# Bachelor of Spatial Science Technology (BSST) - BSpScTech

QTAC code (Australian and New Zealand applicants): Toowoomba campus: 907802; Distance education: 907805

CRICOS code (International applicants): 053512D

| | On-campus | Distance education |
|---|---|---|
| **Semester intake:** | Semester 1 (February)<br>Semester 2 (July) | Semester 1 (February)<br>Semester 2 (July) |
| **Campus:** | Toowoomba | - |
| **Fees:** | Commonwealth supported place<br>Domestic full fee paying place<br>International full fee paying place | Commonwealth supported place<br>Domestic full fee paying place<br>International full fee paying place |
| **Standard duration:** | 3 years full-time, 6 years part-time or external | |
| **Program articulation:** | From: Associate Degree of Spatial Science<br>To: Bachelor of Spatial Science; Master of Spatial Science Technology | |

## Contact us

| Future Australian and New Zealand students | Future International students | Current students |
|---|---|---|
| Ask a question<br>Freecall (within Australia): 1800 269 500<br>Phone (from outside Australia): +61 7 4631 5315<br>Email: studyeng@usq.edu.au | Ask a question<br>Phone: +61 7 4631 5543<br>Email: international@usq.edu.au | Ask a question<br>Freecall (within Australia): 1800 007 252<br>Phone (from outside Australia): +61 7 4631 2285<br>Email usq.suppport@usq.edu.au |

## Geographic information systems major

Geographic Information Systems (GIS) is a powerful new technology having a major impact on many professions. It is an information system that uses computer-based maps generated from data collected in the field in person, by photographs or by satellite. GIS can help people manage resources more effectively, manage local government assets more economically and analyse data precisely. The greatest impact of GIS has been on the mapping industry. This major provides students with the skills to analyse geographic data and help people with decision-making in a range of areas, such as engineering, planning, environmental science, commerce and surveying.

### Career opportunities

Geographic Information Systems Manager or Spatial Information Analyst in Local Government, State and Commonwealth Government agencies and private sector organisations in applications such as environmental assessment, planning and land development.

## Surveying major

This program provides students with the opportunity to apply new and increasingly sophisticated computing technology to surveying and mapping projects. In addition to the core analytical and scientific skills, students undertake studies in global positioning systems, digital mapping, mine surveying, land planning and geographic information systems. The program provides students with a good mixture of practical and theoretical training in surveying and mapping.

### Career opportunities

Surveying Technologist with private organisations, a Mine Surveyor, Supervising Engineering Surveyor and with experience, Manager of Survey Operations in Commonwealth, State and Local Government, or construction organisations.

## Professional accreditation

The Bachelor of Spatial Science Technology (Surveying) program is accredited by the Surveyors Board of Queensland and is recognised in every Australian state and in New Zealand through reciprocal arrangements. The degree, together with relevant industry experience, enables registration as a graduate surveyor with the Queensland Surveyors Board. The degree, together with relevant industry experience, enables registration and/or licensing as a professional mining surveyor with the Surveyors Boards of Queensland and New South Wales.

The Spatial Science Institute has accredited both program majors and graduates are eligible for membership with the Surveying and Spatial Sciences Institute Australia.

## Program aims

The Bachelor of Spatial Science Technology program equips students with a core of basic technical, scientific, analytical, business administration and communication skills that will permit them to undertake further study of the science and practice of spatial science in one of two fields: Geographic Information Systems (GIS) or Surveying.

In addition, students obtain knowledge of the natural, legal, commercial, industrial and social environments in which they will function as professionals. The program instils in students the need for continuing professional development and gives them the ability to adapt to change.

## Program objectives

A student who successfully completes the Bachelor of Spatial Science Technology should be able to demonstrate:

- a broad knowledge of basic scientific and technical skills
- a level of computer literacy skills appropriate to their field of study
- appropriate written and oral communication skills
- the capacity to analyse technical problems and propose solutions
- an understanding of, and the ability to undertake, the processes required to collect, store, and manipulate a variety of spatial data
- a capacity to adapt to change and to master new technologies as they emerge
- an understanding of the natural, social, professional, industrial and technical environments in which they will practice
- the skills required to access information and an aptitude to undertake further learning and study
- a knowledge of surveying or spatial information systems of sufficient depth to gain employment, certification and, where appropriate, registration as a Graduate Surveyor or GIS Spatial Scientist.

