University of Alberta

2017 EAS-222
Principles of Sedimentology and Stratigraphy

Instructor: Dr. George Pemberton,
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Office Hours: No set office hours - I am usually in my office at 0600 hours and it is best seeing me in the morning. Just drop by the office. If you wish to set an appointment just call me or e-mail me and we can set up an appropriate time.

Lecture Room & Time: MWF 1100 - 1150 hrs ESB 327

Course Description: Origin of sedimentary materials; sedimentary processes; sedimentary structures, textures, and flow regimes; properties and classification of clastic and non-clastic rocks; sedimentary environments and facies in non-marine, coastal and marine settings; principles of stratigraphy, stratigraphic nomenclature and the stratigraphic column.

Course Prerequisites: One of EAS 101, 103, 105 or 210
‘It is important to prepare yourself for this course through a review of the prerequisite material. Students who do not have the required prerequisites at the time of taking this course should not expect supplementary professorial tutoring from the instructor.’

Course Objectives and Expected Learning Outcomes:

EAS 222 is an introduction to the concepts of sedimentology and stratigraphy. We will endeavor to concentrate on the following topics: Origin of sedimentary materials; sedimentary processes; sedimentary structures, textures, and flow regimes; properties and classification of clastic and non-clastic rocks; sedimentary environments and facies in non-marine, coastal and marine settings; principles of stratigraphy, sequence stratigraphy, stratigraphic nomenclature and the stratigraphic column. The combination of lecture and lab materials should provide the student with the necessary background to examine and interprete sedimentary rocks in the field.

Lecture Schedule & Assigned Readings
List of Lecture Topics:
1. Introduction
2. Weathering
3. Sediment Transport
4. Sediment Texture
5. Clastic Classification
6. Carbonate Grains
7. Evaporites  
8. Dolomite  
9. Sedimentary Structures  
10. Biogenic Structures  
11. Tides and Tidal Structures  
12. Depositional Environments and Facies  
13. Shoreface and Deltas  
14. Carbonate Environments  
15. Deep Sea Environments  
16. Alluvial and Fluvial Environments  
17. Introduction to Stratigraphy  
18. Sequence Stratigraphy

Lab Schedule

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lab Number and Topic</th>
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<tbody>
<tr>
<td>Jan 9</td>
<td>No labs</td>
</tr>
<tr>
<td>16</td>
<td>Lab 1: Weathering and Erosion</td>
</tr>
<tr>
<td>23</td>
<td>Lab 2: Classification of Clastic Sedimentary Rocks</td>
</tr>
<tr>
<td>30</td>
<td>Lab 3: Classification of Carbonates and Evaporites</td>
</tr>
<tr>
<td>Feb 6</td>
<td>Lab 4: Sedimentary Structures</td>
</tr>
<tr>
<td>13</td>
<td>Lab 5: Clastic Sedimentary Environments</td>
</tr>
<tr>
<td>20</td>
<td><strong>Reading Week: no classes or labs.</strong></td>
</tr>
<tr>
<td>27</td>
<td><strong>Midterm Lab Exam (Labs 1-4)</strong></td>
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<tr>
<td>Mar 6</td>
<td>Lab 6: Carbonate Environments</td>
</tr>
<tr>
<td>13</td>
<td>Lab 7: Introduction to Stratigraphy</td>
</tr>
<tr>
<td>20</td>
<td>Lab 7 continued.</td>
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<tr>
<td>27</td>
<td>Lab 8: Core Logging of Fluvial Deposits</td>
</tr>
<tr>
<td>April 3</td>
<td><strong>Final lab exam</strong></td>
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</tbody>
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Past (or Representative) Evaluative Material:
Will be provided on request

Grade Evaluation:
All assignments and examinations in this course will be given a numerical score. A cumulative course mark will be calculated from those scores, weighted as tabulated below. A final letter grade will be assigned based upon your cumulative mark and my analysis of the class’s cumulative mark distribution. Where possible, natural breaks in the cumulative mark distribution will be used in assigning grades, but no pre-determined distribution of grades will be imposed on the class. Your grade will reflect a combination of your absolute achievement and relative standing in the class. In past years, the mean grade in this course has been in the C+ to B range. The mean grade this year will be based on my judgment of the overall calibre of this class relative to past cohorts.

