

LECTURE/SESSION SCHEDULE

	Lecture Thursday 12-13	Session 1 (Wed 14-16 or Thu 9-11 or Thu 14-16)	Session 2 (Wed 16-17 or Thu 11-12 or Thu 16-17)
Week 1 Aug. 3,4	Unit overview & Introduction to microscopy <i>ND</i>	Practical 1: Transmitted light microscopy <i>RF & ND</i>	Prac 1 continues & Fiordland Case Study <i>RF & ND</i>
Week 2 Aug. 10,11	Mineral groups <i>RF</i>	Practical 2: Plane-polarised light microscopy <i>RF</i>	Fiordland Case Study <i>RF & ND</i>
Week 3 Aug. 17,18	Reading the conditions of igneous crystallisation <i>RF</i>	Practical 3: Crossed-polarised light microscopy <i>RF</i>	Fiordland Case Study <i>RF & ND</i>
Week 4 Aug. 24,25	Metamorphic & minor structures <i>ND</i>	Practical 4: Special techniques of microscopes <i>RF</i>	Prac 4 continues <i>RF</i>
Week 5 Aug. 31, Sept. 1	Interplay between structure and relief <i>SP</i>	Practical 5: Structure & Relief, Air Photos <i>ND (Wed) & SP (Thu)</i>	Forensic Science <i>ND (Wed) & SP (Thu)</i>
Week 6 Sept. 7,8	Folding is ubiquitous <i>SP</i>	Practical 6: Stereographic projection <i>ND (Wed) & SP (Thu)</i>	Hill End Air Photo <i>ND (Wed) & SP (Thu)</i>
Week 7 Sept. 14,15	Fault rocks and structures <i>SP</i>	Practical 7: π -analysis of folds <i>ND (Wed) & SP (Thu)</i>	Prac 7 continues & Forensic Science <i>ND (Wed) & SP (Thu)</i>
Break: Field trip to Hill End 17-21 Sept.			
Week 8 Oct. 5,6	Significance of gaps in the geological record <i>ND</i>	Practical 8: Geological history 1 <i>ND</i>	Hill End sample preparation & Forensic Science <i>ND</i>
Week 9 Oct. 12,13	Discovering past events on maps <i>ND</i>	Practical 9: Geological history 2 <i>ND</i>	Hill End sample preparation & Forensic Science <i>ND</i>
Week 10 Oct. 19,20	Field structures of igneous rocks <i>RF</i>	Practical 10: Analysing unknown thin sections <i>RF (Wed) & SP (Thu)</i>	Prac 10 continues, Hill End sample preparation <i>RF (Wed) & SP (Thu)</i>
Week 11 Oct. 26,27	Stress and Strain <i>SP</i>	Practical 11: Metamorphic rock microscopy <i>RF (Wed) & SP (Thu)</i>	Prac 11 continues, Hill End sample preparation <i>RF (Wed) & SP (Thu)</i>
Week 12 Nov. 2,3	Mineral deposits – how are they formed? <i>SP</i>	Practical 12: Epiclastic sedimentary rock microscopy <i>RF</i>	Prac 12 continues, Hill End sample presentations <i>RF</i>
Week 13 Nov. 9,10	Mineral deposits – interpreting them on maps <i>SP</i>	Practical 13: Pyroclastic sedimentary rock microscopy <i>RF</i>	Exam Revision <i>RF</i>

IMPORTANT DATES:

Week 4 – Thursday 25 August 5pm: Report for Fiordland Case Study is due

Mid-Semester break – Saturday 17 to Wednesday 21 September: Hill End field trip and assessments

Week 10 – Thursday 20 October 5pm: Report for Forensic Science Case Study is due

Week 12 – Monday 31 October 5pm: Email labelled photomicrograph of Hill End thin section to Dr Flood

