

EAS 336 - SEDIMENTARY SYSTEMS - FALL TERM 2012

Instructor Dr. Clark, Room 1-16B ESB, Ph: 492-3266
e-mail: fred.clark@ualberta.ca

Lectures A1 M W F 1300 - 1350 BUS 1-5

Laboratories D1 Monday 1400 - 1650 ESB 3-12
D2 Tuesday 1400 - 1650 ESB 3-12
D3 Tuesday 1700 - 1950 ESB 3-12
D4 Wednesday 1700 - 1950 ESB 3-12

Marks 15% Mid-term exam, **Friday, October 19**
(Lectures through ~October 15)
35% Final exam, **Thursday, Dec. 13, 1400-1700**
(Cumulative, emphasis ~October 17 to end)
5% Class participation; use of i>clicker
20% Laboratory assignments (total of ten)
25% Laboratory final exam, week of December 3

**** Final Exam timing is unofficial; confirm on Bear Tracks when official schedule is set and released by Registrar****

*** Deferred Final Exam is scheduled for Saturday, Jan. 12, 2013, 0900-1200 ***

Texts *Principles of Sedimentology and Stratigraphy*, by Sam Boggs, Jr., 5th Edition, Pearson Prentice Hall. Required. Used in EAS 222.

Facies Models 4, edited by James and Dalrymple, Geological Association of Canada. A reference volume you should own; highly recommended.

Notes **ESSENTIAL**. Lecture outline format, posted online through eClass, on an ongoing basis. Files will be in both Word and PDF format. **Sample mid-term exam questions** will also be posted here.

Schedule October 8: Thanksgiving Day, no class
October 19: Mid-term Exam
November 12: Remembrance Day holiday, no class
December 3-5: Lab Exams
December 5: Last lecture
December 13: Final exam, 1400-1700
January 12/2013: Deferred Final exam, 0900-1200

EAS 336 - FALL TERM 2012

Schedule of Laboratories

<u>Topic</u>	<u>Dates</u>
1. Clastic Rocks in Thin Section	Sept. 17-19
2. Clastic Diagenesis	Sept. 24-26
3. Clastic Sedimentary Depositional Environments	Oct. 1-3
4. Clastic Core Logging Exercise	Oct. 9-10 [?]
Thanksgiving Holiday, Monday, October 8; Lab D1 students to join one of the other sections, or alternate section to be set later in week; TBD.	
5. Carbonate Rocks in Thin Section	Oct. 15-17
6. Carbonate Diagenesis, Porosity and Permeability	Oct. 22-24
7. Dolomitization/ Chemical and Non-carbonate Biochemical Sedimentary Rocks	Oct. 29-31
8. Carbonate Sedimentary Depositional Environments	Nov. 5-7
Remembrance Day Holiday and Fall Term Class Break, November 12 & 13; No labs this week.	
9. Carbonate Core Logging Exercise	Nov. 19-21
10. Introduction to Sequence Stratigraphy	Nov. 26-28
Final laboratory exam	Dec. 3-5

**** NOTE: ALL labs must be completed and handed in,
in order for you to pass the course! ****

**** NOTE: Penalties for late labs will be announced
in first lab sessions ****

THINGS YOU SHOULD KNOW (PART 1)

Course Description: Petrography, petrology, and petrogenesis of clastic, biochemical, and chemical sedimentary rocks. Diagenesis of sediments and sedimentary rocks, selected sedimentary depositional environments, and facies analysis, as tools for the interpretation of the sedimentary rock record. Fundamentals, terminology, and conceptual frameworks of sequence stratigraphy. Laboratory exercises based on the analysis of hand samples, thin sections, and core. Prerequisite: EAS 222. Not available to students with credit in EAS 235 or 236.

Course Objectives and Expected Learning Outcomes (Concise Version): To learn the petrography and petrology of sedimentary rocks; thin section analysis will build on the knowledge base acquired in EAS 222. The study of diagenesis of sediments and sedimentary rocks will enable students to unravel their post-depositional history. Examination of selected sedimentary depositional environments will supplement those from EAS 222, equipping the student to interpret the sedimentary rock record in terms of environments and processes, both depositional and diagenetic. An introduction to the terminology and fundamentals of sequence stratigraphy will also be given.

