GEOS3141
Mineral and Energy Resources
(6 UOC)

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

MANUAL

2020
GEOS3141
Mineral and Energy Resources

MINE2810
Minerals and Processing
(Ore deposits and coal component)

Term 3, 2020

Important Dates

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DAY</th>
<th>DATE</th>
<th>DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS3141 and MINE2810:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 1</td>
<td>Tue</td>
<td>15 Sept</td>
<td>Classes commence</td>
</tr>
<tr>
<td>Week 2</td>
<td>Fri</td>
<td>25 Sept</td>
<td>First ore deposit summary pages due</td>
</tr>
<tr>
<td>Week 5</td>
<td>Fri</td>
<td>16 Oct</td>
<td>Laboratory report &amp; remaining summaries (MINE2810 only)</td>
</tr>
<tr>
<td>Week 7</td>
<td></td>
<td></td>
<td>MINE2810 mid-session test. Date and location TBC</td>
</tr>
<tr>
<td>GEOS3141 only:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 3</td>
<td>Fri</td>
<td>18 Sept</td>
<td>Minerals economics exercise due</td>
</tr>
<tr>
<td>Week 9</td>
<td>Fri</td>
<td>15 Nov</td>
<td>Laboratory report and remaining summary pages due</td>
</tr>
<tr>
<td>Week 9</td>
<td>Tue</td>
<td>12 Nov</td>
<td>Lab skills test (in normal lab time)</td>
</tr>
<tr>
<td>Week 10</td>
<td>Thu</td>
<td>22 Nov</td>
<td>Seminar presentations (online)</td>
</tr>
<tr>
<td>Week 10</td>
<td>Fri</td>
<td>23 Nov</td>
<td>Seminar presentations (online)</td>
</tr>
<tr>
<td>Week 10</td>
<td>Fri</td>
<td>23 Nov</td>
<td>Ore deposit essay due</td>
</tr>
</tbody>
</table>

Completed assignments with cover sheet must be submitted in the lab class or via Moodle (as required) on or before the due date.

Penalty for late submission is a reduction in the maximum mark obtainable of 10% per day (a weekend will count as 20%).
LECTURES (all delivered online and pre-recorded)

Tuesday 2-3 pm online
Thursday 5-6 pm online
Friday 12-1 pm online

LABS (Laboratory 2, Ground Floor north-east end of Building D26, Upper Campus)

Tuesday 3-5 pm D26 Lab 2
Wednesday 3-5 pm D26 Lab 2

Week 6 19-25 October will have no classes as it is the fieldtrip week for all BEES courses.
1. **Class Schedule**  
(MINE2810 students should also refer to Mineral processing component schedule)

