



## Course Outline

**Code: GEO301**

**Title: Mapping with Drones**

**School:** Science and Engineering  
**Teaching Session:** Semester 1  
**Year:** 2020  
**Course Coordinator:** Javier Leon Email: [jleon@usc.edu.au](mailto:jleon@usc.edu.au)  
**Course Moderator:** Neil Tindale Email: [ntindale@usc.edu.au](mailto:ntindale@usc.edu.au)

Please go to the USC website for up to date information on the teaching sessions and campuses where this course is usually offered

### 1. What is this course about?

#### 1.1 Description

This course will introduce you to the application of drones as mapping platforms for environmental applications. You will learn about the basics of aerodynamics, flight navigation systems, legislation and have hands-on practical experience flying small drones (< 2 kg). The emphasis of the course is on employing rigorous science for processing imagery acquired with drones and deriving and visualising a range of 3D mapping and classification products.

#### 1.2 Field trips, WIL placements or activities required by professional accreditation

Activity	Details
Field trip	A field trip is mandatory for the course and will be undertaken during Week 8. Location and exact time/day subject to variation.

#### 1.3 Course topics

- Drone platforms and navigation systems
- Drone applications for environmental science and management
- Imagery processing with Structure from Motion algorithms
- Classification of hyper-spatial data
- Terrain analysis and 3D visualisation

### 2. What level is this course?

300 level Graduate - Independent application of graduate knowledge and skills. Meets AQF and professional requirements. May require pre-requisites and developing level knowledge/skills. Normally taken in the 3rd or 4th year of an undergraduate program

### 3. What is the unit value of this course?

12 units

#### 4. How does this course contribute to my learning?

<b>Specific Learning Outcomes</b> On successful completion of this course, you should be able to:	<b>Assessment tasks</b> You will be assessed on the learning outcomes in task/s:	<b>Graduate Qualities or Professional Standards mapping</b> Completing these tasks successfully will contribute to you becoming:
Demonstrate fundamental knowledge about drone application to mapping, monitoring and restoration.	1. Quizzes 2. Report 3. Field Report	Knowledgeable Ethical.
Design field data collection methodologies and critically analyse different approaches and results	2. Report 3. Field Report	Empowered.
Search, select and analyse relevant academic information and communicate findings to different audiences.	2. Report 3. Field Report	Creative and critical thinkers.
Demonstrate skills in problem definition	2. Report 3. Field Report	Creative and critical thinkers.

#### 5. Am I eligible to enrol in this course?

Refer to the [USC Glossary of terms](#) for definitions of “pre-requisites, co-requisites and anti-requisites”.

##### 5.1 Enrolment restrictions

Nil

##### 5.2 Pre-requisites

ENS253 Geographic Information Science and Technology or enrolled in AR301

##### 5.3 Co-requisites

Nil

##### 5.4 Anti-requisites

Nil

##### 5.5 Specific assumed prior knowledge and skills (where applicable)

GIS and remote sensing

#### 6. How am I going to be assessed?

##### 6.1 Grading scale

Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)

## 6.2 Details of early feedback on progress

Early feedback on the structure for Assessment product 2 report will be given during week 4. Feedback on the topic selection and structure for Assessment product 3 will be given during week 8.

## 6.3 Assessment products

Task No.	Assessment Product	Individual or Group	Weighting %	What is the duration / length?	When should I submit?	Where should I submit it?
1	Quiz/zes	Individual	15%	During computer workshop	During computer workshop	Online Assignment Submission
2	Report	Individual	45%	2,000 words	5pm Friday week 7	Online Assignment Submission with Plagiarism check
3	Oral, and Written Piece	Group	40%	2,000 words and 10 minutes per group	Week 12, 13	Online Assignment Submission with Plagiarism check
			100%			

### Assessment product 1a & 1b: Quizzes

<b>Goal:</b>	To develop your theoretical and practical skills in using drones for mapping applications
<b>Product:</b>	Quiz/zes
<b>Format:</b>	During computer workshops you will be provided with reading material and exercises. At the end of the computer workshop you will complete an online quiz and submit via Blackboard.
<b>Criteria:</b>	<ol style="list-style-type: none"> <li>1. Depth of understanding about principles of flying</li> <li>2. Depth of understanding about flying legislation</li> </ol>
<b>Generic skill assessed</b>	<b>Skill assessment level</b>
Information literacy	Graduate
Applying technologies	Graduate
Problem solving	Graduate