Course Objectives and Expected Learning Outcomes (Long Version):
By the end of this course, you should be able to:

- 1) Perform accurate petrographic examination of siliciclastic sedimentary rocks: identify and describe mineralogy and textures in hand specimen and thin section.
- 2) Name/classify and interpret the significance of siliciclastic sedimentary rocks.
- 3) Describe and explain diagenesis of siliciclastics: products and processes.
- 4) Enumerate and explain the distinguishing features of rocks formed in selected (not covered in EAS 222) siliciclastic sedimentary environments, in order to recognize/interpret these features and environments in the rock record.
- 5) Perform accurate petrographic examination of carbonate

sedimentary rocks: identify and describe carbonate grains and orthochems in hand specimen and thin section.

- 6) Name/classify carbonate sedimentary rocks, using the Dunham scheme, as well as the Folk scheme.
- 7) Describe the products of carbonate diagenesis (petrography), name and explain the processes of carbonate diagenesis, and explain the diagenetic realms in which they occur.
- 8) Explain the basics of carbonate mineralogy and carbonate chemistry, as aids to understanding carbonate diagenesis in particular.
- 9) Enumerate and explain the distinguishing features of rocks formed in various common carbonate sedimentary environments, in order to recognize/interpret these features and environments in the rock record.
- 10) Perform accurate petrographic examination of dolomites using common descriptive/classification schemes, as well as name and explain the various models for the formation of dolomites.
- 11) Perform accurate petrographic examination of evaporite sedimentary rocks, explain their origin, and describe common or significant stratigraphic relationships involving evaporites.
- 12) Explain the formation and common occurrences of cherts.
- 13) Systematically and accurately log sedimentary rock cores, and produce a reasonable interpretation of their geologic history and significance
- 14) Define/explain the fundamental terminology used in sequence stratigraphy, as well as explain the conceptual framework and classical formulation of sequence stratigraphy.
- 15) Name and explain the basic features/surfaces contained in the revised formulation of sequence stratigraphy, as expounded by Catuneanu *et al.* 2009.

THINGS YOU SHOULD KNOW (PART 2)

Class Attendance: You will need to attend class in order to turn the posted lecture outlines into notes. I will not make the material available any other way! As soon as possible, you should get to know one or two other students; in case you miss a class, you will be able to get the missing material from your Study Buddies.

Class Participation: Throughout the term, we will be using i>clicker technology to review material and/or survey opinions on various topics. Your participation in these questions forms the basis for your class participation mark. To give you an idea, response on 90% or more of the questions will get you 5/5, 70-89% gets 4/5, and so on.

If you do not yet have one, you will need to purchase an i>clicker remote, available at the University Bookstore, and register it (i.e. identify it as yours). Registration is to be done on-line, going to www.iclicker.com, then Support, then Register Your Clicker. Of course, use your first and last name as indicated, and for your ID use your CCID (e.g. Charlie Brown's CCID might be cbrown. Do **not** use your student ID#).

You are responsible for bringing a functioning remote to class every day; I will neither provide "loaners" nor batteries. Using more than your own remote in class constitutes an academic offence - both you, and the person whose remote you are using, are misrepresenting that person's attendance and participation.

Format of Exams: Exams are entirely written-answer format; point form answers are acceptable. The midterm exam is scored out of 45 marks, and the final exam out of 120 marks. The style of questions is represented by the posted sample questions.

Grading Criteria: Grades will be assigned neither with pre-determined numerical cut-offs, nor with slavish adherence to a curve or so-called historical distribution. That distribution is used as a rough guide to what the marks distribution could be, but a talented class that performs well will be rewarded with higher grades than "normal"; conversely, an underachieving class will not be propped up by the curve, but will bear the consequences.

Grades are assigned only at the end of the course, based on the total mark as determined according to page 1 of the syllabus. Typically, all marks over 80% receive a grade of A- or better; below that, every 3 or 4% reduction in total mark typically represents one grade lower. Where natural breaks in the mark distribution do not occur, the final lecture exam is used as the discriminator to set grade breaks. Last year's class had a GPA of 2.8 and a median grade of B; the year before, 2.56 and B-, respectively.

In addition, courses with a lab component typically clump marks together at a relatively high total that is not indicative of the students' grasp of the material. **You should be aware, therefore, that a total score of 50% or more in the course as a whole will not ensure a passing grade.** If said score exceeds 50% only by virtue of the lab component, whereas lecture exam results indicate inability to master the course content to any significant degree, the student may still be assigned a failing grade. I would suggest this may occur for anyone whose final exam score is less than 40%, or other circumstances that suggest a passing grade is inappropriate.