<table>
<thead>
<tr>
<th>EXAMS</th>
<th>WEIGHTING</th>
<th>DATE</th>
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<tbody>
<tr>
<td>Midterm #1</td>
<td>20%</td>
<td>Feb. 17</td>
</tr>
<tr>
<td>Final Lecture Exam</td>
<td>35%*</td>
<td></td>
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<tr>
<td>Midterm lab exam</td>
<td>15%</td>
<td>Week of Feb. 27</td>
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<tr>
<td>Lab Participation</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Final lab exam</td>
<td>20%</td>
<td>Week of April 3</td>
</tr>
</tbody>
</table>

*There is no possibility of a re-examination in this course’ (if the final exam weight is less than 40%)

** ‘WARNING: Students must verify this date on Bear Tracks when the Final Exam Schedule is posted’ FYI: The final exam planner is found on the Registrar’s website: http://www.registrarsoffice.ualberta.ca/en/Examinations/Fall-Winter-Exam-Planner-2012-2013.aspx

Grades are unofficial until approved by the Department and/or Faculty offering the course.

Format of Exams:
Both the midterm and final exams will be a combination of objective short answer questions (fill in blanks, multiple choice, definitions) and subjective questions (short answer questions that require the integration of information learned in the course).

Missed Term Exams and Assignments:

A student who cannot write a term examination or complete a term assignment due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred midterm examination, deferral of the weight of the missed term work/exam to other term work, term exam and/or the final exam, extension of time to complete an assignment, make-up laboratory [if offered in this course], etc.).
Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the Code of Student Behaviour.

The deferred midterm exam will be held the evening of Wednesday March 1 at 6:00PM.

Deferred Final Examination:
A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination. Such an application must be made to the student’s Faculty office within 48 hours of the missed examination and must be supported by a Statutory Declaration or other appropriate documentation (Calendar section 23.5.6). Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. Misrepresentation of Facts to gain a deferred examination is a serious breach of the Code of Student Behaviour.

The deferred exam date for EAS 222 is Tuesday May 2 at 9:00AM

Re-examination:

Because the final exam is not worth more than 40% of the final mark no re-examination is allowed for this course. A student who writes the final examination and fails the course may apply for a re-examination. Re-examinations are rarely granted in the Faculty of Science. These exams are governed by University (Calendar section 23.5.5) and Faculty of Science Regulations (Calendar section 192.5.9). Misrepresentation of Facts to gain a re-examination is a serious breach of the Code of Student Behaviour.

Student Responsibilities:

ACADEMIC INTEGRITY: "The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at http://www.governance.ualberta.ca/en/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour.aspx) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University."

All forms of dishonesty are unacceptable at the University. Any offence will be reported to the Senior Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offences. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science the sanction for cheating on any examination will include a disciplinary failing grade (no exceptions) and senior students should expect a period of suspension or expulsion from the University of Alberta.
**EXAMS:** Your student photo I.D. is required at exams to verify your identity. Students will not be allowed to begin an examination after it has been in progress for 30 minutes. Students must remain in the exam room until at least 30 minutes has elapsed. Electronic equipment cannot be brought into examination rooms and hats should not be worn.

**CELL PHONES:** Cell phones are to be turned off during lectures, labs and seminars. Cell phones are not to be brought to exams.

**STUDENTS WITH DISABILITIES:** Students who require accommodation in this course due to a disability are advised to discuss their needs with Specialized Support & Disability Services (2-800 Students’ Union Building).

**ACADEMIC SUPPORT CENTRE:** Students who require additional help in developing strategies for better time management; study skills or examination skills should contact the Student Success Centre (2-300 Students’ Union Building). Policy about course outlines can be found in section 23.4(2) of the University Calendar.

**Disclaimer:** Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.

**Note:** Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.

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**ADDITIONAL PAGES or website links:**

**Understanding Plagiarism**

**Definition:** Plagiarism is the act, intentional or otherwise, of copying or borrowing words or ideas without properly acknowledging the original source. Plagiarism is a form of theft. Plagiarism is a serious violation of the *Code of Student Behaviour* (Section 30.3.2[1]) and is unacceptable behaviour in the pursuit of a University degree.

**What constitutes plagiarism?**

Plagiarism is often misunderstood. Plagiarism is not simply the act of copying text word-for-word; rather, it has a number of different forms.

