

Course Outline

Code: ENS224

Title: Soil Properties, Processes and Rehabilitation

School of:	Science & Engineering
Teaching Session:	Semester 2
Year:	2020
Course Coordinator:	Peter Davies Email: pdavies1@usc.edu.au
Course Moderator:	Neil Tindale

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

Soils represent an important and essential element of the planet's ecosystems, and are particularly relevant to not only environmental scientists and the Earth sciences, but to all industry and community stakeholders. This course provides you with advanced theory, sampling and analytical skills regarding soils, specifically with regards to physical, geochemical and biological processes and culminates with a series of field trips where you will evaluate local degraded and contaminated sites, conduct assessments and evaluations of these sites and provide recommendations for their rehabilitation.

1.2 Course topics

Pedogenesis
Soil Sampling
Physical, geochemical and biological properties of soils
Nutrient cycling in soils
Soil laboratory basics and statistical analyses
Instrument techniques appropriate for soil analysis
Field work, including site assessment and field analyses

2. What level is this course?

200 level Developing - Applying broad and/or deep knowledge and skills to new contexts. May require pre-requisites and introductory level knowledge/skills. Normally undertaken in the 2nd or 3rd 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?

Specific Learning Outcomes On successful completion of this course you should be able to:	Assessment Tasks You will be assessed on the learning outcome in task/s:	Graduate Qualities or Professional Standards mapping Completing these tasks successfully will contribute to you becoming:
Demonstrate and apply theoretical and practical knowledge of soil processes and principles to regional and global contexts	1. Field trip workbook 2. Soil core report	Knowledgeable.
Use practical techniques and analytical methods to collect and organise soil and sedimentary information e.g. observation, sampling, laboratory testing, recording	1. Field trip workbook 2. Soil core report	Empowered.
Integrate findings to identify, classify and interpret soils and to assess, evaluate and provide recommendations for their rehabilitation	1. Field trip workbook 2. Soil core report 3. Field rehab seminar	Creative and critical thinkers. Knowledgeable.
Communicate findings through scientific reports and seminars.	1. Field trip workbook 2. Soil core report 3. Field rehab seminar	Engaged.

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

ENS103

5.3 Co-requisites

Nil

5.4 Anti-requisites

Nil

5.5 Specific assumed prior knowledge and skills (where applicable)

Basic knowledge of geological and pedological theory

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

The field trip in week two is designed as a field workshop to assist in completing task 1a.

6.3 Assessment tasks

Task No.	Assessment Tasks	Individual or Group	Weighting %	What is the duration / length?	When should I submit?	Where should I submit it?
1a	Field Trip Workbook A	Individual	10%	500 words	Week 3	Blackboard
1b	Field Trip Workbook B	Individual	40%	1500 words	Week 12	Blackboard
2	Soil Core Report	Individual	30%	2500 words	Week 9	Blackboard
3	Field Trip Rehabilitation Seminar	Group or Individual	20%	15 minutes	Week 13	In class or online via Zoom
			100%			

Assessment Task 1a and 1b: Field Trip Workbook

Goal:	The goal of this task is to develop field and reporting skills through observing, recording data and completing a workbook (provided) on different soil types and associated environments observed on the field trips taken throughout the course.
Product:	Field Trip Workbook
Format:	You are required to complete and submit a 2000 word workbook on the observations and data collected during the field trips. (500 words per field trip) Students will receive formative feedback on the first two field trips (1a)
Criteria:	You will be assessed on quality of: <ul style="list-style-type: none"> • Descriptions of each field site, soil parameters and associated environments observed. • Validity / rigour of field work conducted • Presentation and interpretation of data

Assessment Task 2: Soil Core Report

Goal:	To produce an initial site assessment and scientific report that integrates and evaluates soil core information
Product:	Scientific Report
Format:	You are required to submit a 2000 word report on the observations and data collected from the physical and geochemical analyses of the soil core collected during the first six weeks of the course.
Criteria:	You will be assessed on quality of: <ul style="list-style-type: none"> • Demonstration of appropriate data collection • Application of practical techniques and analytical methods to provide descriptions of cores observed based on soil core characteristics. • Validity and rigor of laboratory work conducted and use of appropriate statistical analysis • Integration of findings to provide appropriate presentation and interpretation of data • Evidence of teamwork and collaboration with peers • Communication of results