Note as well that all labs must be completed and handed in, in order for you to pass the course.

Unofficial grades will be posted on eClass once calculated. Grades remain unofficial until approved by the Department and/or Faculty offering the course.

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 (215 Central Academic Building).

Examinations Through SSDS: Students who will be writing exams through SSDS (Specialized Support and Disability Services) should bring their Letter of Introduction to the instructor as early in the term as possible, and the Exam Instructions & Authorization (orange form) sheet to the instructor at least one week before individual exams. As well, you should book the exams with SSDS as soon as possible, as the demand for spaces is high and they may not be able to accommodate you if you try to book too close to the exam date(s).

Deferred Midterm Examinations: A student who cannot write a

midterm examination due to incapacitating illness, severe domestic affliction or other compelling reasons may be granted a deferral (timing to be determined in consultation with instructor), or an excused absence (very unlikely; weight transferred to the Final Exam). Applications for deferral of or excused absence from the midterm examination must be made in writing to **the instructor** with suitable supporting documentation (e.g. doctor's note, statutory declaration, or other as determined in consultation between student and instructor), within 48 hours of the missed examination. Misrepresentation of facts to gain a deferral or excused absence is a serious breach of the *Code of Student Behaviour*.

Deferred Final Examinations: 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 (*in lieu* of a medical statement form) or other appropriate documentation (Calendar section 23.5.6). The course instructor does not have authority to grant deferred final examinations, although they may have input into the decision to grant a deferred exam. 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 date for said deferred exam, should it be granted, is noted on the schedules on the first page.

Reexaminations: There will be no reexaminations in this course, because the final exam counts less than 40% toward the course mark (see Calendar section 23.5.5[1b]).

Access To Instructor: Anytime you can find me in my office with the door open; I do not keep set office hours, so feel free to drop by. If you wish to ensure that I will be there, arrange a meeting ahead of time, either by phone or e-mail.

Academic Support Centre: Students who require additional help in developing strategies for better time management, study skills, or examination skills should contact the Academic Support Centre (2-703 Students' Union Building).

STUDENT RESPONSIBILITIES

Missed Laboratory Assignments or Lab Exam: A student who cannot complete their laboratory work because of an incapacitating illness, severe domestic affliction or other compelling reasons must arrange to submit the work and can apply to have the weight of the assignment distributed over the rest of the lab assignments; a missed final lab exam needs approval for a deferral. Applications for such measures must be made in writing to the **Geology Undergrad Lab Coordinator (Marilyn Huff; <huff@ualberta.ca>)** with supporting documentation, within 48 hours of the missed due-date of the assignment or exam. Deferral of laboratory work or exams 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. **Remember that all labs have to be completed to pass the course.**

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 www.ualberta.ca/secretariat/appeals.htm) 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 offense 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 offenses. 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.

Students should also be aware of the Faculty of Science's stance on plagiarism, as described on their web site, and the Truth in Education (TIE) issues covered on the web site <http://www.uofaweb.ualberta.ca/TIE/>. We recognize that there will be collaboration and cooperation in the completion of lab exercises, but the work you submit should be clearly and distinctly your own. If you are in any doubt you should consult the "Collaborating on Assignments" link on the TIE web site. Additional guidance may be obtained from the Lab Coordinator and/or Teaching Assistants.

Examinations: Your student photo I.D. is required at exams to verify your identity. Students will not be allowed to begin the final examination after it has been in progress for 30 minutes, and 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 (they have been used for cheating).

Cell Phones and Other Electronic Devices: Cell phones and related devices are to be turned off and stowed (i.e. off the desk/tablet top) during lectures and labs, and are not to be brought to exams. Given that course materials are posted online and intended for in-class use, students may use laptop computers in class to make/fill in notes. Any other use of laptops in class is prohibited. Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.

Copyright: Dr. Fred E. Clark, Department of Earth and Atmospheric Sciences, University of Alberta, 2012. This also applies to any course notes, exam materials, or illustrations posted on-line; students are of course permitted to download and print such materials for the purpose of taking this course of studies.

DISCLAIMER: Any typographical errors in this Course Outline are subject to change and will be announced in class.