## Admission requirements

**Applicants shall normally:**

- have studied four semester units and achieved an exit assessment of 'Sound Achievement' or better in the Queensland Senior Secondary School subject: English. It is recommended that applicants should also have satisfactorily completed the subject: Mathematics B (Mathematics A is assumed)

or

- be able to demonstrate that they have achieved an equivalent standard in these subjects at another institution

and

- **Australian applicants:** have achieved a Queensland Overall Position (OP) band, or an equivalent Rank based on qualifications and previous work experience, at or above the specified cut-off level
- **International applicants:** must have met the University's English language requirements or have completed the University's ELICOS/EAP programs.

## How to apply

### Domestic students

Application for undergraduate programs may be made through the Queensland Tertiary Admissions Centre (QTAC). The same procedure applies whether you plan to study on-campus or by distance education.

If you completed Year 12 at a Queensland secondary school you will be assessed for entry on the basis of your Overall Position (OP) or equivalent score. Year 12 students from other states or territories are considered for entry on the basis of their UAI, ENTER or TER and the subject prerequisites indicated. Other applicants will be based on their overall Rank.

### International students

This program is offered to international students. An international student is a person who is not an Australian or New Zealand citizen and not an Australian permanent resident. Please refer to USQ International for information about entry requirements, visa arrangements and how to apply.

## Program fees

#### Commonwealth supported place

A Commonwealth supported place is where the Australian Government makes a contribution towards the cost of your higher education and you as a student pay a student contribution amount, which varies depending on the courses undertaken. You are able to calculate the fees for a particular course via the Course Fee Finder. Commonwealth Supported students may be eligible to defer their fees through a Government loan called HECS-HELP.

#### Domestic full fee paying place

Domestic full fee paying places are funded entirely through the full fees paid by the student. Full fees vary depending on the courses that are taken. You are able to calculate the fees for a particular course via the Course Fee Finder.
Permanent Humanitarian Visa holders, Permanent Resident visa holders and New Zealand citizens who reside outside Australia pay full tuition fees.
Domestic full fee paying students may be eligible to defer their fees through a Government loan called FEE-HELP.

#### International full fee paying place

International students pay full fees. Full fees vary depending on the courses that are taken and whether they are studied on-campus, via distance education/online. You are able to calculate the fees for a particular course via the Course Fee Finder.

## Program structure

The Bachelor of Spatial Science Technology is a 24 unit program consisting of Academic Courses and Practice Courses.

Academic Courses are normally one-unit courses and involve approximately 155 hours of student work per unit.

Practice Courses are zero unit courses and each involves approximately 50 hours of student work. The only grades available for a Practice Course are Pass (P) and Fail (F). A Practice Course is designed to enable students to acquire specific competencies associated with their major study. These competencies range from specific practical and communication skills through to generic competencies relating to ethical and social

responsibility, awareness of the environment, teamwork, etc. For an external student a Practice Course generally involves attendance on-campus for a one-week residential school.

## Program completion requirements

The Bachelor of Spatial Science Technology Program normally involves three years of full-time study or six years of part-time study.

Students must complete the program within a maximum period of five years of full-time study or 10 years of part-time study from the date of their initial enrolment. To graduate from a particular major students must successfully complete all of the core course plus the specialist and Practice courses in that major, including the required number of Electives.

## Required time limits

Full-time students have a maximum of five years to complete this program. Part-time students have a maximum of 10 years to complete this program.
A pro-rata adjustment of the maximum time period will apply for those students who transfer from one mode of study to another. A pro-rata reduction in the maximum time period will apply to students who are admitted to a program with advanced standing.

## Practical experience

Practical experience is desirable and encouraged but is not required for the completion of the Bachelor of Spatial Science Technology program. Students are encouraged to obtain practical experience during vacation periods.

## IT requirements

Students should refer to the section entitled Access to Information Technology Facilities in the General Faculty and Program Information section of this Handbook.

