PROPOSAL TO INTRODUCE A NEW PROGRAM

1. MAIN FEATURES OF PROPOSAL

1.1 Proposed name of the program
Bachelor of Engineering in Geoinformation Systems

1.2 Proposed abbreviation of the program
BE in Geoinformation Systems

1.3 Program code
3743

1.4 Staff Contact
Dr Samsung Lim

ext/email
54505/s.lim@unsw.edu.au

1.5 Program Authority
School: Surveying and Spatial Information Systems **Faculty:** Engineering
AOU code:

1.6 Reason for the proposal

The School of Surveying & Spatial Information Systems has been offering a single BE degree program – BE in Surveying and SIS. The disciplines of Surveying and Spatial Information Technology/Science/Systems involve the measurement, analysis, management, storage and display of spatial data describing the Earth, its physical features and the built environment. It encompasses professionals in the traditional specialised areas of cadastral surveying, engineering & mining surveying, cartography, computer graphics, photogrammetry, geodesy, and land development.

However, as spatial information is increasingly being integrated into business, government and personal decision-making, the tools and skills of Spatial Information Specialists are finding wider application. Geoinformation technologies and applications are "hot" at present (e.g. Google Earth, Google Maps, Virtual Earth, Pictometry, earth observation, GPS, etc.) and despite the Global Financial Crisis the sector is still experiencing continuing demand. Therefore it is timely to offer a new BE degree program in geoinformation technologies that encompass geographic information systems (GIS), Web-GIS, satellite imagery, databases, computer graphics, remote sensing and global positioning systems. The School has developed two BE degree programs that could be offered as of 2010, one being the BE in Surveying, and the other BE in Geoinformation Systems. This proposal is to introduce **BE in Geoinformation Systems**.

BE in Geoinformation Systems aims to produce geospatial-IT-literate graduates with the appropriate mix of skills for the new digital "geoinformation" industries that require graduates to create digital maps, manipulate satellite/airborne images, build geoweb and mobile applications, set up GIS, monitor environmental parameters, and so on. The proposed BE in Geoinformation Systems is a 4-year engineering degree focusing on geospatial/IT aspects of the School's discipline, and the way the program is structured will not educate graduates to ultimately become registered land surveyors in NSW. However, there will be the opportunity for students to switch from one program to another if they so wish.

Tick relevant box:

	YES	**NO**
1.7 Authorisation		
Has this proposal received endorsement from the: **University Librarian**	X	
Has this proposal received endorsement from the: **Registrar's Nominee**		X

Has this proposal received approval from the: **Dean**	X	
1.8 Consultation Process Have other interested parties, including other academic units, students and visiting committees, been consulted on this proposal? Provide details under section 3.	X	
1.9 Planning Office Does this proposal fit in with your Faculty's enrolment profile? Has the Planning Office been informed of your proposal?	X	
1.10 Units of Credit Does this proposal conform to the University's policy on units of credit? Provide details, particularly where there is a divergence from this policy, under section 2.5.	X	
1.11 General Education Program (<u>for undergraduate programs only</u>) Does this proposal conform to the University's policy on General Education? (Undergraduate programs must include: (i) 12 units of credit in General Education courses and, (ii) 56 hours of instruction in professional ethics and social responsibility of graduates.) Provide details, particularly where there is a divergence from this policy, under section 2.11.3.	X	

2. PROGRAM DETAILS

2.1 Conditions governing the award

Program rules will be provided under the Faculty Handbook Entry.

2.2 Is it proposed that this program will replace an existing program?

YES		
NO	X	

2.3 CURRENT ENTRY IN THE FACULTY HANDBOOK

None

2.4 PROPOSED ENTRY IN THE FACULTY HANDBOOK

The BE in Geoinformation Systems is a four year, full time degree program. This program aims to prepare a graduate for a broad range of career opportunities in the various branches of geoinformation technologies and applications. To this end the program covers general geoinformation principles, as well as specialised geoinformation practice. Specialisation is provided for through the provision of elective courses offered in the third and fourth years of the program and the choice of a targeted final year thesis project often aligned with an external industry partner.