Exam: To be advised once the examinations timetable is drawn up

**MACQUARIE UNIVERSITY
DEPARTMENT OF EARTH & PLANETARY SCIENCES
FACULTY OF SCIENCE**

**GEOS207
Field and Laboratory Studies in Geoscience
GEOS910
Geoscience in the Field and Laboratory**

Unit Outline – Semester 2, 2011 – Internal only

Unit Coordinator:	A/Prof Nathan Daczko 9850-8371 nathan.daczko@mq.edu.au Room 509, E7A	Tutors:	Dr Richard Flood 9850-8370 richard.flood@mq.edu.au Room 508, E7A	Dr Sandra Piazzolo 9850-4407 sandra.piazzolo@mq.edu.au Room 425, E7A
Credit Points:	3 (GEOS207) / 4 (GEOS910)			
Contact hours:	Lecture: 12-13 Thursday Laboratory: 14-17 Wednesday or 9-12 or 14-17 Thursday			
Pre-requisites:	GEOS115/125 (822/821) or GEOS226 (811) or GEOS266/ENVE266			
Website:	http://learn.mq.edu.au/			

INTRODUCTION

Geoscience relies on our ability to observe, measure and describe materials of the Earth. You will be exposed to a range of field and laboratory techniques commonly employed in geoscience research, including geochemical techniques such as x-ray diffraction, electron microprobe, and x-ray fluorescence; methods of 2D geo-scientific data analysis of a variety of maps and air photographs; geophysical techniques including remote sensing; structural analysis techniques including stereographic projections and fold analysis; petrographic techniques including back-scattered electron imaging and use of a petrological microscope to examine geoscience materials in thin section (e.g., rocks, mineral sands, weathered rocks, soils, gems, fossils, ores, ancient pottery, etc); and geoscience computing techniques. You will not only learn to interpret maps, but will create your own map in a simple, well-exposed terrain on the field excursion.

GEOS207 / GEOS910 is a prerequisite for third year geology subjects including GEOS344 (GEOS882) Structural and Metamorphic Geology, GEOS343 (GEOS884) Magmas, Ores and Geochemistry and the fieldtrip to central Australia (GEOS307 / GEOS804). However, GEOS207 / GEOS910 also serves as an important science subject useful to those continuing in Geophysics, Environmental Science, Palaeontology, Museum Studies, Physical Geography, Chemistry, Biology, etc.

EXPECTED LEARNING OUTCOMES

Develop the skills needed to –

- Select appropriate techniques to characterise and analyse geoscience materials (e.g. rocks, minerals, soils, etc)

- Typify the bedrock controls on landforms and geomorphology
- Utilise the power of back-scattered electron microscopy and petrographic microscopic analysis of thin sections
- Interpret the significance of microstructures in geoscience materials
- Undertake projects of a complex nature
- Report on the results of common geochemical laboratory techniques such as x-ray diffraction, x-ray fluorescence, and electron microprobe analysis
- Describe and analyse simple field structures, including strike/dip of inclined strata, angular relations across unconformities, the style and attitude of folds, and the types of faults and their displacement
- Interpret cross-cutting relationships in the field and laboratory to determine the sequence of geoscience events for a given problem
- Exploit the strength and flexibility of GIS software to digitise data collected in the field and to present an overview of field relations in graphical format

TECHNOLOGY USED / GRADUATE CAPABILITIES

This unit can be seen as three interconnected streams. A lecture stream will give a broad overview of the topics, provide background information and introduce new ideas and concepts that link in with the laboratory practical and case study streams.

There will be two case studies. These case studies will be extended enquiries into real geo-scientific problems. The first will be smaller and extend for 3 weeks, while the second will extend over 7 – 8 weeks. These problems are different to the ones that you would typically find in textbooks, and more closely resemble the investigations that scientists face in the real world, with many interacting factors and a number of possible solutions.

Each of the case studies will allow you to explore the ideas in depth and will provide an effective and, we hope, enjoyable method of learning. There is also the added benefit of providing you with opportunities to develop generic skills and graduate capabilities such as problem solving, teamwork, communication, accessing and evaluating information and in using scientific approaches to solve problems.

You will be working individually for each case study, both in attempting to solve the problem and to produce a final report. However, you are encouraged to consult with others in the class and to help each other with the work, although, final reports should be done individually. You will be expected to do substantial research outside of the scheduled time (e.g. library and/or web-based literature search, data processing and plotting).

An optional part of the unit involves using computers and Geographic Information Systems (GIS). Other technology that we will use involves laboratory equipment including petrographic microscopes and geochemical instruments housed in the Geochemical Analysis Unit (GAU) such as the electron microprobe (EMP) and scanning electron microscope (SEM).

