Pass (Level 8) Distinction; Merit Grade One, Merit Grade Two; Pass (Levels 7)
School responsible	School of Surveying & Construction Management
Professional body accreditation	SCSI/RICS Chartered Institution of Civil Engineering Surveyors (CICES)
External provider type (where applicable)	NA
Delivery location	TU Dublin Bolton Street

Part 2   Programme approval information

Date of review event	**19th April 2021**
Date of approval by University Programmes Board	
Proposed date of commencement	**September 2021**

Part 3   Programme background/structure

Background

Since 1967, TU Dublin (formerly DIT) has been the only third-level institution in Ireland to provide a full-time academic course in Geographic Science. In 1999, the need for higher qualified 'geo-surveyors' both nationally and internationally and the aspiration to provide graduates with better employment and further study prospects, lead to the development of the current 4-year honours

degree programme. This programme was last independently reviewed in 2006 when a new Work Placement Module was introduced. Periodic School reviews, accreditation visits by professional bodies and annual External Examiners' input have enriched the programme and ensure module content and assessment methods remain current.

To further service industry needs, the programme is also to be offered on a part-time basis, whereby part-time students will sit alongside their full-time peers. It is expected that the introduction of an early exit award will enhance the attractiveness when marketing this part-time programme to professionals in the geospatial sector who are currently unqualified. Documentation pertaining to the part-time offering of the programme is available in the online folder entitled part-time Earn and You Learn Programme. The School is proposing that the programme be renamed 'Geospatial Surveying'.

Stated aims and learning outcomes of the programme
The programme aims are to prepare and equip students with the knowledge and skills for a career in the geospatial industry. The aims and philosophies of the programme are to:
1.   expose students to a wide range of subject areas and geospatial technologies;
2.   maintain a strong and applied scientific and information technology base;
3.   maintain an appropriate balance between M1: measurement, M2: modelling and M3: data management to enable graduates to thrive in the geospatial industry;
4.   develop and enhance personal and life skills;
5.   prepare students for entry into industry, membership of professional bodies and for progression to post-graduate programmes;
6.   develop an ethos for life-long learning and support for alma mater.

Upon successful completion of the programme, graduates will be able to:

K1	Y3	Distinguish between and mitigate for the different measurement errors and biases which adversely influence accuracy and precision.
K2	Y3	Appreciate the nature and scope of existing and emerging methods used to manage (to include - tenure, policy, use and use) coastal land, coastal zones and marine spaces and the significance of good spatial data management therein.
K3	Y3	Explain the theoretical and conceptual foundations on which geospatial data is managed to ensure '*measure once use often*' sustainable data collection is employed.
K4	Y3	Undertake the most common survey computations wrt coordinate operations and transformations, scale factor etc.
K5	Y3	Explain the purpose of quality control in a survey with reference to best practice guidelines.
K6	Y3	Appraise and select the most appropriate spatial data collection techniques for surveys, including ground-based systems, GNSS, image (remote sensing), laser (LiDAR), UAV and satellite-based systems (Earth Observation/EO).