As geoinformation is increasingly being integrated into business, government and personal decision-making, the tools and skills of geoinformation specialists are finding wider application. Geoinformation technologies encompass geographic information systems (GIS), Web-GIS, satellite imagery, databases, computer graphics, remote sensing and global positioning systems (GPS).

The BE in Geoinformation Systems aims to nurture geospatial-IT-literate graduates with the appropriate mix of skills for the new digital geoinformation industries that require graduates able to construct digital

maps, manipulate satellite/airborne images, build geoweb and mobile applications, set up GIS, monitor environmental parameters, and so on.

For details of all academic requirements for this program, see http:www.eng.unsw.edu.au/rules/

Program Objectives and Learning Outcomes

Please see http:www.eng.unsw.edu.au/rules/

Program Structure

The program structure below gives one sequence of courses that fulfils the requirements of the degree. The timing of the general education courses and elective courses may be modified to optimize the student's choice of courses. Suggestions for other course sequences consistent with timetabling and availability can be found on the School website at http://www.gmat.unsw.edu.au While some courses are given twice a year, many courses are given only once a year. In addition, courses may have prerequisites and exclusions. Thus students should plan their enrolments appropriately.

Year 1

Choose ONE of:

MATH1131 Mathematics 1A (6 UOC)

MATH1141 Higher Mathematics 1A (6 UOC)

And ONE of:

MATH1231 Mathematics 1B (6 UOC)

MATH1241 Higher Mathematics 1B (6 UOC)

And ONE of:

PHYS1121 Physics 1A (6 UOC)

PHYS1131 Higher Physics 1A (6 UOC)

Plus these following 3 courses:

ENGG1000 Engineering Design (6 UOC)

GMAT1110 Surveying and GIS (6 UOC)

COMP1917 Higher Computing 1 (6 UOC)

Plus choose two electives from the Year 1 Elective list
http://www.eng.unsw.edu.au/rules/elective.htm

Suggested Year 1 electives for this program are:

GMAT1400 Land Resource Assessment (6 UOC)

COMP1927 Higher Data Structures and Algorithms (6 UOC)

Not all courses are offered in both sessions but students should complete 24 UOC in each session.

Year 2

GMAT2210 GIS in Practice (6 UOC)

GMAT2500 Surveying Computations and CAD (6 UOC)

GMAT2550 Data Analysis by Least Squares (6 UOC)

GMAT2700 Geodesy and Spatial Reference Frames (6 UOC)

MATH2089 Numerical Methods & Statistics (6 UOC)

COMP1927 Higher Data Structures and Algorithms (6 UOC)

COMP2911 Engineering Design in Computing 2 (6 UOC)

General Education (6 UOC)

Students who have taken COMP1927 in Year 1 have available Year 2 elective in their program. Guidance and approval from the Director of Undergraduate Studies should be sought for the selection of this elective and the re-arrangement of the program. Suggested Year 2 elective for students who have taken COMP1927 in Year 1 is:

COMP2041 S/W Construction: Techniques and Tools (6 UOC)

Year 3

GMAT3150 Field Projects (6 UOC)

GMAT3210 Geoinformation Science (6 UOC)

GMAT3420 Cadastral Surveying and Land Law (6 UOC)

GMAT3600 Earth Observation Systems (6 UOC)

GMAT3700 Precise GPS Positioning (6 UOC)

General Education (6UOC)

Two Electives (12UOC)

Year 4

GMAT4010 Undergraduate Project Thesis A (6 UOC)

GMAT4015 Undergraduate Project Thesis B (6 UOC)

GMAT4150 Field Projects 2 (6 UOC)

GMAT4720 Survey Business Management (6 UOC)

Four electives (24UOC)

Year 3 Electives

Suggested (others may be accepted with Head of School approval)

COMP3171 Object-Oriented Programming (6 UOC)

COMP3311 Database Systems (6 UOC)

COMP3421 Computer Graphics (6 UOC)

COMP3511 Human Computer Interaction (6 UOC)

GMAT2120 Electronic Survey Instruments (6 UOC)

GMAT3100 Surveying Applications and Design (6 UOC)

Year 4 Electives

COMP4511 User Interface Design and Construction (6 UOC)