Field trip

During this unit of study you will be required to attend the field trip; it forms an essential part of the unit and builds upon skills you may have learnt in GEOS226 / GEOS811 Introduction to Field Geology. You are provided with more detail of the field trip later, but for now you should take special note of the following:

- *Equipment*
The basic requirements are a hand lens, magnet, and some method of testing mineral hardness (e.g. a pocket knife, Ni-alloy coin, etc.). Buy a geological hammer only if you intend to continue in a geological field. As the weather is not always kind, note taking can be a problem if ballpoint or ink pens are used. Pencils are recommended. Learn to be neat and tidy in these initial stages, and form a good habit early. It is much easier to discipline yourself now than to change habits later.
- *Clothing*

Everyone has their own idea of comfort, but some common features of field clothing are obvious. Wear sensible, tough footwear, such as boots or strong sneakers. Thongs, fashion shoes and street shoes are useless and unacceptable. We will be walking over some irregular rock outcrops and may be in snake-infested areas. We cannot guarantee good quality weather; so you should have waterproof clothing. Long trousers, such as jeans, are safer than shorts. Bring a hat and sunscreen.

Time Allocation

According to Macquarie University guidelines, you are required to spend 39 hours of study per credit point. For GEOS207 / GEOS910 this works out to approximately four hours per week at the lecture/laboratory sessions, the field trip and approximately three hours per week doing at home study. Conscientious use of this time, particularly if it is spread over the whole semester will provide its reward.

ASSESSMENT

The assessment consists of several components, listed below. A satisfactory standard (50% pass mark) is required in all components.

<i>Case studies</i>	20%
<i>Pracs and online quizzes</i>	10%
<i>Fieldwork</i>	20%
<i>Final examination</i>	50%

Case studies

The case studies are worth 5 and 15% each. You will be given specific details of what is expected when you begin each case study. Generally, each case study will involve a written report and your use of English and referencing the source of your ideas is important (see Appendix 2).

Pracs and online quizzes

At the end of three randomly selected practicals, you will be asked to hand in one page from that days practical work. These will be graded and returned to you the following week. There will be a series of online quizzes each week starting in week 2. The questions are drawn from the information given in lectures and this unit of study booklet. You will be warned the class before of what part of the booklet the questions are drawn from.

Fieldwork

There will be a short field trip (approximately 5 days, including travel), run in the mid-semester break, to train you in geoscience field techniques. Most assessment tasks are handed in during the field trip.

Final examination

The final exam will cover material from the lectures, class practical exercises and case studies. Questions will draw on information and ideas from the whole unit to give an integrated view of the unit. The exam will include questions that ask you to apply your knowledge to interpret and solve problems. You will be allowed to take one A4 page of notes into the exam, otherwise it is closed book.

ASSESSMENT TASKS

The dates for submission of assessment tasks are listed on the first page of the unit outline.

Extensions for case study report or assignment submission will be given only for illness or misadventure, which must be supported by documentation and a written request. This request should also indicate the extension period required. Case study reports or assignments submitted late without approval will be penalised 10% of the potential total mark per day late. Students must keep a digital copy or photocopy of their reports.

Queries, appeals and special consideration

In the first instance, contact the unit convenor if there are any questions about the assessment tasks themselves, or about the comments and grades that you receive for your assignments or reports. You are permitted to appeal against your final grade in any of your units. Before initiating an appeal, discuss your unit grade fully with the unit convenor. More details of the Faculty of Sciences' appeals procedures are available in the Science Centre, ground floor E7A (phone: 9850 6000). The University's special consideration policy can be found at: http://mq.edu.au/policy/docs/special_consideration/policy.pdf

The Dangers of Plagiarism and how to avoid it

The University's policy can be found at: www.mq.edu.au/policy/docs/academic_honesty/policy.pdf
The integrity of learning and scholarship depends on a code of conduct governing good practice and acceptable academic behaviour. One of the most important elements of good practice involves acknowledging carefully the people whose ideas we have used, borrowed, or developed. All students and scholars are bound by these rules because all scholarly work depends in one way or another on the work of others.

Therefore, there is nothing wrong in using the work of others as a basis for your own work, nor is it evidence of inadequacy on your part, provided you do not attempt to pass off someone else's work as your own.

