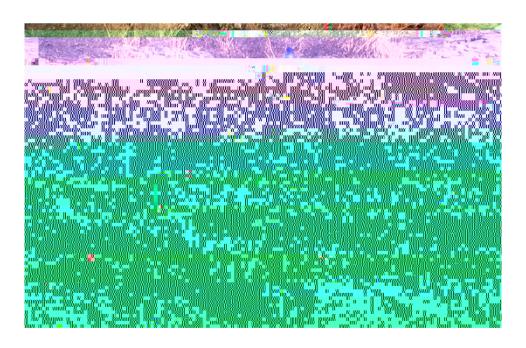


GEOS3141 Mineral and Energy Resources (6 UOC)

MINE2810 (Ore Deposits and Coal Component) Minerals and Processing (6 UOC)



MANUAL

Term 3, 2022

LECTURES all face-to-face

Weeks 1-5

Monday 9-

1. QASS SCHEDULE (MINE281) students should also refer to Mineral processing component schedule)

Wk	Lecture 1 (1hr)	Lecture 2 (1hr)	Lecture 3 (1hr)	Lab 1 (2hr)	Lab 2 (2hr)	Assessment
1	Intro to course (IG)	Weathering, oxidation and alteration (IG)	Ore Petrology (IG)	Revision of minerals (IG)	Alteration assemblages and structures (IG)	
2	Volcanogenic massive sulfide deposits (IG)	Structural controls on ore deposits (MvK)	JORC code and compliance (JB)	Ore petrology (IG)/Ore suites 1 (IG)	Ore suites 2 (IG)	First summary sheet (initial feedback on deposit reports)
3	Porphyry Cu-Au-Mo 1 (IG)	Porphyry Cu-Au-Mo 2 (IG)	Sedimentary and supergene Fe/Mn deposits (IG)	Ore suites 3 (IG)	Ore suites 4 (IG)	
4	Public Holiday (no class)	Hydrothermal Au 1 (IG)	F)	Ore suites 5 (IG)	Ore suites 6 (IG)	
5	Use of portable technologies (DC)	Magmatic deposits 1 (IG)	M (I	Mineral economics (DC) (DC)	Ore suites 7 (IG)	
5				Coal 1 (JB)	Coal II (JB)	Summary sheets due

Week 10

Mon 14 Nov Industry Speaker Wed 16 Nov Student Seminars Thu 17 Nov Student Seminars

IG = Ian Graham

MvK = Martin van Kranendonk

DC = David Cohen

JB = John Barber

NR = Neil Rutherford

LAB Classes

WEEK 1

Wed 14 Sept LAB 1, 11-1: Revision of minerals (IG)

Fri 16 Sept LAB 2, 11-1: Alteration assemblages and structures (IG)

WEEK 2

Wed 21 Sept LAB 3, 11-1: Ore Petrology/Ore suites 1 (IG)

Fri 23 Sept LAB 4, 11-1: Ore suites 2 (IG)

WEEK 3

Wed 28 Sept LAB 5, 11-1: Ore suites 3 (IG)

Fri 30 Sept LAB 6, 11-1: Ore suites 4 (IG)

WEEK 4

Wed 5 Oct LAB 7, 11-1: Ore suites 5 (IG)

Fri 7 Oct LAB 8, 11-1: Ore suites 6 (IG)

WEEK 5

Coal component for MINE2810 students / normal classes for GEOS3141 students

Wednesday 12 Oct LAB 9, 11-1: Mineral Economics (DC)98 Tm0 g0 G[)]TJETQ000008873 0 59544 841

WEEK 8

Wed 2 Nov LAB 13, 11-1: Ore suites 9 (IG)

Fri 4 Nov LAB 14, 11-1: Lab skills revision (IG)

WEEK 9

Wed 9 Nov LAB 15, 11-1: Lithogeochemistry (DC) Fri 11 Nov **LAB 16, 11-1: Lab skills test (IG)**

WEEK 10

Wed 16 Nov LAB/LEC 17, 11-1: Geotechnical (industry)

Fri 18 Nov Lab 18, 11-1: Field techniques (IG)

2. COURSELOGISTICS

This course component forms part of GEOS3141 (6 uoc) and MINE2810. GEOS3141 extends for all 10 weeks and includes the mineral (ore and coal) and the petroleum geology component. The geology component of MINE2810 extends over the first 5 weeks.

It is a core course of the BE (Mining Engineering) and in the geology major of the BSc, as well as being an option in other science programs for students who have completed the necessary prerequisite level 1 GEOS courses.