<table>
<thead>
<tr>
<th>Wk</th>
<th>Lecture 1 (1hr)</th>
<th>Lecture 2 (1hr)</th>
<th>Lecture 3 (1hr)</th>
<th>Lab 1 (2hr)</th>
<th>Lab 2 (2hr)</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intro to course (AA)</td>
<td>Weathering, oxidation and alteration (IG)</td>
<td>Ore Petrology (IG)</td>
<td>Revision of minerals (IG)</td>
<td>Mineral Economics / Ore suites 1 (DC)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Volcanogenic Massive Sulfide deposits 1 (IG)</td>
<td>Volcanogenic Massive Sulfide deposits 2 (IG)</td>
<td>Sedimentary Mn &amp; Fe / Supergene deposits (DC)</td>
<td>Ore petrology (IG)</td>
<td>Alteration Assemblages / Ore suites 2 (IG)</td>
<td>First summary sheet (initial feedback on deposit reports)</td>
</tr>
<tr>
<td>3</td>
<td>JORC code and compliance (JB)</td>
<td>Porphyrty Cu-Au-Mo 1 (IG)</td>
<td>Porphyrty Cu-Au-Mo 2 (IG)</td>
<td>Ore suites 3 (IG)</td>
<td>Ore suites 4 (IG)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hydrothermal Au 1 (AA)</td>
<td>Hydrothermal Au 2 (AA)</td>
<td>Use of portable technologies (DC)</td>
<td>Ore suites 5 (IG)</td>
<td>Ore suites 6 (IG)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Magmatic deposits 1 (IG)</td>
<td>Magmatic deposits 2 (IG)</td>
<td>MVT and CMPV deposits (IG)</td>
<td>Ore suites 7 (IG)</td>
<td>Ore suites 8 (IG)</td>
<td>Summary sheets and report</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Coal I (JB)</td>
<td>Coal II (JB)</td>
<td>No GEOS3141 Classes in week 6</td>
</tr>
<tr>
<td>7</td>
<td>Critical element deposits 1 (IG)</td>
<td>Critical element deposits 2 (IG)</td>
<td>Uranium deposits (NR)</td>
<td>Logging and interpreting drill chips and cores (IG)</td>
<td>Ore suites 9 (IG)</td>
<td>MINE2810 mid session exam</td>
</tr>
<tr>
<td>8</td>
<td>Diamond deposits (IG)</td>
<td>Gem deposits (IG)</td>
<td>Case study: Bowdens epithermal Ag deposit (IG)</td>
<td>Lab skills revision (IG)</td>
<td>Lab skills revision (IG)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Case study: Hera and Federation deposits (IG)</td>
<td>Exploration project management (industry)</td>
<td>Industry speaker</td>
<td>Lab skills test</td>
<td>Lithogeochemical lecture + lab (DC)</td>
<td>Lab skills test / Summaries and Report</td>
</tr>
<tr>
<td>10</td>
<td>Industry speaker</td>
<td>Student seminars</td>
<td>Student seminars</td>
<td>Geotech lecture + lab</td>
<td>Field techniques (IG)</td>
<td>Essay and seminars</td>
</tr>
</tbody>
</table>
LIST OF LECTURES AND LABS

WEEK 1
Tue 15 September
LEC 1, 2-3: Introduction to course (AA)
LAB 1, 3-5: Revision of minerals (IG)

Wed 16 September
LAB 2, 3-5: Mineral Economics / Ore suites 1 (DC)

Thu 17 September
LEC 2, 5-6: Weathering, oxidation and alteration (IG)

Fri 18 September
LEC 3, 12-1: Introduction to Ore Petrology (IG)

WEEK 2
Tue 22 September
LEC 4, 2-3: Volcanogenic massive sulfide and SEDEX deposits I (IG)
LAB 3, 3-5: Ore Petrology (IG)

Wed 23 September
LAB 4, 3-5: Alteration assemblages / Ore suites 2 (IG)

Thu 24 September
LEC 5, 5-6: Volcanogenic massive sulfide and SEDEX deposits II (IG)

Fri 25 September
LEC 6, 12-1: Sedimentary Fe and Mn deposits (DC)
WEEK 3
Tue 29 September
LEC 7, 2-3: JORC code and compliance (JB)
LAB 5, 3-5: Ore suites 3 (IG)

Wed 30 September
LAB 6, 3-5: Ore suites 4 (IG)

Thu 1 October
LEC 8, 5-6: Porphyry Cu-Au-Mo deposits I (IG)

Fri 18 September
LEC 9, 12-1: Porphyry Cu-Au-Mo deposits II (IG)

WEEK 4
Tue 6 October
LEC 10, 2-3: Hydrothermal Au I (AA)
LAB 7, 3-5: Ore suites 5 (IG)

Wed 7 October
LAB 8, 3-5: Ore suites 6 (IG)

Thu 8 October
LEC 11, 5-6: Hydrothermal Au II (AA)

Fri 9 October
LEC 12, 12-1: Use of portable technologies (DC)
WEEK 5
Coal component for MINE2810 students / normal classes for GEOS3141 students

Tue 13 October
GEOS3141
LEC 13, 2-3: Magmatic deposits I (IG)
LAB 9, 3-5: Ore suites 7 (IG)

MINE2810
LAB/LEC, 3-5: Coal component I (JB)

Wed 14 October
GEOS3141
LAB 10, 3-5: Ore suites 8 (IG)