## Residential schools

External students are required to attend a number of residential schools during their program. These are associated with Practice Courses and are normally conducted at the end of Semester 3 (February), or during the mid-semester recess in Semester 2 (September/October).

Students enrolled in the external offer of a Practice Course **must attend** the residential school for that course. In some cases students enrolled in the on-campus mode may also be required to attend the residential school. Students should only enrol in a Practice Course when they are able to attend the residential school for that course. Practice Courses **may not** be taken earlier than shown except with the permission of the Program Coordinator responsible for the program. In some cases students may enrol in two Practice Courses in one term so they can complete the two residential schools in a two-week period. The actual dates for each residential school are shown in the Residential School schedule in this Handbook.

### Practice courses

The majority of the practical and professional experience requirements for the program are contained within the major recommended enrolment pattern in the following table. These are zero unit courses, which are a **compulsory part** of the program, however they do not attract a student contribution charge for Australian Residents or a tuition fee for international students.

## Articulation

Graduates of an Associate Degree in Spatial Science would normally be eligible for up to 16 units of credit towards the Bachelor of Spatial Science Technology within the same field. Similarly, Bachelor of Spatial Science Technology graduates would normally be eligible for up to 24 units of credit towards the Bachelor of Spatial Science degree within the same field. Students who have completed an associate degree or certificate program in surveying than five years ago are eligible to claim advanced standing. The number of units of

advanced standing granted will depend upon the nature and currency of the studies undertaken, and on the major undertaken.

The programs in Surveying and Geographic Information Systems also articulate to and from each other and enable students to move between Surveying and Geographic Information Systems degrees, whilst still retaining a significant amount of credit.

Prospective students who wish to upgrade an existing qualification should contact the Faculty to obtain information about likely exemptions and recommended enrolment patterns for their upgrade program.

## Exit points

Students who, for whatever reason, are unable to complete the Bachelor of Spatial Science Technology and who satisfy all of the requirements of the Associate Degree in Spatial Science may be permitted to exit with that award.

## Geographic Information Systems Major recommended enrolment pattern

To satisfy the requirements of the program students must complete all of the Academic and Practice Courses in the following table that shows the recommended enrolment patterns for on-campus and external students. Students following a non-standard enrolment pattern should consult the course synopses section of this Handbook to ascertain if a course is offered in another term.

| Major study: Geographic Information Systems (Major Study Code: 15405) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Course | Year of program and semester in which course is normally studied | | | | | | Residential school (compulsory /optional) | Enrolment requirements |
| | On-campus (ONC) | | External (EXT) | | Online (WEB) | | | |
| | Year | Sem | Year | Sem | Year | Sem | | |
| **Academic Courses** | | | | | | | | |
| MAT1500 Engineering Mathematics 1* | 1 | 1 | 1 | 1 | | | | |
| GIS1402 Geographic Information Systems | 1 | 1 | 1 | 1 | | | | |
| SVY1102 Surveying A | 1 | 1 | 2 | 1 | | | | |
| ENG1101 Introduction to Engineering Problem Solving | 1 | 1 | 2 | 1,2 | | | | |
| GIS1401 Geographic Data Presentation | 1 | 2 | 1 | 2 | | | | |
| ENG1002 Introduction to Engineering and Spatial Science Applications | 1 | 2 | 1 | 1,2 | | | | |
| SVY1110 Introduction to Global Positioning System | 1 | 2 | 2 | 2 | | | | |
| CSC1401 Foundation Programming | 1 | 2 | 2 | 1, 2 | | | | |
| ENV2201 Land Studies | 2 | 1 | 3 | 1 | | | | |
| SVY3202 Photogrammetry and Remote Sensing | 2 | 1 | 3 | 1 | | | | |
| GIS3404 Geographic Data Visualisation | 2 | 1 | 4 | 1 | | | | |
| ENG2002 Technology, Sustainability and Society | 2 | 1 | 4 | 2,3 | | | | |
| ENG2102 Engineering Problem Solving and Analysis | 2 | 2 | 3 | 2 | | | | Pre-requisite: ENG1101 |
| SVY3201 Sustainable Urban Design and Development | 2 | 2 | 3 | 2 | | | | |
| SVY3200 Land Administration | 2 | 2 | 4 | 2 | | | | |
| GIS3405 Spatial Analysis and Modelling | 2 | 2 | 4 | 2 | | | | |
| SVY4309 Practice Management for Spatial Scientists | 3 | 1 | 5 | 1 | | | | |
| SVY4203 Urban and Regional Planning | 3 | 1 | 5 | 1 | | | | |
| Elective (Select from the Electives list) | 3 | 1 | 6 | 1 | | | | |
| CIS2002 Database Design and Implementation | 3 | 1 | 6 | 1,3 | | | | |
| Elective (Select from the Electives list) | 3 | 2 | 5 | 2 | | | | |
| GIS3406 Remote Sensing and Image Processing | 3 | 2 | 5 | 2 | | | | |
| GIS4407 Web Based Geographic Information System | 3 | 2 | 6 | 2 | | | | Pre-requisite: GIS1402 or S tudents must be enrolled in one of the following Program s: GCGS or GDST or MSST or GCNS or GCST or GDNS or MENS |