### Assessment product 2: Technical report

<b>Goal:</b>	To identify, interpret and communicate an overview of key concepts in processing and reporting drone-derived data.
<b>Product:</b>	Report
<b>Format:</b>	The report should synthesise and communicate results derived from computer workshops in a clear and concise writing style. The length should be a maximum of 2,000 words and the structure should follow a conventional scientific report template.
<b>Criteria:</b>	<ol style="list-style-type: none"> <li>1. Identification of appropriate literature (relevant, current, credible)</li> <li>2. Demonstrate skills in data analysis and presentation of results</li> <li>3. Structure, clarity and style of the written assignment</li> </ol>
<b>Generic skill assessed</b>	<b>Skill assessment level</b>
Communication	Graduate
Information Literacy	Graduate

**Assessment product 3: Fieldtrip report**

<b>Goal:</b>	To present the methodology and results obtained from fieldwork, including the analysis and discussion of data/evidence collected and conclusions derived from the results	
<b>Product:</b>	Oral and Written Piece	
<b>Format:</b>	A concise scientific report based on data collected by each group. The written report should be around 2,000 words and written in the style of a manuscript for publication in the peer-reviewed literature, including a reference list, as well as tables and illustrations, as needed. Each group will also present their main findings as an oral presentation, which will include a 3D visualisation of results.	
<b>Criteria:</b>	<ol style="list-style-type: none"> <li>1. Application of theoretical and practical knowledge.</li> <li>2. Use of measuring methods and tools to collect data and produce 3D products and classified maps.</li> <li>3. Accurate interpretation and analysis of data</li> <li>4. Critical analysis of advantages and limitations of applied methods</li> <li>5. Communication, both orally and in structured writing, to informed audiences in a field report, using supporting scholarly sources and data.</li> <li>6. Demonstration of collaboration and working well in a group.</li> <li>7. Quality of presentation, grammar and spelling.</li> </ol>	
<b>Generic skill assessed</b>	<b>Skill assessment level</b>	
Communication	Graduate	
Organisation	Graduate	
Information literacy	Graduate	
Collaboration	Graduate	

**7. Directed study hours**

The directed study hours listed here are a portion of the workload for this course. A 12 unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Directed study hours may vary by location. Student workload is calculated at 12.5 learning hours per one unit.

<b>Location:</b>	<b>Directed study hours for location:</b>
USC Sunshine Coast	Lectures: 2 hours per week x 12 weeks Computer Labs: 1 or 2 hours per week (as specified) x 10 weeks Field Trip: 2 hours during Week 8

**8. What resources do I need to undertake this course?**

Please note that course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site. Please log in as soon as possible.

**8.1 Prescribed text(s)**

N/A

**8.2 Specific requirements**

Field work is a significant component for this course. You will be required to undertake field work (1 day, local), where you will need to wear covered footwear, hat, long-sleeved shirt and long trousers for field safety. Detailed time, location and potential costs will be set out at the beginning of the semester. Discuss any financial hardship that might be associated with the field studies with the Course Coordinator.

## **9. Risk management**

Risk assessments have been performed for all field activities and low to moderate levels of health and safety risk exists. Moderate risks may include working in an Australian bush setting, working with people, working outside normal office hour for example. It is your responsibility to research and understand the risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the online induction training for students.

## **10. What administrative information is relevant to this course?**

### **10.1 Assessment: Academic Integrity**

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

### **10.2 Assessment: Additional requirements**

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

- a) The final mark is in the percentage range 47% to 49.4%
- b) The course is graded using the Standard Grading scale
- c) You have not failed an assessment task in the course due to academic misconduct

### **10.3 Assessment: Submission penalties**

Late submission of assessment tasks will be penalised at the following maximum rate:

- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task's identified value) for the third day
- 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task.

Weekdays and weekends are included in the calculation of days late.

To request an extension, you must contact your Course Coordinator and supply the required documentation to negotiate an outcome.

#### 10.4 Study help

In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to [Student Hub](#).

Contact Student Central for further assistance: +61 7 5430 2890 or [studentcentral@usc.edu.au](mailto:studentcentral@usc.edu.au)

#### 10.5 Wellbeing Services

Student Wellbeing Support Staff are available to assist on a wide range of personal, academic, social and psychological matters to foster positive mental health and wellbeing for your success. Student Wellbeing is comprised of professionally qualified staff in counselling, health and disability Services.

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, mental health issue, learning disorder, injury or illness, or you are a primary carer for someone with a disability, [AccessAbility Services](#) can provide assistance, advocacy and reasonable academic adjustments.

To book an appointment with either service go to [Student Hub](#), email [studentwellbeing@usc.edu.au](mailto:studentwellbeing@usc.edu.au) or [accessability@usc.edu.au](mailto:accessability@usc.edu.au) or call 07 5430 1226

#### 10.6 Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability

Visit the USC website:

<http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching>

#### 10.7 General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC Moreton Bay** – Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **USC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **USC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: [studentcentral@usc.edu.au](mailto:studentcentral@usc.edu.au)