K7	Y4	Identify and locate appropriate academic and professional reference material.
K8	Y4	Have an appreciation for sustainable GI and business management in the geospatial sector.
K9	Y4	Identify, evaluate and manage risk in the execution of a geospatial project.
K10	Y4	Appreciate the role of geospatial data and GIS in society including institutional, economic and regulatory aspects within a sustainable framework.
K11	Y4	Appreciate current land administration re-engineering trends and the significance of fit-for-purpose spatial information is playing in this and in good governance generally.
KHS1	Y3	Design, produce and deliver a digital survey plan from survey measurements in the field for use in BIM.
KHS2	Y3	Produce of 3D realistic models from latest massive data collection techniques such as Lidar and Photogrammetry.
KHS3	Y3	Have significant work related practical experience in the geospatial sector.
KHS4	Y3	Have the ability to work in harmony with others, motivate people and appreciate other views and perspectives.
KHS5	Y3	Communicate effectively - present a survey project from planning to deliverable with analysis.
KHS6	Y3	Possess thorough theoretical and practical skills in spatial statistics and modelling within a GIS environment.
KHS7	Y3	Demonstrate practical competency and inter-disciplinary approach by designing customised workflows for complex real-world industry solutions, critically assessing the appropriateness of cutting-edge and conventional techniques for geospatial data analysis, data integration and digital map creation.
KHS8	Y4	Have developed independent learning skills, presentations, report writing and team-work skills.
KHS9	Y4	Communicate and present well with considered recommendations and conclusions.
KHS10	Y4	Assimilate, synthesise and evaluate geospatial information and select a suitable and 'fit for purpose' solution in a range of geospatial problem domains
KHS11	Y4	Select the most appropriate survey methodology and processing techniques for a geospatial survey.
KHS12	Y4	Write basic scripts for GIS applications.
KHS13	Y4	Integrate and apply knowledge and learning from and between other domains and discipline areas.
KHS14	Y4	Possess the technical and scientific skills to adapt and address new challenges by reviewing scientific literature systematically, merging and integrating multi-source and multi-type geospatial data, cutting-edge tools and techniques (including field, photogrammetric and remote sensing) to deliver academic research and industry solutions.

KHS15	Y4	Outline and discuss the legislative frameworks of safety, health and the environment along with contract and planning, land ownership, land registration and planning issues.
C1	Y3	Design and undertake a geospatial survey cognisant of professional standards
C2	Y3	Confidently present on work undertaken to a knowledgeable audience
C3	Y3	Critically reflect on work undertaken.
C4	Y3	Design and build spatial databases, employ proprietary, open-source and web GIS applications
C5	Y4	Create geoprocessing models using Python for GIS interface customisation and case study assessments
C6	Y4	Provide consultancy and advice on best solutions and practice in a local application or national regulatory context with regard to geospatial matters.
C7	Y4	Possess a highly developed sense of professionalism and ethical judgement.
C8	Y4	Possess an appreciation of the importance of continuing professional development, self-learning and membership of appropriate professional bodies and learned societies.
C9	Y4	Applies solid scientific approach to research problems, critically assess methodology and design procedures for the collection, analysis, delivery of data and communication of results with appropriate recommendations to different audiences

Programme structure

The full-time programme is delivered over four years, while the part-time programme is delivered over five years. In semester two of year three of the full-time programme students undertake a work placement or an Erasmus study abroad. In the part-time programme, students complete a number of Work-based Learning modules. Both full and part-time students undertake a major dissertation in the final year of their programme.

Entry Requirements

Entry to the full-time programme requires applicants to have at least six passes in the Irish Leaving Certificate, with at least two of these passes at Higher Level. Applicants must also have achieved a minimum grade of O 4/H7 in Mathematics, and O6/H7 in English or Irish.

Where students have previously successfully undertaken a course of study in the Geospatial domain or a related discipline, an assessment of the learning achieved will be undertaken by academic staff via interview.

Applications from international students who are suitably qualified and who are proficient in English will be considered. All applicants whose first language is not English and who have not been educated through the medium of English will be required to meet the following requirements: - An IELTS overall score of 6.5 or better with minimum subject scores of 6.5 for each section, or an equivalent English language proficiency test.

Applicants to the part-time programme must be in appropriate full-time employment as a trainee within a Geospatial Surveying related business.

Entry to the part-time programme requires applicants to have at least six passes in the Irish Leaving Certificate, with at least two of these passes at Higher Level. Applicants must also have achieved a minimum grade of O 4/H7 in Mathematics, and O6/H7 in English or Irish. Alternatively, the following will be considered:
− applicants in possession of a FETAC level 5 qualification in a related construction or engineering discipline.
− mature students who are 23 years of age or older on 1st January in the calendar year of proposed entry to an undergraduate programme.

Applications to the latter years of the programme will be considered for those applicants who already possess experience in the industry and/or possess a construction-related undergraduate qualifications. Consideration for the particular year of entry will depend on the level of the programme qualification attained by the applicant ie Higher Certificate, Ordinary Degree and Honours Degree etc.