MINE2810
LAB/LEC, 3-5: Coal component II (JB)

Thu 15 October
GEOS3141 students only
LEC 14, 5-6: Magmatic deposits II (IG)

Fri 16 October
GEOS3141 students only
LEC 15, 12-1: MVT and CMPV deposits (IG)

WEEK 6
19 to 25 October
Fieldtrip week break for GEOS3141 students
WEEK 7
Tue 27 October
LEC 16, 2-3: Critical element deposits I (IG)
LAB 11, 3-5: Analysing and interpreting drillcores and drill chips (IG)

Wed 28 October
LAB 12, 3-5: Ore suites 9

Thu 29 October
LEC 17, 5-6: Critical element deposits II (IG)

Fri 30 October
LEC 18, 12-1: Uranium deposits (NR)

WEEK 8
Tue 3 November
LEC 19, 2-3: Diamond deposits (IG)
LAB 13, 3-5: Lab skills revision (IG)

Wed 4 November
LAB 14, 3-5: Lab skills revision (IG)

Thu 5 November
LEC 20, 5-6: Gem deposits (IG)

Fri 6 November
LEC 21, 12-1: Case study: Bowdens epithermal Ag deposit (IG)
WEEK 9
Tue 12 November
LEC 22, 2-3: Case study: Hera and Federation deposits (IG)
LAB 15, 3-5: Lab skills test (IG)

Wed 13 November
LAB/LEC 16, 3-5: Lithogeochemistry (DC)

Thu 14 November
LEC 23, 5-6: Exploration project management (industry)

Fri 15 November
LEC 24, 12-1: Industry speaker

WEEK 10
Tue 17 November
LEC 25, 2-3: Industry speaker
LAB/LEC 17, 3-5: Geotechnical (industry)

Wed 21 November
LAB 18, 3-5: Field techniques (IG)

Thu 22 November
LEC 26, 5-6: Student seminars I

Fri 23 November
LEC 27, 12-1: Student seminars II
2. **Course Logistics**

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 (followed by a mid-session exam).

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 (minerals section):**

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

Lecturers
DC – David Cohen  
d.cohen@unsw.edu.au  
by arrangement
JB – Jon Barber  
j.barber@unsw.edu.au  
OMB (Mining Eng)
NFR – Neil Rutherford  
AA – Anita Andrew

Technical Staff  
Mira van der Ley

**Consultation:**  
During laboratory sessions or by appointment with staff.

**Other Details:**

<table>
<thead>
<tr>
<th>Year of Delivery</th>
<th>2020</th>
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</thead>
<tbody>
<tr>
<td><strong>Course Code</strong></td>
<td>GEOS3141 / MINE2810</td>
</tr>
<tr>
<td><strong>Course Name</strong></td>
<td>Mineral and Energy Resources / Minerals and Processing</td>
</tr>
<tr>
<td><strong>Academic Unit</strong></td>
<td>School of Biological, Earth and Environmental Sciences, Faculty of Science</td>
</tr>
<tr>
<td><strong>Level of Course</strong></td>
<td>III</td>
</tr>
</tbody>
</table>
| **Units of Credit**    | 6 for GEOS3141  
3 unit component of MINE2810 |
| **Session(s) Offered** | T3 |
| **Assumed Knowledge, Prereqs** | Level 1 geology |
| **Hours per Week**     | 7 (GEOS3141); 7 MINE2810 (weeks 1 to 4 inclusive) |
| **Number of Weeks**    | 9 / 6 weeks |
| **Commencement Date**  | Tuesday, September 15 |

**Equipment:**  
Appropriate footwear is required for laboratory sessions (i.e. no thongs). Students with inappropriate footwear will be ejected from the labs.
3. Course overview

The Australian economy remains closely linked to the success at discovery, mining and export of a range of mineral commodities. Australia is a major exporter of Au, Al, Fe, Ni, C and U. A significant proportion of graduates in the geosciences or mining will wind up working for all or part of their professional careers in the minerals sector. At the small scale, ore deposits can be viewed in terms of their host rocks, structure, mineral distributions, geochemistry and geophysical characteristics. At the larger scale, the nature and location of mineral deposits can be explained in terms of crustal and upper mantle processes, most of which are embedded in the great unifying theory of geology, plate tectonics.