Assessment Task 3: Field Trip Rehabilitation Seminar

Goal:	You will collect and analyse complex field data from the NDLC field trip and develop a presentation that includes site rehabilitation activities to a group of peers and professionals.
Product:	Seminar
Format:	Student groups will present a 15 minute oral seminar supported with multimedia resources to their peers, course staff and invited environmental professionals. For online students, an individual seminar via Zoom will be presented
Criteria:	You will be assessed on quality of: <ul style="list-style-type: none"> • Scientific communication: presentation of a scientific seminar • Assessment and descriptions of soils observed based on their characteristics. • Validity and rigour of field / laboratory work conducted • Recommendations • Evidence of teamwork and collaboration with peers

7. What are the course activities?**7.1 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.

This course will be delivered via technology-enabled learning and teaching. All lectures will remain in this mode for Semester 2 2020. When government guidelines allow, students that elected on-campus study via the class selection process will be advised when on campus tutorials and practical sessions will resume.

Location: Specific Campus(es) or online:	Directed study hours for location:
USC Sunshine Coast	1 x 2 hour lecture per week; 1 x 2 hour Laboratory session weeks 3,,5,6, 7, 8, 12 and 13; 1 x 3 hour field trips weeks 1,2, 4, 9,10,11 For online students, all lectures, labs and field trips will be filmed and available via Blackboard.

7.2 Course content

Week # / Module #	What key concepts/content will I learn?
1	Intro to soils <ul style="list-style-type: none"> • What is a soil? • Primary productivity and natural systems
2	Soil Sampling <ul style="list-style-type: none"> • Techniques • Appropriate methods
3	Pedogenesis <ul style="list-style-type: none"> • Formation processes • Horizons / profiles • Types of soils
4	Physical properties I <ul style="list-style-type: none"> • Structure / texture • Colour and composition

5	Physical properties II <ul style="list-style-type: none"> • Soil mechanics • Soil water; Aeration / drainage • Morphology of colloids
6	Geochemical properties I <ul style="list-style-type: none"> • Links between phys / chem • Moisture / pH / Salinity
7	Geochemical properties II <ul style="list-style-type: none"> • Transfers / transformations • Clay chemistry / Ionic exchange • Sediment / pollution transport
8	Biological properties I <ul style="list-style-type: none"> • Soil organic matter • Soil organisms (macro / meso)
9	Biological properties II <ul style="list-style-type: none"> • Soil microbes • Microbial facilitations
10	Nutrient cycling <ul style="list-style-type: none"> • C/N/P relationships • Macro / micro nutrients
11	Degraded Soils <ul style="list-style-type: none"> • Eroded and saline soils • Effects of industry / mining
12	Polluted / contaminated soils <ul style="list-style-type: none"> • Contaminated land assessment • Remediation of soils
13	Soil Rehabilitation <ul style="list-style-type: none"> • Assessment / objectives / planning • Regeneration / rehabilitation • Evaluation of success

Please note course content may be subject to variation.

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)

Please note that you need to have regular access to the resource(s) listed below as they are required:

Author	Year	Title	Publisher
National Committee on Soil and Terrain	2009	Australian Soil and Land Survey Field Handbook	CSIRO

8.2 Specific requirements

Nil

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 as a student to review course material, search online, discuss with lecturers and peers, and understand the health and safety risks associated with your specific course of study. It is also your responsibility to familiarise yourself with the University's general health and safety principles by reviewing the [online Health Safety and Wellbeing training module for students](#), and following the instructions of the University staff.

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

Eligibility for Supplementary Assessment

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

10.5 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>

10.6 General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC South Bank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- USC Moreton Bay - Service Centre, Building A – Ground Floor, 1 Moreton Bay Parade, Petrie
- **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