To maintain good academic practice, so that you may be given credit for your own efforts, and so that your own contribution can be properly appreciated and evaluated, you should acknowledge your sources and you should ALWAYS:

1. State clearly in the appropriate form where you found the material on which you have based your work.
2. Acknowledge the people whose concepts, experiments, or results you have extracted, developed, or summarised, even if you put these ideas into your own words.
3. Avoid excessive copying of passages by another author, even where the source is acknowledged. Find another form of words to show that you have thought about the material and understood it, but remember to state clearly where you found the ideas.

If you take and use the work of another person without clearly stating or acknowledging your source, you are falsely claiming that material as your own work and committing an act of PLAGIARISM. This is a very serious violation of good practice and an offence for which you will be penalised.

YOU WILL BE GUILTY OF PLAGIARISM if you do any of the following in an assignment, or in any piece of work which is to be assessed, without clearly acknowledging your source(s) for each quotation or piece of borrowed material:

1. Copy out part(s) of any document or audio-visual material, including computer-based material.
2. Use or extract someone else's concepts or experimental results or conclusions, even if you put them in your own words.
3. Copy out or take ideas from the work of another student, even if you put the borrowed material in your own words.
4. Submit substantially the same final version of any material as a fellow student. On occasions, you may be encouraged to prepare your work with someone else, but the final form of the assignment you hand in must be your own independent endeavour.

Feedback

Feedback on assessment tasks is given in this unit in the following ways:

- 1) Our primary mode of assessment feedback: the assessment marker will present overall feedback to the class, at either a lecture or in a tutorial, on what aspects of the assignment were done best and where improvement is needed in general.
- 2) Students are strongly encouraged to seek further feedback (at the time it is given or by making an appointment with the assessment marker) if they are unsure of any aspect of the feedback or if they want further feedback.
- 3) We provide you with assignment cover pages in the unit of study booklet that, on the reverse side, have a checklist of what is asked in the assignment and a detailed breakdown of the marks awarded for each component. Scoring full marks for a given component indicates that you did exceptionally well. Alternatively, scoring poorly in a component strongly suggests it required further work.

4) In the instance of scoring very poorly overall, you will be provided with written feedback on the assignment indicating where you could improve.

EVALUATION / RECENT CHANGES TO PREVIOUS OFFERINGS

We are interested in your ideas about how the unit is progressing and how it can be improved. At certain points during the semester, you will be invited to fill out a brief survey (1 page) or have a class discussion to give us some feedback on how you find the unit content and presentation methods. There will also be opportunities at the end of the unit to give an overall impression. If you have any particular comments (good and bad) or ideas on how to make the unit better, please let your tutor know. There have been many changes made to previous offerings over the past few years based on student feedback. For example, the first case study assignment is now smaller and has been reduced from 7 weeks to 3 weeks. This allowed us to bring the deadlines of each assignment forward to get their deadlines out of the times students indicated they had a high assignment load. To accommodate this change we have also moved some of the microscope practical classes to the end of the unit to bring forward the map interpretation aspects. In another example, we introduced the online quizzes in 2009 following feedback from students who requested a more structured guide to their at home study time. Most students find this very useful as it makes them read the background notes, allowing them to get more out of the practical classes.

TEXTS AND REFERENCES

Unit of study booklet

This contains material that will be referred to in lectures, the laboratory practical exercises and case studies. The booklet is essential for you to have to follow the lectures and laboratory sessions, but you will gain from supplementing the diagrams by your own explanatory notes. The completed worksheets are invaluable as an aid during revision for the examination.

Textbook

There is no set textbook for GEOS207 / GEOS910; this booklet contains all the basic information. The following list of texts is provided as a guide to useful texts in this field for your level:

1. C.A. Boulter "Four-dimensional analysis of geologic maps"
2. G.M. Bennison, P.A. Olver & K.A. Moseley "An introduction to geological structures and maps"
3. P.R. Leyshon & R.J. Lisle "Stereographic projection techniques"
4. R.J. Twiss & E.M. Moores "Structural Geology"
5. C.D. Gribble & A.J. Hall "A practical introduction to optical mineralogy"
6. W.A. Deer, R.A. Howie & J. Zussman "An Introduction to the rock-forming minerals"

Reading List

You may find the following books helpful for reference. They should provide useful supportive material to the lectures, case studies and laboratory exercises, and supplement the Unit of Study booklet.