COMP9018 Advanced Graphics (6 UOC)

COMP9315 Database Systems Implementation (6 UOC)

COMP9318 Data Warehousing and Data Mining (6 UOC)

COMP9321 Web Applications Engineering (6 UOC)

COMP9322 Service-Oriented Architectures (6 UOC)

COMP9323 e-Enterprise Project (6 UOC)

COMP9417 Machine Learning and Data Mining (6 UOC)

COMP9517 Computer Vision (6 UOC)

GMAT4400 Land Management and Development Design 1 (6 UOC)

GMAT4450 Land Management and Development Design 2 (6 UOC)

GMAT4860 Sustainable Land Development (6 UOC)
GMAT4900 Principles of GPS Positioning (6 UOC)
GMAT4910 GeoIT and Informobility Applications (6 UOC)
GMAT9211 Modern Geodesy and Applications (6 UOC)
GMAT9300 Aerial and Satellite Imaging Systems (6 UOC)
GEOS3911 Environmental Impact Assessment (6 UOC)

Total HPW Session 1 and 2 depends on electives chosen.

General Education Requirements
Please see http:www.eng.unsw.edu.au/rules/

Honours
Please see http:www.eng.unsw.edu.au/rules/

Academic Rules
Please see http:www.eng.unsw.edu.au/rules/

Fees
For information regarding fees for UNSW programs, please refer to the following website: https://my.unsw.edu.au/student/fees/FeesMainPage.html

Industrial Experience Requirements
Please see http:www.eng.unsw.edu.au/rules/

Field Excursions
Students may have to complete a number of field projects as part of their program and are expected to complete all necessary fieldwork for any course. They must be prepared to pay all the appropriate costs associated with these field projects, and must be in attendance at all scheduled examinations, except in exceptional circumstances.

Professional Recognition
The degree of BE in Geoinformation Systems is not yet recognised by Engineers Australia for admission of its graduates as corporate members. Professional recognition will be sought.

Area(s) of Specialisation
Geoinformation Systems

2.5 Units of credit

Stage 1	48UOC
Stage 2	48UOC
Stage 3	48UOC
Stage 4	48UOC
Stage 5	

Stage 6
Total units of credit for the program 192
Full-time program load equivalence (EFTSU)

2.6 Admission Requirements

The Faculty of Engineering policy will be applied on admission, advanced standing, credit transfer and/or exemptions.

Exemption or substitution will be approved by a program authority where a student is not required to undertake a course they have already completed as part of another award but they are required to complete the same number of units of credit in other courses.

2.7 Program attendance mode

Will this program be available on an

Internal	X
External	
Combination	

2.7.1 Multi-mode Delivery

Courses will be offered in a full semester mode by full-time or part-time staff on the campus.

2.8 Program attendance type

Will this program be available in:

Full-time	
Part-time	
Both	X

2.9 Program of study (stream) (POS) available in this program

N/A

2.10 Next Program Review Date

2014, the normal 4 year cycle

2.11 For Undergraduate Programs only

2.11.1 Program Prerequisites

Are there any program pre-requisites for admission eg. HSC 2 Unit English?

YES	

NO	X

2.11.2 UAC Code
UAC CSP CODE: 425006 (tentative)
UAC DFEE CODE: 445006 (tentative)

2.11.3 General Education program
No change to current General Education requirements of UNSW (12UOC).

(i) 12 units of credit in General Education courses
The program is designed such that General Education courses should normally not be taken in the first year of study.

(ii) 56 hours of instruction in professional ethics and social responsibility of graduates
Provided through ENGG1000 and GMAT3150.

2.11.4 Honours
(i) Will Honours be awarded in this program?

YES	X
NO	

(ii) How will Honours be determined?
By meritorious performance during the program determined by WAM.