Australia is a major producer and exporter of thermal (power production) and coking (steel production) coals. Periods of relative stability in the crust provided opportunities for the growth of vegetation and the deposition of plant materials in an anaerobic swamp that prevented oxidation. Subsequent burial with associated temperature and pressure gradients reduced moisture and resulted after uplift and erosion in the coal deposits mined today.

General content:
Ore forming processes, mobilization, transport and deposition of metals. Description and genesis of key ore deposit types, volcanic and sedimentary hosted massive sulfides, porphyry Cu-Au, mesothermal Au, magmatic Ni, iron ores, gem stones and uranium. Exploration methods. Review of (economic) mineral and rock identification. Deposit suites from some important Australian and overseas mineral deposits. The coal component will focus on the formation of coal, its chemical changes in formation and how these changes affect the marketability and utilization. Basic methods of exploration and mining will be reviewed. The final lectures for mining engineering students only will cover processing and utilization.

Course objectives:
The course provides students an introduction to the fundamental concepts and processes relating to the genesis, geological characteristics and exploration for some archetypical ore deposits. 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. The course also emphasises the development of report writing skills and group work.

Domains:

Fundamental principles → Deposit examples → Laboratory exercises → Reporting

Acquisition of knowledge → Application to theory → Application to practice → Communication to others

Assumed knowledge:
Geology Basic mineralogy and petrology; the plate tectonic model.
Chemistry Basic knowledge of the periodic table and chemical reactions.

Readings:
A couple of key references will be provided for each of the major topics in the course. These are required reading and their content is examinable in the exam.

Continual course improvement:
Periodically, student evalative feedback on this course is gathered, using among other means myExperience. Student feedback assists us in continual improvements to courses in the School of BEES. myExperience and Blue pulse will operate this session.
4. **TEACHING AND LEARNING METHODS**

The framework will be provided by the lectures and selected readings, together with practical exercises. Students will be directed towards appropriate references in the library and on the web and will be expected to undertake their own program of reading and reflection.

Intellectual skill development is embedded throughout the course, but is specifically addressed in a number of the topics and tasks. The ability to integrate and apply concepts and principles from one area of the subject to another are intrinsic to high-level performance in the programme.

**Expectations of students**

Attendance at laboratories is strongly suggested. See school website for other BEES policies [http://www.bees.unsw.edu.au/current-students](http://www.bees.unsw.edu.au/current-students)

**Guidelines on Teaching:**

1. A climate of enquiry should be developed where students feel challenged
2. Activities should be interesting and challenging
3. Material must be perceived as relevant to future study or professional practice
4. There must be dialogue/interaction between lecturers and students
5. There should be multiple teaching methods
6. Goals, outcomes and requirements of the course must be clearly articulated
7. Students are to be encouraged to take responsibility for own learning
8. Broad graduate attributes must be developed
9. Co-operative work with peers assists learning
10. There must be informative and timely feedback to students on progress.

**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. Contribute to group work

(d) Transferable skills

1. Communicate scientific ideas
2. Work as part of a team
5. Resources

**Moodle:** Lecture notes and other references.

**Books:**
- Centre for Ore Deposit Research, 2002, Giant ore deposits: characteristics, genesis and exploration, PQ 553.1/52
- Ridley, J., 2013, Ore deposit geology. Cambridge University Press. 553/64.
- Geological Society. Geology Australian Coal Basins