Plagiarism occurs when:
- a student hands in work done wholly or in part by another person
- portions (paragraph, sentence, phrase) of a submitted work are taken from another source without proper reference to that source
- a student paraphrases sections of another work without acknowledging the source
- ideas in a work are borrowed, derived or developed from another source without reference to that source (for example, "checking a few internet sites for ideas")

It is also an act of academic dishonesty when, without prior instructor approval, a student hands in work in one class when the work was prepared for another class.
How to avoid plagiarism
The simplest way to avoid plagiarism is to reference any sources properly (using both in-text, parenthetical citations in the body of your assignment and a Works Cited or References page at the end). While it is commonplace in academia to build upon the knowledge of others, it is necessary to clearly state the sources and foundations of that knowledge. Referencing must conform to an accepted system of documentation. Please see [http://www.uofaweb.ualberta.ca/TIE/](http://www.uofaweb.ualberta.ca/TIE/) and click on the 10 Ways to Write Papers Without Plagiarism link.

Penalties for plagiarism
Plagiarism will be reported to the Senior Associate Dean of Science and plagiarized work will typically receive a grade of zero (i.e. a mark of zero on the entire essay or assignment). Additional sanctions for misconduct under the Code of Student Behaviour will likely include:

  - Reprimand - the student receives written notification of the misconduct and a permanent discipline record in the Faculty of Science.
  - A reduced grade or disciplinary failing grade (F8) in the course.
  - Conduct Probation until the end of the student’s program.
  - Suspension from the University for up to 2 years.
  - Expulsion from the University, depending on the extent of the misconduct and especially if a student has a previous discipline record.

If students have any questions about plagiarism, they are encouraged to consult with their instructors to learn what is acceptable, before making mistakes and getting into serious trouble.

Science Lab Course - Hall of Shame
Every student should sit down and actually read the Code of Student Behavior, but the reality is that few do so. When students agree to come to the UofA, they also agree to abide by the Code. The Code was written by faculty and students and forms a framework for honest and respectful conduct in courses, in exams, in interactions with fellow students and instructors, and in all other aspects of student life.

All students arrive at university having heard about ethical conduct. Most have exercised such conduct in their secondary school careers and in their lives. Students also hear about academic integrity in every class at the University and instructors cite parts of the Code on the first day of class so that all students will know what to read and the expectations. Ethical conduct is the foundation on which the University of Alberta’s reputation is built. So what types of penalties are imposed against those who accidentally or intentionally stray to the dark side? Real examples are given below:

1) Plagiarism: Student A forgot a flow sheet for one of the lab exercises. His partner, Student B, gives Student A his flow sheet to ‘look at’ as ‘a guide’. Student A makes a hasty but near perfect copy of the flow sheet and both students hand their copies in for a mark. The students admit to the charge, but claim ignorance of the Code.

**Charge Student A:**

Plagiarism [Section 30.3.2(1)].

**Charge Student B:** Participation in an Offence [Section 30.3.6(5)]

**Penalty to both:** Zero on entire report and Letter of Reprimand.

Letter of Reprimand = a written reminder of the charge and a warning not to do it again. It goes in the student’s Discipline File within the Faculty of Science, which will
exist for the current plus 7 years, and is copied to the University Appeals Coordinator to be held as part of the central record. The Letter of Reprimand also warns that any further transgression will be dealt with severely. All discipline files are confidential, so not seen by other professors, parents or employers. However, in some cases (eg. an application to a professional school) the school will ask the Faculty whether the student has a history of disciplinary action and we provide the student’s information with their permission. Failure to give permission is often taken as a sign that the student has something to hide.

How to avoid this situation?
(1) Students should hand in their own independent work.
(2) Students can choose to hand in nothing and take a zero. Who knows – the instructor might give an extension?

In the case described above, the flow sheet was 10/30 marks, out of 360 total lab assignment marks that counted 20% of the overall score, -- this amounts to 0.5% of the final grade. Instead of accepting a small reduction in the total mark, Student A and B have a Discipline File and are on warning for the remainder of their degree program in

2) Plagiarism: Student C and Student D work together on writing up their lab report. They are partners and share data collected together. They hand in separate lab reports that contain very similar graphs and tables, and the discussion is largely word-for-word copy. They admit to having worked together on the reports and having prepared the text together, although they thought they were working more independently than the reports show.