| Major study: Geographic Information Systems (Major Study Code: 15405) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Course | Year of program and semester in which course is normally studied | | | | | | Residential school (compulsory /optional) | Enrolment requirements |
| | On-campus (ONC) | | External (EXT) | | Online (WEB) | | | |
| | Year | Sem | Year | Sem | Year | Sem | | |
| Elective (Select from the Electives list) | 3 | 2 | 6 | 2 | | | | |
| **Practice Courses** | | | | | | | | |
| SVY1901 Surveying and Spatial Science Practice 1^ | 1 | | 2 | 1 | | | C | |
| SVY2902 Surveying and Spatial Science Practice 2^# | 2 | | 4 | 3 | | | C | Pre-requisite: SVY1901 and SVY1102 or Students must be enrolled in one of the fol lowing Programs: GCNS or GDNS or MENS |
| SVY2903 Surveying and Spatial Science Practice 3^> | 2 | | 5 | 3 | | | C | Pre-requisite: SVY1901 and SVY1102 or Students must be enrolled in one of the fol lowing Programs: GCNS or GDNS or MENS |
| **Electives (Select from the following)** | | | | | | | | |
| CIS3001 Object-Oriented Programming with Java | | 1 | | 1 | | | | |
| CIV2701 Road Design and Location | | 1 | | 1 | | | | Pre-requisite: MAT1500 or ENG1500 or Students must be enrolled in one of the fol lowing Programs: GCST or GDGS |
| ENV4204 Environmental Technology | | 1 | | 1 | | | | Pre-requisite: MAT1100 or MAT1500 or Students must be enrolled in one of the fol lowing programs: GCEN or GDET or METC or MENS or GCNS or GDNS or MSST |
| ENG3003 Engineering Management | | 1 | | 1 | | | | |
| MKT1001 Introduction to Marketing | | 1 | | 1,2,3 | | | | |
| ACC1101 Accounting for Decision-Making | | 1,2 | | 1,2,3 | | | | |
| AGR2301 Agricultural Science | | 2 | | 2 | | | | |
| MGT1000 Organisational Behaviour | | 1 | | 1,2,3 | | | | |
| LAW2107 Environmental Law | | 2 | | 2 | | | | |
| MAT1502 Engineering Mathematics 2 | | 1 | | 1 | | | | Pre-requisite: Only Students enrolled in Program BENG must have done MAT1500 or MAT1100 |
| REN1201 Environmental Studies | | 1 | | 1 | | | | |
| REN3302 Sustainable Resource Use | | 2 | | | | | | |
| SVY1104 Survey Computations A | | 2 | | 2 | | | | Pre-requisite: SVY1102 or SVY1500 or Students must be enrolled in one of the fol lowing Programs: GCST or GDST |

**Footnotes**

* Students with a mathematics background which is not to the standard of a Sound Achievement in Queensland Senior Mathematics B (or equivalent), will be required to undertake ENG1500 Engineering Fundamentals in lieu of MAT1500 Engineering Mathematics 1, and will need to undertake MAT1500 Engineering Mathematics 1 at a later stage of their program as one of their Elective courses. Please refer to the notes in the General Faculty and Program Information section in this Handbook.