** indicates a book in Special Reserve in the Library; * indicates a book on 3-day loan.

- *Allum, J.A.E., Photogeology and regional mapping. 111 p. Oxford: Pergamon, 1985. QE36 .A45
- *Barnes, John W., Basic geological mapping. 3rd ed. 133 p. Chichester; New York: Wiley, c1995. QE36 .B33/1995
- *Bennison, George M., Olver, Paul A., Moseley, K.A., An introduction to geological structures and maps. 8th ed. 168 p. London: Hodder Education 2011 (older version QE601.2 .B46 1997)
- *Boulter, Clive A., Four dimensional analysis of geological maps: techniques of interpretation. 296 p. Chichester; New York: Wiley, c1989. QE36 .B68
- *Deer, W.A., R.A. Howie, J. Zussman, An introduction to the rock-forming minerals. 2nd ed. 696 p. Harlow, Essex, England: Longman Scientific & Technical; New York, NY: Wiley, 1992. QE364 .D37/1992
- *Folk, Robert L, Petrology of sedimentary rocks. 182 p. Austin, Texas: Hemphill Pub. Co., 1980. QE471 .F63

- *Gribble, C. D., A.J. Hall, A practical introduction to optical mineralogy. 249 p. London; Boston: Allen & Unwin, 1985. QE369.O6 .G75/1985
- *Hobbs, B.E., W.D. Means, P.F. Williams, An outline of structural geology. 571 p. New York: Wiley, c1976. QE601 .H6
- *Kerr, Paul, Optical mineralogy. 4th ed. 492 p. New York: McGraw-Hill, c1977. QE369.O6 .K46/1977
- **Leyshon, Peter R., and R.J. Lisle, Stereographic projection techniques in structural geology; with computer programs by J. van Gool, D. van Everdingen, and R.J. Lisle. 104 p. Oxford; Boston: Butterworth-Heinemann, 1996. QE601.3.S83 .L49/1996
- *Maltman, Alex, Geological maps: an introduction. 2nd ed. 260 p. Chichester: John Wiley & Sons, c1998. QE36 .M35/1998
- *MacKenzie, W.S. and C. Guildford, Atlas of rock-forming minerals in thin section. 98 p. London: Longman, 1980. QE363.8 .M32
- *MacKenzie, W.S. and A.E. Adams, A color atlas of rocks and minerals in thin section. 192 p. New York: Halsted Press, c1994. QE434 .M33/1994
- *Pichler, Hans, and C. Schmitt-Riegraf ; translated by L. Hoke. Rock-forming minerals in thin section. 220 p. London; Melbourne: Chapman & Hall, 1997. QE397 .P5313
- *Reed, S. J. B., Electron microprobe analysis and scanning electron microscopy in geology. 201 p. New York: Cambridge University Press, c1996. QE440 .R43/1996
- *Roberts, John L., Introduction to geological maps and structures. 1st ed. 332 p. Oxford; New York: Pergamon Press, 1982. QE36 .R63
- *Rollinson, Hugh R. Using geochemical data: evaluation, presentation, interpretation . 352 p. Harlow, Essex, England: Longman Scientific & Technical; New York: Copublished in the U.S. with J. Wiley & Sons, 1993. QE515 .R75/1993
- *Shelley, David, Igneous and metamorphic rocks under the microscope: classification, textures, microstructures, and mineral preferred-orientations. 1st ed. 445 p. London; New York: Chapman & Hall, c1993. QE461 .S4815/1993
- *Twiss, R.J. and E.M. Moores, Structural geology. 532 p. New York: W.H. Freeman, c1992. QE601 .T894/1992
- *Vernon, R. H., Metamorphic processes: reactions and microstructure development . 247 p. London: Murby, 1976. QE475.A2 .V4
- *Winkler, Helmut G. F., Petrogenesis of metamorphic rocks. 5th ed. 348p. New York: Springer-Verlag, c1979. QE475.A2 .W5613/1979
- *Yardley, B.W.D., An introduction to metamorphic petrology. 248 p. Harlow, Essex, England: Longman Scientific & Technical; New York: Wiley, 1989. QE475.A2 .Y37/1989
- *Zussman, J., Physical methods in determinative mineralogy. 2d ed. 720 p. QE367 .Z8/1977

CD-ROMS

- **Dunning, J and Onesti, L.J., 1998. Earth Matters. Freeman and Co., New York. QE38.D8
- **Tasa, D., 1999. Illustrated dictionary of earth science. Tasa Graphic Arts. QE5.I45

Library Loans

The Library at Macquarie will have provided you with information on library loans. The procedures differ for metropolitan and country students. Please familiarise yourself with the procedures appropriate in your case. If you have any enquiries contact the Library on (02) 9850-7500.