Charge Student C & D:
Plagiarism [Section 30.3.2(1)].
Penalty to both: Zero on entire report and Letter of Reprimand.

How to avoid this situation?
As described above, students should hand in their own independent work. It is OK, and encouraged, for students to with their lab partner and to share data. They can even discuss how they might approach the writing of the lab report, but as soon as the pen hits the paper (or more likely, the fingers hit the keyboard), the report and the interpretations must be their own independent work.

In the case described above, the report was worth 30 marks out of 360 total lab assignment marks that counted 20% of the overall score – in other words just 1.7% of the final marks.

For this small potential gain, Student A and B now have a permanent Discipline File and are on warning for the rest of their degree program in the Faculty of Science.

3) Cheating: Student E & F independently used a calculator in a midterm exam to check their math. On the exam cover sheet it clearly stated that ‘Calculators and other electronic devices’ are not permitted. Before the exam was handed out, the professor clearly stated that ‘Calculators and other electronic devices’ were not permitted. Students had been repeatedly warned that ‘Calculators and other electronic devices’ were not permitted for lab quizzes.

Student E & F claimed that the instructions for the midterm were not clear. They also said that they didn’t need the calculator to actually do the math, but were just checking their work. However, Student F said that he finished 5 min before the rest of the class. The instructor concluded that this was maybe because Student F didn’t have to do longhand math.

Charge Student E&F
Penalty to both: Zero on the quiz and Letter of Reprimand (plus warning that cheating on any examination—a quiz might be defined as an exam—normally results in a disciplinary failing grade in a course.

4) Plagiarism and Participation in an Offence: Student G & H are partners in the lab and work together on writing up their lab report. They are partners and share data collected together. They hand in separate lab reports that contain essentially identical tables, although the discussion is different between the reports. Careful examination shows that Student G likely did the Results and Student H likely did the Discussion, which were exchanged and personalized by editing. When confronted, the students said they worked on separate computers side-by-side and talked about their results, but did not copy from each other. The students were asked if they shared electronic files and they denied this.

When told that a third student (Student I) had also submitted an almost identical report, Students G & H expressed surprise and did not understand how it was possible—maybe just a coincidence because the lab book tells students how to format the data. Several hours after Student I was contacted to see the professor for an interview, Student G also contacted the professor to say that he now remembered sending his Tables to another student for use in formatting his report. Student G also remembered that unfortunately he had accidentally left his results in the Tables that he sent to his friend. Student I withdrew from the course before charges were laid. When interviewed about misconduct, he explained to the professor that he was no longer in the course and that the professor had no right to interview or charge him.

**Charges Student G & H:**

**Plagiarism** [Section 30.3.2(1)]

**Penalty:** Zero on the lab report, a Letter of Reprimand, and a one step grade reduction in the course.

**Charge against Student G with respect to Student I:**

**Participation in an Offence** [Section 30.3.6(5)]

**Penalty:** 4 month suspension.

**Charge against Student I:**

**Plagiarism** [Section 30.3.2(1)]

**Penalty:** Expulsion (Student I was a repeat offender with multiple previous offences and this offence was one more in a string of dishonest behaviours).

The lab report in question was worth 30 marks, out of 360 total lab assignment marks that counted 20% of the term summary—just 1.7% of the overall score.

It is the ACT OF CHEATING that is punished, not the expected gain. Arguing ‘it was only a lab quiz’ or ‘I have nothing to gain’ are not successful defenses. Withdrawing from the course does not erase the original problem and charges can be pursued whether or not the student comes to his/her own defense. Decisions are made of balance of probabilities after weighing the evidence and any statements made by the student. Dishonesty during the discipline process precludes any possibility of leniency when sanction is being determined.
5) **Misrepresentation of Facts.** Student J has a heavy exam schedule and decides to defer two final exams to lighten his load. He arrives at the Faculty Office after missing his exams and applies for deferred exams, providing a Medical Statement form (it was the student’s choice to do so). When the Faculty Office checks the Medical Statement, they learn it is a false declaration and concludes that the student was not ill on those days. The case is reported to the Senior Associate Dean.

**Charge:**

**Misrepresentation of Facts for Academic Advantage** [Section 30.3.6(4)].

**Penalty:** Grade of F8 in both courses and a 1 year suspension (this was a senior student who definitely knew better).