**Journals:**
- Economic Geology
- Mineralium Deposita
- Ore Geology Reviews
- International Journal of Coal Geology

6. Assessment, Ore Deposits Section of the Course

<table>
<thead>
<tr>
<th></th>
<th>MINE2810 (Geology cpt)</th>
<th>GEOS3141</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ore suites (50%) &amp; final report (50%)</td>
<td>30 %</td>
<td>40 %</td>
</tr>
<tr>
<td>Mineral economics exercise</td>
<td>-</td>
<td>10 %</td>
</tr>
<tr>
<td>Lab skills test</td>
<td>-</td>
<td>25 %</td>
</tr>
<tr>
<td>Seminar presentation</td>
<td>-</td>
<td>10 %</td>
</tr>
<tr>
<td>Seminar paper (ore deposit essay)</td>
<td>-</td>
<td>15 %</td>
</tr>
<tr>
<td>Theory exam (mid session)</td>
<td>50 %</td>
<td>-</td>
</tr>
<tr>
<td>Coal exercises</td>
<td>20 %</td>
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</table>

Knowledge and understanding will be tested through the reports, assignments and exam. The theory exam will be based on the lecture material plus key articles indicated in this manual and provided on Moodle.

The theory exam for the geology component of MINE2810 will be 1 hour and include ore deposits and coal geology. It is scheduled for Week 7.

There is no exam for GEOS3141.

The criteria for assessing the ore suite reports is described below but will be further discussed in the laboratories. Full details of each assessment and marking criteria will be provided in class or on Moodle. Where group work is permitted, students should ensure that they make a significant contribution to the group.

Feedback on all assessments will be provided 2 weeks after submission, through marks and comments on Moodle.
<table>
<thead>
<tr>
<th>Component</th>
<th>Pass / Credit</th>
<th>Distinction +</th>
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<tbody>
<tr>
<td><strong>Laboratories</strong></td>
<td>Demonstrate basic observational skills applied to samples.</td>
<td>Demonstrate a high level of observational skills applied to samples.</td>
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<tr>
<td></td>
<td>Adequate presentation of results.</td>
<td>Superior skills in presentation of results.</td>
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<tr>
<td></td>
<td>Basic data interpretation and the drawing of conclusions from results.</td>
<td>Detailed interpretation of results drawing out most of the key features of the data as they relate to the problems posed.</td>
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<td></td>
<td>Use of clear technical English in reports.</td>
<td>Use of literature to assist in interpretation of observations, including a number of journal articles.</td>
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<tr>
<td><strong>Essay</strong></td>
<td>Review of a sufficient number of references of direct relevance to the topic selected, but with minimal reference to high level sources (e.g. journal articles).</td>
<td>Review of more than the minimum required amount of literature, including use of scientific papers, books and other high level sources of direct relevance to the topic selected.</td>
</tr>
<tr>
<td>GEOS3141 only</td>
<td>Drawing some key observations, principals, theories and issues from the literature.</td>
<td>Comprehensive coverage of observations, principals, theories and issues drawn from the literature.</td>
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<tr>
<td></td>
<td>Basic integration of material drawn from the literature and subsequent presentation in the essay.</td>
<td>Advanced level of integration and synthesis of material from the literature and presentation in the essay.</td>
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<tr>
<td></td>
<td>Summarizing key conclusions within the literature reviewed.</td>
<td>Critical evaluation and synthesis of the material presented in the literature.</td>
</tr>
<tr>
<td></td>
<td>Use of clear technical English and effective structure.</td>
<td>Use of clear technical English and effective structure with demonstration of higher level communication skills.</td>
</tr>
<tr>
<td><strong>Seminar</strong></td>
<td>Some demonstration of capacity to generate own slides, with necessary clarity and relevance to topic.</td>
<td>Creation of high visual impact slide material.</td>
</tr>
<tr>
<td>GEOS3141 only</td>
<td>Capacity to engage audience with the oral presentation.</td>
<td>Capacity to enthuse audience with the oral presentation.</td>
</tr>
<tr>
<td></td>
<td>Good technical content.</td>
<td>A high level of technical content.</td>
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<tr>
<td></td>
<td>Correct timing.</td>
<td>Good balance between components of presentation, introduction, data, and conclusions.</td>
</tr>
<tr>
<td></td>
<td>Ability to answer questions.</td>
<td>Correct timing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ability to answer questions.</td>
</tr>
</tbody>
</table>
7. Academic Honesty 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?

