Earth Sciences 4460A. Sedimentology of clastic and carbonate rocks

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Lectures Two lecture hours per week; Monday, Wednesday, 10:30-11:30, Chem 9
Labs: 3 laboratory hours per week; 2:30-5:30 B&G 1065

Prerequisites: ES 2260a/b, ES3314a/b, or permission of the Department.
"Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites."

Syllabus. The emphasis of this course will be on ***sedimentary environments***, the ***processes*** that characterize them, and the ***sedimentary rocks*** that result from those processes. As with most other fields of geology, "*the present is the key to the past*", and with this in mind, I will attempt, as far as possible, to discuss ancient sedimentary environments (represented by rocks) in terms of **modern** settings and processes.

Labs. Some stratigraphic problems will be set during lab time. These will be based on subsurface information (logs, cores), and will provide an introduction to log and core interpretation, and some of the principles of Sequence Stratigraphy. At the end of the course, you will complete an exercise that further develops the principles of sequence stratigraphy and the construction of a chronostratigraphic chart. The distribution of facies and environments with respect to relative sea level changes will be discussed.

Field Trip If at all possible I will organize a one-day field trip to the Halton Hills area to enable us to get some 'hands on' experience describing and interpreting sedimentary rocks. A brief report on this trip will be required and will constitute 10% of the course mark. Because of budget restrictions (no supplementary funds are available this year), this trip will have to be self-funded – I anticipate a charge of about $20 per student (to be finalized).

Term Papers. **Two** papers will be prepared during the course. These will be limited to **eight** text pages each, plus relevant illustrations, captions and references, and will involve a literature review of a variety of topics. A few key references will be given as the basis for each paper. One or more of the labs will be used as tutorial sessions, when each student will present her/his essay to the group, and be prepared to discuss and elaborate ideas. Each paper will be worth 20% of the total course mark. Papers should include a brief (200 word) but informative Abstract; and a set of brief Conclusions. References and Figures must be keyed to the text. The second paper will involve review by your peers before submission for grading. Your efforts both as a reviewer and as an author will be taken into account in the grading scheme. Additional details will be provided separately. Papers must be supplied as hard copy and also as electronic WORD format for possible checking with *Turnitin* software (see 'Academic Offenses' below).

Mid-Term Test. There is *no* formal mid-term test in this course.

Final Exam. The final exam will be of two hours, and will involve essay-type answers to questions spanning the entire range of topics covered in the course. Needless to say, relatively brief, clearly-discussed answers, (with due attention to spelling and grammar) are more likely to result in good marks than a random regurgitation of disconnected facts! The final exam will constitute 50% of the course mark.

Course Materials

Main Text: *Facies Models: Response to Sea Level Changes* (4th. Edition, 2010) Edited by R.W. Dalrymple and N.P. James. Geological Association of Canada. A very readable, basic introduction to sedimentary facies models. Essential reading for this course.

Recommended reading (not purchase) *Sedimentary Environments: Processes, Facies & Stratigraphy* (3rd. Edition, 1996) Edited by H.G. Reading. Blackwell Scientific Publications. ISBN 0-632-03627-3. (The Bible for sedimentary geologists - a comprehensive review of all major sedimentary environments).

Evaluation

Two Term Papers (40%);
Field Trip report (10%)
Final Exam, 50%

Academic Offences:

"Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf ."

"All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com)."

Absence from Exams

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see:
http://www.uwo.ca/univsec/handbook/appeals/medical.pdf

Accommodation due to Illness

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services.
The form can be found here:
https://studentservices.uwo.ca/secure/medical_document.pdf

Accessibility

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Approximate Schedule of Topics

Week	Class	Topic	Lab Topic
1	1	Introduction to course, Facies principles	Well log correlation
	2	Facies Principles; Intro to carbonate environments	
2	3	Peritidal carbonate environments	Essay prep
	4	Carbonate shelves and reefs	
3	5	Platform margins, slopes and deep water environments	
	6	Fluvial systems – braided rivers	Field Trip, Sun 27 Sept (tentative)
4	7	Fluvial systems – meandering rivers	Essay Preparation
	8	Fluvial systems - floodplains	
5	9	Fluvial systems – anastomosed rivers	
	10	Deltas – river-dominated	
6	11	Deltas – wave-dominated	#1 Essay Presentation Oct 15th (hand-in Oct 12 @ 5 pm)
	12	Deltas – tide-dominated	
7	13	Eolian environments	Essay preparation
	14	Wave-dominated clastic shelves - coasts	
8	15	Clastic shelves – offshore sediment transport	Essay Preparation
	16	Tide-dominated coasts	
9	17	Tide-dominated shelves	Essay Preparation
	18	Deep-water systems - processes	
10	19	Deep-water – submarine fan models	Deliver essay #2 to reviewer 09:30 Nov 14th
	20	Principles of sequence stratigraphy – key surfaces	
11	21	Sequence stratigraphy – systems tracts	Sequence strat. exercise
	22	Sequence stratigraphy - chronostratigraphy	
12	23	Trace fossils – burrowing behavior (ethology)	#2 Essay presentation Nov. 26th (hand-in Nov 23rd)
	24	Trace fossils – ichnofacies concepts	
13	25	Spare slot	Wrap-up session