Course staff (Geology component):

IG Ian Graham Coordinator i.graham@unsw.edu.au Samuels 131

Lecturers DC David Cohen d.cohen@unsw.edu.au by arrangement JB Jbn Barber

i.barber@unsw.edu.au OMB (Mining Eng)

Other Details:

Year of Delivery	2022
Course Code	GEOS3141 / MINE2810

Laboratory work will provide practical skills in identifying the key features of samples from some important ore deposits and to place these samples within the geological framework of the genesis of those deposits.

Knowledge, Understanding and Skills (Course learning outcomes):

- (a) Knowledge and understanding of:
 - 1. The nature of economic geology as a discipline
 - 2. Relevant fundamentals of ore- and coal-forming processes
 - 3. Ore deposits in the context of their plate tectonics setting
 - 4. Genetic models for key deposit types and related examples

(b) Intellectual skills

- 1. Think logically and critically in a scientific manner
- 2. Undertake study and investigations in areas of science outside those immediately familiar
- 3. Analyse and interpret mineralogical and lithological data
- 4. Distill observations, literature review and other knowledge into concise technical reports
- 5. Appreciate the current state of knowledge of ore deposits

(c) Practical skills

- 1. Accurately observe, record and interpret earth materials and data
- 2.

Marking Criteria:

Laboratories	Demonstrate basic observational skills applied to samples.	Demonstrate a high level of observational skills applied to samples.		
	Adequate presentation of results.	Superior skills in presentation of results.		
	Basic data interpretation and the drawing of condusions from results.	Detailed interpretation of results drawing out most of the key features of the data as		
	Use of dear technical English in reports.	they relate to the problems posed.		
		Use of literature to assist in interpretation of observations, including a number of journal articles.		
		Use of clear technical English in reports.		
Seminar	Some demonstration of capacity to generate own slides, with necessary clarity and	Creation of high visual impact slide material.		
GEOS3141 only	relevance to topic.	Capacity to enthuse audience with the oral presentation. A high level of technical content.		
	Capacity to engage audience with the oral			
	presentation.			
	Good technical content.			
	Correct timing.			
	Ability to answer questions.			

7. ACADEMICHONESTY AND PLAGIARISM

UNSW policies on avoiding plagiarism must be followed. Students who commit plagiarism, as defined below, risk academic penalties ranging from loss of marks to exclusion from the university.

What is Plagiarism?

direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished),

8. H&S OBLIGATIONS

The School of BEES recognises its obligations to provide a safe working environment for all persons involved in School-related activities. To achieve this goal with regards to teaching and learning, the School conforms with the UNSW Health and Safety Policy Statement and related procedures. These documents stipulate that everyone attending a UNSW workplace must ensure their actions do not adversely affect the health and safety of others. This outcome is achieved

Ore Suite Specimen Sets (selected from)

DEPOSIT TYPE VHMS Sedex	Porphyry / epithermal	Mesothermal Au	Magmatic Ni	Iron Ore	Regolith
Mt. Isa Woodlawn Rosebury Scuddles Mt. Lyell Lady Loretta Century	Bingham Goonumbla Ok Tedi Grasberg Woodlark	Giddginbung Lancefield St Ives Kalgoorlie Paddington	Sudbury Kambalda Mt. Windarra	Middleback Ra.	Lady Annie Thakaringa

10. ORE SUITE SPEAMEN SETS (PAPERS)

VHMS/ sedex

Mt. Isa Forrestal, P.J., 1990, Mount Isa and Hilton Silver-Lead-Zinc Deposits.

Woodlawn McKay, W.J. and Hazeldene, R.K., 1987, Woodlawn Zn-Pb-Qu sulfide deposit, NSW,

Australia: An interpretation of ore formation from field observations and metal zoning.

Rosebury Lees, T., Khin Zaw, Large, R.R. and Huston, D.L., 1990, Rosebery and Hercules Copper

Lancefield & Ives Hronsky, J.M.A., Perriam, R.P.A. and Schmulian, ML, 1990, Lancefield Gold Deposit,

Laverton.

Kalgoorlie Gout, J.M.F., Geghorn, J.H. and Eaton, P.C., 1990, Geology of the Kalgoorlie gold field

Roberts, D.E. and Elias, M., 1990, Gold Deposits of the Kambalda-St Ives Region.

Paddington Hancock, M.C., Robertson, I.G. and Booth, G.W., 1990, Paddington Gold Deposits.

Magmatic Ni

Sudbury Ames, D.E., 2005, Consolidation and synthesis of mineral deposit knowledge.