Student assessment
In accordance with TU Dublin's General Assessment Regulations. In some modules where there is more than one assessment component, minimum thresholds of performance apply. The Work Placement in year three shall be assessed on a pass/fail basis.

Derogations from the General Assessment Regulations
None sought.

Part 4	Review Details and Membership of Panel

Schedule of meetings
Monday 19th April 2021

Via Microsoft Teams

09.00 am   Introductory meeting between Panel, Director and Dean of College of Engineering & Built Environment, Head and Assistant Head of School of Surveying & Construction Management, Chairperson and members of Programme Committee as appropriate. Presentation from School.

9.30 am   Private meeting of Panel to discuss agenda.

10.15 am   Meeting with Head of School, Assistant Head of School, Chairperson and appropriate members of the Programme Committee, to discuss specific issues raised by the Panel.

11.30 am	Break.
11.45 am	Meeting of Panel with staff teaching on programme to discuss such matters as syllabi, teaching methods and assessment issues.
12.45 pm	Panel meets with a group of current students and graduates of the existing BSc in Geographic Science.
1.30 pm	Lunch
2.00 pm	Private meeting of Panel to consider draft reports.
3.15 pm	Final meeting of Panel with Head, Assistant Head of School, Programme Chair and other staff as appropriate.

Panel Membership

External Members

Dr Brian Dermody	Assistant Professor, Copernicus Institute of Sustainable Development, Faculty of Geoscience, Utrecht University
Sarah Sherlock	Geospatial Consultant, Murphy Geospatial

Internal Members

Dr Teresa Hurley (Chair)	Campus Planning Team, TU Dublin – City
Dr Leanne Harris	School of Biological & Health Sciences, TU Dublin- City
Alan McDonnell	School of Mechanical & Design Engineering, TU Dublin – City

Quality Assurance Office

Jan Cairns	Quality Assurance Officer, TU Dublin – City

Documentation submitted

The Panel received the programme documentation and a set of appendices relevant to the programme as well as briefing notes on the review process.

Part 5   Summary of Panel Recommendations against key questions

Is the market demand and need for the programme clear and articulated?	Yes
Are the aims, objectives and learning outcomes of the programme well-founded and clearly formulated?	Yes
Are the entry requirements clear and appropriate?	See Recommendations of the Panel in respect of non-standard entry to the full-time programme.
Are the arrangements for access, transfer and progression in accordance with University policy and NFQ?	See Recommendations of the Panel in respect of the possibility of transfer from the part-time to the full-time route.
Are the programme learning outcomes at the appropriate level as set out by the NFQ requirements?	Yes
Do the individual modules 'add up' to a coherent programme?	Yes
Are Graduate Attributes embedded within the programme?	See Recommendations of the Panel in respect of giving Graduate Attributes greater visibility in the Student Handbook.
Will the accumulation of the module learning outcomes result in the attainment of the programme learning outcomes?	See Recommendations of the Panel in respect of a mapping between programme and module learning outcomes and assessment.
Is there appropriate use of student-centred learning, teaching and assessment strategies, including the First Year Framework for Success checklist, which recognise the needs of diverse student groups?	Yes
Do the curricula and teaching schemes in each module descriptor give realisable substance to the module's aims, objectives and learning outcomes?	Yes
Are the assessment methods and criteria aligned to the learning outcomes in each module?	See Recommendations of the Panel in respect of a mapping between programme and module learning outcomes and assessment.

Are facilities and resources, including staff, in place to support the delivery of the programme at the standard proposed?	Yes

Part 6   Recommendations of the Panel

The Panel is pleased to recommend continuing approval of the programme, now leading to the awards of Bachelor of Science (Honours) in Geospatial Surveying, at Level Eight on the National Framework of Qualifications, and the Bachelor of Science in Geospatial Surveying, at Level Seven on the National Framework of Qualifications. The Panel recommends approval of the part-time, Earn as you Learn route through the programme. It is happy to recommend approval of the new programme title – Geospatial Surveying, as a more accurate reflection of the programme content and the industry. The Panel attaches two conditions to the above approval and fourteen recommendations.