^ On-campus students should enrol in the external offering of this course

\# Students who have completed GIS2901 do not need to undertake SVY2902.

> Students who have completed GIS3901 do not need to undertake SVY2903.

## Surveying Major recommended enrolment pattern

To satisfy the requirements of the program students must complete all of the Academic and Practice Courses in the following table that shows the recommended enrolment patterns for on-campus and external students. Students following a non-standard enrolment pattern should consult the course synopses section of this Handbook to ascertain if a course is offered in another term.

| Major study: Surveying (Major Study Code: 15406) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Course | Year of program and semester in which course is normally studied | | | | | | Residential school (compulsory /optional) | Enrolment requirements |
| | On-campus (ONC) | | External (EXT) | | Online (WEB) | | | |
| | Year | Sem | Year | Sem | Year | Sem | | |
| **Academic Courses** | | | | | | | | |
| MAT1500 Engineering Mathematics 1* | 1 | 1 | 1 | 1 | | | | |
| GIS1402 Geographic Information Systems | 1 | 1 | 1 | 1 | | | | |
| SVY1102 Surveying A | 1 | 1 | 2 | 1 | | | | |
| ENG1101 Introduction to Engineering Problem Solving | 1 | 1 | 2 | 1,2 | | | | |
| ENG1002 Introduction to Engineering and Spatial Science Applications | 1 | 2 | 1 | 1,2 | | | | |
| SVY1110 Introduction to Global Positioning System | 1 | 2 | 1 | 2 | | | | |
| GIS1401 Geographic Data Presentation | 1 | 2 | 2 | 2 | | | | |
| SVY1104 Survey Computations A | 1 | 2 | 2 | 2 | | | | Pre-requisite: SVY1102 or SVY1500 or Students must be enrolled in one of the fol lowing Programs: GCST or GDST |
| SVY2301 Automated Surveying Systems | 2 | 1 | 3 | 1 | | | | Pre-requisite: SVY1104 or S tudents must be enrolled in one of the following Program s: GCST or GDST |
| SVY2106 Geodetic Surveying A | 2 | 1 | 3 | 1 | | | | Pre-requisite: SVY1110 or S tudents must be enrolled in one of the following Program s: GCNS or GCST or GDNS or GDST or MSST or MENS |
| CIV2701 Road Design and Location | 2 | 1 | 4 | 1 | | | | Pre-requisite: MAT1500 or ENG1500 or Students must be enrolled in one of the fol lowing Programs: GCST or GDGS |
| ENV2201 Land Studies | 2 | 1 | 4 | 1 | | | | |
| ENG2102 Engineering Problem Solving and Analysis | 2 | 2 | 3 | 2 | | | | Pre-requisite: ENG1101 |
| SVY2303 Construction Surveying | 2 | 2 | 3 | 2 | | | | Pre-requisite: SVY1104 |
| ENG2002 Technology, Sustainability and Society | 2 | 2 | 4 | 2,3 | | | | |
| SVY3304 Cadastral Surveying | 2 | 2 | 4 | 2 | | | | Pre-requisite: (SVY1102 and SVY1104) or Students must be enrolled in one of the fol lowing Programs: GCNS or GCST or GDNS or GDSTor MSST or MENS |
| SVY3202 Photogrammetry and Remote Sensing | 3 | 1 | 5 | 1 | | | | |
| Elective (Select from the Electives list) | 3 | 1 | 5 | 1 | | | | |
| SVY2302 Mine Surveying | 3 | 1 | 6 | 1 | | | | Pre-requisite: SVY1104 or S tudents must be enrolled in one of the following Program s: GCNS or GCST or GDNS or GDGS |
| Elective (Select from the Electives list) | 3 | 1 | 6 | 1 | | | | |