Plagiarism is the presentation of the thoughts or work of another as one’s own.* Examples include:

- 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), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgement;
- paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

https://student.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne.
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 through the establishment of a documented chain of responsibility and accountability for all persons in the workplace, extending from the Head of School through to the students undertaking courses offered.

As part of this chain of responsibility and accountability, the Course Authority is responsible for ensuring all activities associated with this course are safe. The Course Authority has undertaken detailed risk assessments of all course activities and identified all associated potential hazards. These hazards have been minimised and appropriate steps taken to ensure your health and safety. For each activity, clear written instructions are given and appropriate hazard warnings or risk minimisation procedures included for your protection.

It is the student's responsibility to prepare for all practical work. Students should be familiar with the written procedures scheduled for the practical class and identify all personal protection requirements needed to complete the exercise in a safe manner. Students must comply with all safety instructions given by the Course Authority and/or Laboratory / Field Demonstrator, and observe the Safety Information located outside or within teaching rooms. If you are unsure of any safe operating procedures or written instruction regarding safety, you should seek further information from the Course Authority and/or Laboratory / Field Demonstrator before attempting the task. Failure to comply with safety instructions may be considered as a form of academic misconduct. If the outcome of a student's failure to comply with safety instructions results in personal injury, or endangers the health and safety of others, then the matter may be dealt with by WorkCover as a breach of the Work Health and Safety Act 2011, and the Work Health and Safety Regulation 2011.

**Conditions of Entry to Courses**

To abide with Section 17 (1) (Persons in control of workplaces etc, used by non-employees to ensure health and safety) and Section 19 (Employees at work to take care of others and to co-operate with employer) of the N.S.W. Occupational Health & Safety Act (1983):

1. (a) All persons entering laboratories are required to wear sturdy shoes at all times. **Thongs, sandals and open-toed shoes are not acceptable.**

   (b) Sturdy footwear is required on all field excursions and boots are strongly recommended.

2. (a) Safety glasses, masks, gloves, helmets and/or ear muffs must be worn when provided by supervising staff. Students must wear laboratory coats and safety glasses in chemical laboratories.

   (b) Students in second and higher years must be in possession of approved safety goggles and must wear them when within 3 m of anyone hammering rocks.

3. Students with ongoing medical conditions, needing regular medication (e.g. diabetes, asthma, allergies, etc.), are required to inform the field excursion supervisor so that they are aware of your condition, but this information will be strictly confidential to staff members.

4. All students taking field excursions are expected to have had a **Tetanus** injection within the last 10 years. These injections are readily available at the Student Health Centre.

5. (a) The University of New South Wales is a **smoke-free work environment**. Smoking is prohibited on the entire UNSW campus. BEES, the sciences of the outdoors, strongly supports this concept of a healthy, clean-air work environment.

   (b) Alcohol consumption and smoking are not permitted in University vehicles nor in vehicles hired by the University for field excursions.

**ENTRY TO SCHOOL BUILDINGS, AND ATTENDANCE ON FIELD EXCURSIONS, WILL BE DENIED TO STUDENTS WHO DO NOT ABIDE BY THESE CONDITIONS.**

Prof Alistair Poore, Head of School
9. **ORE DEPOSIT SUITES AND LABORATORY REPORTS**

The laboratories will focus on a suite of world-class mineral deposits. Literature on each deposit is available on Moodle and in the UNSW laboratory. Apart from the formal lab session times, you may make use of the laboratory when not being used for other classes.

**Do not remove any of the rocks or sections from the laboratory.**

**GEO53141**

**General examination of the ore suites**

1. Examine the specimen sets from all the deposits listed below and complete a *summary sheet for ten of the deposits*, representing *at least five* deposit types.
2. For each deposit suite you are required to study the hand specimens provided, including the thin and polished sections where available.
3. At least one paper on the deposits examined should be read.
4. Feel free to work in small groups *in the lab* but the *summary sheets must be written individually*.