The Panel would like to commend the following:
- evidence of strong team involvement in the review of the programme
- the well-prepared documentation and appendices
- an Equality, Diversity and Inclusivity focus at School level
- the success of the peer mentoring programme for year-one students
- the various strategies for the marketing of the programme including the College-wide resource.
- strong industry engagement including the Advisory Board
- the hands-on nature of the programme and project work, as noted by students
- the introduction of the part-time 'earn as you learn' programme that will increase access to the programme and assist in the ongoing viability of the programme
- the opportunity for students who leave the programme early to achieve a level seven award
- the inclusion of the Surveying Computations module and the change from pure maths to Proper Adjustment
- the delivery of Topographical Surveying now running as two semester-long modules rather than a year-long module.

Conditions

1. A rationale should be provided for the 60% pass threshold for the Work Placement module and a more detailed statement on how this applies to the various assessments in this module. It is noted that this module could be assessed on a pass/fail basis with appropriate pass criteria, as it does not contribute to the award classification.

2. The Programme Team should address the detailed feedback on the documentation including module descriptors already provided by Panel members.

Recommendations

1. In relation to the marketing and promotion of programme, the Panel considers that the Team should develop a strong narrative for the programme that captures the programme vision including the multidisciplinary nature of the programme, the use of open-source data and novel approaches to its analysis, how the programme might have a positive impact on sustainability, among other aspects. This can then be used on the programme websites, and in other promotional material.

2. The Team should explore newer, emerging social media for use in marketing and promotion of programme.

3. The Team should consider whether the non-standard entry routes, e.g. mature students, FETAC entrants, to the part-time programme might also apply as entry routes to the full-time programme.

4. The Team should consider how a student might transfer from the full-time to the part-time programme, should they wish to work in the industry before completing the programme, while continuing to work towards the final award.

5. Measures should be put in place to ensure that there is consistency between the placement providers in the exposure that employers can give to a student to the various aspects of the industry.

6. Key aspects such as critical thinking, consideration of ethical matters, sustainability should be made more explicit within module descriptors

7. Programme learning outcomes should be mapped to the module learning outcomes and assessment methods, to demonstrate this alignment and how programme learning outcomes are met.

8. The Team should communicate with students regarding actions taken in response to feedback (closing the feedback loop), using the class representatives, Programme Committees, student handbooks.

9. The preparation workshops provided to students for the Work Placement should be referenced within the module descriptor/Work Placement Handbook.

10. The Team should review the assessment of modules where the current method is final examination only and consider the inclusion of some element of formative assessment to ensure that students receive feedback on their progress at an earlier stage in the module.

11. The Professional Development module should be amended to include academic writing support from the outset of the programme.

12. The School should investigate how software licences might be made available to students through the new WVD platform.

13. The Team should review the assessment workload at the end of the first semester of each year which appears to be a particular pressure point for students.

14. The University's Graduate Attributes should be more evident within the Student Handbooks.

After-session note, raised by a Panel member following the review event:

The Programme Team should consider expanding its BIM focus as the programme is too narrow in this regard currently. BIM has a specific meaning; however, and does not capture all that the graduates of the course will do and or will be required of them in industry. Digital Twin is a much

better term as it may include land, building, utilities, in the design, built and natural worlds. The programme needs to be considerate of the whole of the built and natural environment and bring the AEC sectors on that journey too. One BIM at a time goes against the most basic and fundamental survey principle of whole to the part. There is a need for geospatial frameworks that enable multiple BIMs and global participation or at the very least European level to satisfy our INSPIRE obligations (which we currently ought to be adhering to) and enable thorough collaboration. The programme is best placed to formulate taught knowledge and structures on this to ensure that we can see and achieve robust consistency in and across sectors and jurisdictions.