Presentation of Case Study Reports and Assignments

You are required to research, prepare and write the case study reports and assignments at the standard expected at tertiary level. Since most of what you learn is tested in written form, it is essential that you learn to write effectively. Organisation is the key to achieving this, and the following steps should assist you.

Preparation

- (i) Determine what is required in the case study report. Make sure you understand each word used to ensure that you are writing to the topic set, not to one of your own invention.
- (ii) Read the relevant unit material and generate a list of key words, which will help you locate other references in the Library. Do this early. Remember that reference books may be hard to find if you leave your library research too late.
- (iii) When taking notes from a reference always note the bibliographical information and Call Number. If you write down a quotation, take a note of the page it was on. There is nothing more frustrating than having to look back through a book for one sentence.

The Outline

- (i) Introduction. Define terms and outline your approach to the topic.
- (ii) Discussion. This section is for explanation and discussion of the topic. It may help to write down a list of major points that will become your paragraphs, so that you can arrange your notes under each point.
- (iii) Conclusion. This is not a reiteration of the discussion, but a summary statement that rounds off the report.

The Drafts (at least one — more probably two or three)

- (i) Keep referring back to the question — have you strayed from the topic?
- (ii) Single sentences or paragraphs should not express too many ideas. A logical development of your theme should be the aim throughout the essay.
- (iii) In your initial draft, do not worry too much about the word limit. It is a simple matter to cut down extraneous or repetitive material in subsequent rewrites — in fact this should be your aim.
- (iv) Support your statements with facts and references.
- (v) References: quotations should be used only if the point being made is vital to your argument and if you could not express it better yourself. If you paraphrase, you must acknowledge your authority as you would when quoting directly — after the paraphrased section or quotation, i.e. (Smith, 1981, p.132). Make sure you document this reference in your Bibliography or list of References. Remember, plagiarism is cheating! All references must be clearly documented at the end of your assignment. For more details on referencing of material see Appendix 2 of your Unit of Study Booklet.

The Final Product

- (i) If possible, allow a few days between writing your final draft and the finished report, to allow you to critically read and edit it. There is a danger that if it is too fresh in your mind, you will read what you think is there, rather than what you have actually written. Read your final draft through several times — once for fluency and clarity of ideas, once for punctuation and once for spelling. For clarification of problems, refer to an authority such as the Australian Government Publishing Service Style Manual.
- (ii) Write (or type — learn now if you are an untidy writer) your assignment for submission, and then check it again. Is there a title, your name on each page, page numbers, etc.?
- (iii) Submit your case study report on or before the due date to the GEOS207 / GEOS910 assignment box in the ELS Centre (level 1, E7A), and keep a digital copy or photocopy. Assignment boxes are located in the reception area of the ELS Centre (Room 101), which is on the ground floor at the western end of building E7A. Campus maps are available at <http://www.bgo.mq.edu.au/campus.htm>. The Centre opens from 8.30am to 5.30pm on Monday to Friday. An after hours submission box is located at the entrance to E7A, (a labelled slot in the door nearest to E5A). All assignments are to be submitted **before** 5PM on the date specified and must include a completed and signed coversheet stapled to the front cover. The Assignment Cover Sheets are partly filled out for you at the end of the unit outline or alternatively, these can be downloaded from the web at www.els.mq.edu.au, click on Assignment Cover Sheet.

Formatting

- (i) All typed text submitted for case studies is to be 12 point font at 1.5 line spacing. Margins should be approximately 2 cm. Place your name in the header and number each page.
- (ii) Page limits should be strictly adhered to.
- (iii) In all that you hand in, marks will be given for “communication”; that is how effectively you communicate your ideas. This will include how well your text/maps/profiles/sketches convey your concepts, and how well written your report is (including correct use of English and of referencing procedures — see Appendix 2).

Now, perhaps, you can see how important it is to start the whole process early if you are to do a good job. If you are having problems along the way, consult your tutor, and consult a how-to-do-it text.

Good studying and much success in Field and Laboratory Studies in Geoscience