Kambalda Cowden, A. and Roberts, D.E., 1990, Komatiite-hosted nickel sulphide deposits,

Kambalda

Mt. Windarra

Reddell, C.T. and Schmulian, M.L., 2002, Windarra Nickel Deposits, Laverton Naldrett, A.J., 2002, Requirements for forming giant Ni-Qu sulphide deposits.

Iron Ore

General

Middleback Ra. Yeates, G. 1990, Middleback Ranges Iron Ore Deposits.

General Harmsworth, R.A., Kneeshaw, M., Morris, R.C., Robinson, C.J. and Shrivastava, P.K.,

1990, BIF-derived iron ores of the Hamersley Province.

Regolith

Thackaringa (Excerpts from) Cohen, E.J., 2014. Cobalt dispersion in the secondary environment at the

Thackaringa cobaltiferous pyrite deposits, Broken Hill, NSW.

Lady Annie (Excerpts from) Davies, O., 2016.

11. REFERENCE LIST:

Ames, D.E., 2005, Consolidation and synthesis of mineral deposit knowledge. Geological Survey of Canada. Web site; gsc.nrcan.gc.ca/mindep/ photolib/vms/ whitewater/index_e.php.

- Davies, O., 2016. Lady Annie. Hons Thesis, UNSW.
- Lanier, G., John, E.C., Swensen, A.J., Reid, J., Bard, C.E., Caddey, S.W. and Wilson, J.C., 1978, General Geology of the Bingham Mine, Bingham Canyon, Utah. Economic Geology, 73:1228-1241.
- Lees, T., Khin Zaw, Large, R.R. and Huston, D.L., 1990, Rosebery and Hercules Copper-Lead-Zinc Deposits. In: F.E. Hughes (Ed), Geology of the Mineral Deposits of Australia and Papua New Guinea, 1241-1247.
- Lindhorst, J.W. and Cook, W.G., 1990, Gidginbung Gold-Slver Deposit, Temora. In: F.E. Hughes (Ed), Geology of the Mineral Deposits of Australia and Papua New Guinea, 1365-1370.
- MacDonald, G.D. and Arnold, L.C., 1994, Geological and geochemical zoning of the Grasberg Igneous Complex, Irian Jaya, Indonesia. Journal of Geochemical Exploration, 50:143-178.
- McKay, W.J. and Hazeldene, R.K., 1987, Woodlawn Zn-Pb-Ou sulfide deposit, NSW, Australia: An interpretation of ore formation from field observations and metal zoning. Economic Geology, 82:141-164.
- Mernagh, T.P., Wyborn, L.A.J. and Jagodzinski, E.A., 1998, Unconformity-related U-Au-PGE deposits AGSO Journal of Australian Geology and Geophysics, 17:197-205.
- Mill, J.H.A., Clifford, B.A., Dudley, R.J. and Roxton, P.A., 1990, Scuddles Zinc-Copper Deposit at Golden Grove. In: F.E. Hughes (Ed), Geology of the Mineral Deposits of Australia and Papua New Guinea, 583-590.
- Naldrett, A.J., 2002, Requirements for forming giant Ni-Ou sulphide deposits. In: Cooke DR & Pongratz J (eds), Giant Ore Deposits: Characteristics, Genesis and Exploration, CODES Spec Publ. 4, 195–220.
- Reddell, C.T. and Schmulian, M.L., 2002, Windarra Nickel Deposits, Laverton In: Cooke DR & Pongratz J (eds), Giant Ore Deposits: Characteristics, Genesis and Exploration, CODES Spec Publ. 4, 561-566.
- Roberts, D.E. and Elias, M., 1990, Gold Deposits of the Kambalda-St Ives Region. In: F.E. Hughes (Ed), Geology of the Mineral Deposits of Australia and Papua New Guinea, 479-491.
- Rush, P.M. and Seegers, H.J., 1990, Ok Tedi Copper-Gold Deposits. In: F.E. Hughes (Ed), Geology of the Mineral Deposits of Australia and Papua New Guinea, 1747-1754.
- Stenger, D.P., Kelsey, S.E., Peltonen, D. and Tapper, C., 1998, Deposition of gold in Carlin-type deposits: The role of sulfidation and decarbonisation at Twin Creeks, Nevada Economic Geology, 90:301-315.
- Thompson, J.F.H, Lessman, J. and Thompson, J.B., 1986, The Temora Au-Ag Deposit: A newly recognised style of high sulfur mineralisation in the lower Palaeozoic of Australia. Economic Geology, 81:732-738.
- Yeates, G. 1990, Middleback Ranges Iron Ore Deposits. In: F.E. Hughes (Ed), Geology of the Mineral Deposits of Australia and Papua New Guinea, 1045-1048.