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|---|---|---|---|---|---|---|---|---|
| Course | Year of program and semester in which course is normally studied | | | | | | Residential school (compulsory /optional) | Enrolment requirements |
| | On-campus (ONC) | | External (EXT) | | Online (WEB) | | | |
| | Year | Sem | Year | Sem | Year | Sem | | |
| SVY3200 Land Administration | 3 | 2 | 5 | 2 | | | | |
| SVY2105 Survey Computations B | 3 | 2 | 5 | 2 | | | | Pre-requisite: SVY2106 or Students must be enrolled in one of the following Programs: GCNS or GCST or GDNS or GDST or MSST or MENS |
| SVY3201 Sustainable Urban Design and Development | 3 | 2 | 6 | 2 | | | | |
| SVY3107 Geodetic Surveying B | 3 | 2 | 6 | 2 | | | | Pre-requisite: SVY1110 or Students must be enrolled in one of the following Programs: GCNS or GCST or GDNS or GDST or MSST or MENS |
| **Practice Courses** | | | | | | | | |
| SVY1901 Surveying and Spatial Science Practice 1^ | 1 | | 2 | 1 | | | C | |
| SVY2902 Surveying and Spatial Science Practice 2^ | 2 | | 3 | 3 | | | C | Pre-requisite: SVY1901 and SVY1102 or Students must be enrolled in one of the following Programs: GCNS or GDNS or MENS |
| SVY2903 Surveying and Spatial Science Practice 3^ | 2 | | 4 | 3 | | | C | Pre-requisite: SVY1901 and SVY1102 or Students must be enrolled in one of the following Programs: GCNS or GDNS or MENS |
| SVY3904 Surveying and Spatial Science Practice 4^ | 3 | | 6 | 2 | | | C | Pre-requisite: SVY2903 or Students must be enrolled in one of the following Programs: GCNS or GDNS or MENS |
| **Electives (Select from the following)** | | | | | | | | |
| SVY4309 Practice Management for Spatial Scientists | | 1 | | 1 | | | | |
| ACC1101 Accounting for Decision-Making | | 1,2 | | 1,2,3 | | | | |
| CIV2605 Construction Engineering | | 1 | | 1 | | | | |
| ENV2103 Hydraulics I | | 1 | | 1 | | | | Pre-requisite: CIV1501 |
| ENV4204 Environmental Technology | | 1 | | 1 | | | | Pre-requisite: MAT1100 or MAT1500 or Students must be enrolled in one of the following programs: GCEN or GDET or METC or MENS or GCNS or GDNS or MSST |
| GIS3404 Geographic Data Visualisation | | 1 | | 1 | | | | |
| SVY4203 Urban and Regional Planning | | 1 | | 1 | | | | |
| CSC1401 Foundation Programming | | 2 | | 1,2 | | | | |
| MAT1502 Engineering Mathematics 2 | | 1,2 | | 1,2 | | | | Pre-requisite: Only Students enrolled in Program BENG must have done MAT1500 or MAT1100 |
| REN1201 Environmental Studies | | 1 | | 1 | | | | |
| SVY4304 Land and Cadastral Law | | 2 | | 2 | | | | |
| GIS3405 Spatial Analysis and Modelling | | 2 | | 2 | | | | |
| GIS3406 Remote Sensing and Image Processing | | 2 | | 2 | | | | |
| GIS4407 Web Based Geographic Information System | | 2 | | 2 | | | | Pre-requisite: GIS1402 or Students must be enrolled in one of the following Program |

| Major study: Surveying (Major Study Code: 15406) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Course | Year of program and semester in which course is normally studied | | | | | | Residential school (compulsory /optional) | Enrolment requirements |
| | On-campus (ONC) | | External (EXT) | | Online (WEB) | | | |
| | Year | Sem | Year | Sem | Year | Sem | | |
| | | | | | | | | s: GCGS or GDST or MSST or GCNS or GCST or GDNS or MENS |

**Footnotes**

* Students with a mathematics background which is not to the standard of a Sound Achievement in Queensland Senior Mathematics B (or equivalent), will be required to undertake ENG1500 Engineering Fundamentals in lieu of MAT1500 Engineering Mathematics 1, and will need to undertake MAT1500 Engineering Mathematics 1 at a later stage of their program as one of their Elective courses. Please refer to the notes in the General Faculty and Program Information section in this Handbook.

^ On-campus students should enrol in the external offering of this course.