**Detailed examination and report on one of the ore suites**

5. Select *one* of the deposits and, in addition to the summary page, write a brief technical report describing the form of the deposit and its host rocks and outlining current understanding of the deposit genesis.
6. The length of this report should be 1,500–1,700 words and include a detailed analysis of the samples and deposit descriptions. The headings used in the summary sheet provide a good basis for the headings you should use in your report but do not need to be adhered to strictly.
7. Many features of the deposit and your account of deposit genesis will need to be summarised from the literature. When using information obtained from the provided literature be careful not to plagiarise. Rephrase text into your own words. Do not copy text verbatim. Reference correctly.
8. Feel free to work in small groups *in the lab* but the *reports must be written individually*. If you have worked with other student then quote your partner(s)’ name(s) in the report heading.
9. The reports are due as per the schedule on page 2 of the Manual.

**MINE2810**

**General examination of the ore suites**

1. Examine *five* specimen sets, each from different deposit *types* and complete a *summary sheet for those five deposits*.
2. For each deposit suite you are required to study the hand specimens provided. Examination of the thin and polished sections is optional.
3. At least one paper on the deposits examined should be read.
4. Feel free to work in small groups *in the lab* but the *summary sheets must be written individually*.

**Detailed examination and report on one of the ore suites**

5. Select *one* of the deposits and, in addition to the summary page, write a brief technical report describing the form of the deposit and its host rocks and outlining current understanding of the deposit genesis.
6. The length of this report should be 800–1,000 words (3 to 4 pages excluding summary sheet and illustrations) The headings used in the summary sheet provide a good basis for the headings you should use in your report but do not need to be adhered to strictly.
7. Many features of the deposit and your account of deposit genesis will need to be summarised from the literature. When using information obtained from the provided literature be careful not to plagiarise. Rephrase text into your own words. Do not copy text verbatim. Reference correctly.
8. Feel free to work in small groups *in the lab* but the *reports must be written individually*. If you have worked with other student then quote your partner(s)’ name(s) in the report heading.
9. The reports are due as per the schedule on page 2 of the Manual.

All summary sheets and reports should be submitted as hard copies to the B-S-B Office (G27).
Ore Suite Specimen Sets (selected from)

<table>
<thead>
<tr>
<th>DEPOSIT TYPE</th>
<th>VHMS Sedex</th>
<th>Porphyry / epithermal</th>
<th>Mesothermal Au</th>
<th>Magmatic Ni</th>
<th>Iron Ore</th>
<th>Regolith</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Isa</td>
<td>Bingham</td>
<td>Giddginbung</td>
<td>Sudbury</td>
<td>Middleback Ra.</td>
<td>Lady Annie</td>
<td></td>
</tr>
<tr>
<td>Woodlawn</td>
<td>Goonumbla</td>
<td>Lancfield St Ives</td>
<td>Kambalda</td>
<td>Mt. Windarra</td>
<td>Thakaringa</td>
<td></td>
</tr>
<tr>
<td>Rosebury</td>
<td>Ok Tedi</td>
<td>Kalgoorlie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scuddles</td>
<td>Grasberg</td>
<td>Paddington</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mt. Lyell</td>
<td>Woodlark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lady Loretta</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

10. ORE SUITE SPECIMEN SETS (PAPERS)

VHMS / sedex
Woodlawn     McKay, W.J. and Hazeldene, R.K., 1987, Woodlawn Zn-Pb-Cu sulfide deposit, NSW, Australia: An interpretation of ore formation from field observations and metal zoning.
Mt.Lyell       Corbett, K.D., 2001, New mapping and interpretations of the Mt Lyell Mining District, Tasmania.
Lady Annie    General

Porphyry Cu-Au-Mo (+ epithermals)
Ok Tedi       Rush, P.M. and Seegers, H.J., 1990, Ok Tedi Copper-Gold Deposits.
Woodlark     tba

Mesothermal Au
Kalgoorlie  
Clout, J.M.F., Cleghorn, J.H. and Eaton, P.C., 1990, Geology of the Kalgoorlie gold field

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

Magmatic Ni  
Sudbury  

Kambalda  

Mt. Windarra  

General  

Iron Ore  
Middleback Ra.  

General  

Regolith  
Thackaringa  

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

11. REFERENCE LIST:


