

Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

The sections shown on this interface are based on the templates [UG OBTL+](#) or [PG OBTL+](#)

If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to [Data Transformation Status](#) for more information.

Expected Implementation in Academic Year	
Semester/Trimester/Others (specify approx. Start/End date)	
Course Author * Faculty proposing/revising the course	Asst Prof Aron Meltzner
Course Author Email	meltzner@ntu.edu.sg
Course Title	ADVANCED FIELD COURSE IN GEOLOGY
Course Code	ES3005
Academic Units	0
Contact Hours	204
Research Experience Components	

Course Requisites (if applicable)

Pre-requisites	ES2002 Earth Materials ES2004 Layers and Landforms ES2101 Introduction to Geological Field Mapping ES3002 Structural Geology and Tectonics Or by instructor permission
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

This course will provide you with the essential skills required by all Geoscience based careers, and therefore benefit whichever career path you choose. The course aims to provide you with the knowledge to describe and map geological and geomorphic features in the field, reconstruct detailed histories of geological events from multiple lines of evidence, and link the observable rock record with active Earth processes. This course will challenge you to develop practical field skills in order to document and understand a wide variety of tectonic settings, time periods, and geological processes.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Describe, map, and report on igneous, sedimentary, and metamorphic rocks, active fault scarps, Quaternary deposits and geomorphic features, and volcanic deposits.
ILO 2	Document detailed and informative observations, as well as your evolving ideas in a field notebook.
ILO 3	Map complex geology and morphology on topographic basemaps.
ILO 4	Make appropriate structural and stratigraphic measurements.
ILO 5	Collect and annotate effective field photographs.
ILO 6	Communicate your observations and scientific conclusions drawn from how geological processes shaped the area you are studying.
ILO 7	Articulate the main geological concepts present in the area you are studying, and suggest areas for further research.

Course Content

Upon arrival in the field, students will participate in basic orientation exercises including detailed safety briefings. The main field course will take place in three different areas of eastern California. Mapping days On each mapping day, students will participate in a morning briefing, head into the field area to participate in mapping projects, and work on report writing or map production in the evening. Students will participate in camp maintenance and food preparation on a rotating group basis. Area 1 - Cerro Gordo, CA Students will map bedrock geology of a fold-and-thrust belt. They will identify rock types and their field relationships, construct cross sections at multiple scales, and create a geological map. Students will observe faults, folds, pervasive deformation structures, sedimentary sequences, and complex igneous units. Area 2 - Panum Crater, CA Students will map a young rhyolitic eruptive center. They will identify different eruptive units, observe and interpret ductile and brittle rock fabrics, and construct a conceptual model of the evolution of Panum Crater during its life cycle. Area 3 - Lundy Canyon, CA Students will map surficial sediments and geomorphic features related to multiple cycles of glaciation, Pleistocene lake level fluctuations, delta formation, and range-front normal faulting. They will create a detailed geomorphic-geological map and investigate the relationships between peak glaciation, lake level high stand, and long-term uplift of the Sierra Nevada mountains. Rest days Approximately one day per week, students will participate in a short morning field exercise and then travel into a nearby town to wash clothes, rest, and participate in voluntary short field excursions in the region. After spending the night in proper accommodations, they will return to the field and participate in afternoon field work. Final field tour The last days of the field camp will be used for regional field excursions, which will challenge the students to integrate their field experiences into an overarching picture of the geological evolution of the East Sierra Nevada region. Camp participation The essential skills of independent field work include the ability to cook, clean, perform tasks that benefit the camp as needed, and maintain good working relationships with other camp members. Students will participate in food preparation, cooking, and dish washing on a rotating group basis.

Reading and References (if applicable)

This course has no textbook. We will provide reference material related to the study areas in the field, and instructors will give periodic evening lectures as well as technical instruction on the outcrop.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
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Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Independent learning	This is an upper level class and therefore students are required to show initiative in their learning process. This supports aspects of all the learning outcomes.
Active learning	Students will be in the field where they will be exposed to learning in different environments. This supports aspects of all learning outcomes

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Others([assignments (e.g. term paper, essay)] Continuous assessment in the field)	1,2,3,4,5,6	Knowledge; Intellectual flexibility and critical thinking; Passion and communication; Formulating questions; Research; Problem solving; interdisciplinary; Lifelong learning; Values; Collaboration and leadership.	20	Individual		
2	Continuous Assessment (CA): Others([case studies/analysis] Field notebook, photographs, maps and cross sections)	1,2,3,4,5,,67	Knowledge; Intellectual flexibility and critical thinking; Problem solving; Interdisciplinary.	40	Individual		
3	Continuous Assessment (CA): Others([group or individual projects/evaluations] Project reports)	6,7	Knowledge; Intellectual flexibility and critical thinking; Passion and communication; Formulating questions; Research; Problem solving; interdisciplinary; Lifelong learning; Values; Collaboration and leadership.	40	Individual		

Description of Assessment Components (if applicable)

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Formative Feedback

Students will present their field notebooks, maps, and annotated photographs to instructors on a periodic basis in order to get feedback. Grades will be assessed on neatness of presentation, application of appropriate scientific documentation methods, correctness, and relevance to geological problems previously highlighted by the instructors.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
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Course Policy

Policy (Academic Integrity)

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Policy (General)

Students are expected to complete all assigned readings and activities, and take all scheduled assignments by due dates. Students are expected to take responsibility to follow up with course notes, assignments and course related announcements they have missed.

Policy (Absenteeism)

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Policy (Others, if applicable)

Students are expected be aware that they are representing ASE and NTU whilst on placement, and behave in a way which represents the school and department favourably.

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Last Updated By: Lim Zu An