2.11.5 University Medal
Can the program lead to the award of the University Medal?

YES	X
NO	

2.12 For Postgraduate Programs only

2.12.1 Research Degree

2.12.2 Inclusion of Undergraduate Courses

2.13 For Double, Combined or "Fast Track" Programs only

2.13.1 Completion requirements for the degree/degrees

2.13.2 Transfer arrangements to either of the single degrees

2.13.3 Award of Honours in the degree/degrees

2.13.4 General Education program

2.13.5 Program Authority

2.14 For Alternative Delivery Programs only

2.14.1 Alternative Delivery Arrangements

2.14.2 University resources required by students

2.15 Information Technology Requirements for students (for all proposed programs)

Where specialist software packages are required, access will be provided as part of a course pack for students. Information on requirements for individual courses and/or specialisations is provided in the handbook descriptions and course outlines.

3. CROSS REFERRAL

3.1 Academic Units with Potential Interest

School of Computer Science and Engineering

3.2 Material Overlap and Service Teaching

(i) Does the proposal overlap with material already being taught by other academic units?
No

(ii) Will students in other programs take courses in this program?
Civil Engineering students will take GMAT1110 as an elective.

(iii) Will service teaching be provided or has it been in the past and will it no longer be provided, by other departments/schools?
Many of Year 3 Electives and Year 4 Electives will be provided by the School of Computer Science Engineering and other Schools in the Faculty of Engineering and other Faculties.

3.3 Academic Cross-referral

I have examined the Program Proposal and have no concerns with the matter proceeding.

Further Comments:

Dean or Presiding Member of consulted Faculty/Faculties
/ /2009

3.4 Administrative Units or External Organisations with Interest

The proposal has been developed by the School's academic executive committee after extensive consultation within the School of SSIS (including staff and current students), the School's Advisory Board, the School of Computer Science and Engineering (including Head of School and Director of Undergraduate Studies), and Associate Dean of the Faculty (Academic).

3.5 Administrative Cross-referral

I have examined the Program Proposal and have no administrative concerns with the matter proceeding.

Further Comments:

Registrar's Nominee

/ /2009

4. COURSE DETAILS

No new courses required.

5. RESOURCE STATEMENT

5.1 Resource Impact Summary
N/A

5.2 Enrolment Planning

2010:	30
2011:	60
2012:	60

5.3 Details of Fees
Local students are subject to normal HECS requirements.
International students are subject to normal fees for programs in the Faculty of Engineering.

5.4 Teaching/Staff Commitments

5.4.1 Teaching Format
No change from current practice.

5.4.2 Staffing Requirements
No additional staffing required.

5.4.3 Support Requirements
No additional support required.

5.5 Accommodation
No additional facilities required

5.6 Materials Requirements
No additional materials required.

5.7 Equipment Requirements
No additional equipment required.

5.8 Computing Requirements
No additional computing s/w required.

5.9 Library Requirements
No additional library holdings required.

6. AUTHORISATION

6.1 University Librarian's Endorsement

I have examined the Library needs related to the above proposal and certify that existing Library holdings, staffing, services and accommodation are adequate / inadequate (delete one) to cover the demands that are inherent in it.

Appropriate arrangements for the use of digitised material to support this program have been made by the Program Authority with the University Librarian.

Further Comments:

University Librarian
/ /2009

6.2 Dean's Approval

I have examined the resource implications of the above proposal in regard to staff, space, materials, equipment, capital funds, and computing, and certify that:

(Tick whichever is applicable)

6.2.1 (i) the proposal involves no additional resources. (A statement from the Head of School explaining how this can be achieved must be provided below); or

(ii) the proposal involves additional resources and it is proposed to redeploy existing resources within the faculty. (A statement from the Head of School explaining how this will be achieved must be provided below); or

(iii) the proposal involves additional resources to be obtained as set out below; or

(iv) the additional resources essential to bring the proposal into effect cannot be found within resources available to the faculty.

6.2.2 **Fees** (delete if not applicable):

- a fee will not be charged for this program (other than HECS)
- a fee will be charged for this program for local fee-paying students
- a fee will be charged for international students

If a fee is to be charged the Dean certifies as follows:

I have ensured that the Vice-Chancellor has been advised of the proposed fee arrangements, and note that approval of fee arrangements is needed before the new program can be implemented.

6.2.3 the proposal conforms to the University's commitment to Equal Opportunity in Education.

Statement from Head of School on Source of Additional Resources and/or Further Comments:

Dean
/ /2009