

## **GEOL 7700 Advanced Clastic Sedimentology**

**This course is run in conjunction with the undergraduate course GEOL 4270 Advanced Studies in Earth Sciences.**

### **INSTRUCTOR:**

**William M. Last** (office: 228 Wallace Bldg.; office hours: 8:30-10:00 Tuesday & Thursdays or by appointment; telephone: 474-8361; Email: WM\_Last@UManitoba.ca)

### **MEETING TIME:**

First term; Tentatively scheduled for Slot 1: 8:30-9:20, MWF; 243 Wallace Building; exact time will depend on my schedule, your schedule, and the schedule of the people taking 7.427. In order to plan the course I need a copy of your timetables/schedules at the first organizational meeting.

### **LABORATORY:**

TBA; In general, there is no 'organized' laboratory session, however individual research projects may be assigned which will require use of sedimentological laboratory equipment and facilities, either as a group or on individual basis.

### **Field Trip:**

TBA; *If* this component of the course is run, it will be absolutely REQUIRED of all participants; NO EXCEPTIONS. Tentative dates of the field trip are October 6-11. However, because of the significant increase in airfares and vehicle rental costs over the past two years and the fact that the course is being run in conjunction with the undergraduate 7.427, means that the financial aspects of a week-long field effort may be prohibitive. We will discuss the various options during our first organizational meeting, and details will be announced as soon as possible after our first meeting.

### **Course Format:**

This course involves extensive readings with weekly seminar/discussion meetings during which there will normally be at least two student-presented seminars followed by extended discussion of the particular topic. Although I will take the lead on seminars and some background lectures during the initial weeks of the course and may present a short introduction to selected topics during the term, throughout most of the course there will consist of a minimum of lectures by me. Senior undergraduate students may be

participating in this course as credit for 7.427 (Advanced Studies in the Earth Sciences). In general, undergraduate participants will be required to do somewhat less reading and may have different assignments; they will, however, be expected to participate equally in the seminars and discussions.

For each weekly session(s), you will be required to read about 12 to 15 assigned papers on a predetermined topic and to prepare appropriately researched and formatted written responses to one or several questions on the topic of the readings. With the exception of the initial several weeks, papers and accompanying general reference lists will normally be assigned one week in advance. A list of points to be considered in the reading will also be provided in advance.

There will normally be two 20-30 minute, student-presented seminars each session. The number of presentations by each participant will ultimately depend on the number of students registered in the two courses (i.e., 7.427 & 7.770) but it is likely you will be required to present *at least 4 seminars* during the term. Each session will begin with a short introduction followed by the seminars and associated discussion. Because all participants in the course will have done most of the reading, the seminar should not be simply a description of the assigned reading (although you must remember that the 7.427 participants will have done somewhat less reading). Instead the seminar should be an overview that will set the stage for any following discussion points. As such, the seminar would normally emphasize the pros and cons of the various models and ideas related to the subject, a summary of the main conflicts in interpretations, a general statement about the relationship to previously considered topics, a general status of the subject, and most importantly, your ideas on the subject.

Following each seminar, there will be a general discussion of the topic and of the assigned readings. I will be the facilitator during these post-seminar discussions but you must be prepared to participate by asking questions of the seminar leader, offering comments and perspectives. Your ability to intelligently and critically summarize and discuss the topics is essential. Your class participation is required. If there is no discussion, I will assume all is clear.

A comprehensive 'term paper' on an assigned subject will be required.

Some of the material presented in this course will be in the form of video tapes and other AV programs. The majority of videotapes and AV programs used in this course belong to either University of Manitoba or to other organizations. Unfortunately, these videotapes *cannot* be borrowed by individual students for study outside of class.

### **Textbook:**

There is no formally assigned textbook for this course. I will assume that everyone is *already* reasonably familiar with the contents of *Sedimentary Environments: Processes, Facies and Stratigraphy* (H. G. Reading, editor; 3<sup>rd</sup> Edition; 1996), *Sandstone Depositional Environments* (P. A. Scholle & D. Spearing, editors; 1982), and *Facies Models: Response to Sea Level Change* (R. G. Walker & N. P. James, editors; 1992).

### **Grading:**

The grade for this course is based on weekly assignments (25%), term paper (30%), and seminars & seminar discussion participation (45%).

The last date for voluntary withdrawal from the course without academic penalty is *November 15*. I am instructed by ROASS policy to advise you to read the academic regulations and policies in the University Graduate Calender. In particular, be aware of the policies regarding academic dishonesty, including “plagiarism and cheating”, “examination personation”, and “attendance and debarment”.

### **Policy for Late Assignments & Projects**

*Late assignments, projects, and reports will not be accepted.*

### **Course Content & Topic Outline:**

(not in order of coverage)

#### **1. Modern Facies Analysis**

Facies relationships and statistical analyses; associations and sequences  
Facies modelling

Use and pitfalls of interpreting depositional processes using wireline logs  
Sedimentary structures: use and interpretation in cores; in outcrop; review of nature of stratification; classification of internal structures, organic structures, deformational structures, inorganic structures

#### **2. Review of Process Controlled Genetic Units**

Principle of lateral accumulation  
Lateral versus vertical accretion  
Classic versus modern stratigraphic principles  
Classification of environments and processes

## **Continental Setting**

### **3. Alluvial & Lacustrine Sediments**

Alluvial fans; arid & humid  
Alluvial plains  
Fluvial sedimentation and deposits  
    Intermittent streams  
    Braided streams  
    Meandering streams  
    Anastomosing streams  
Lakes & playas

### **4. Aeolian Sediments**

Ergs  
Dunes/draas  
Eolian plains

## **Coastal Transitional Setting**

### **5. Transitional Sediments**

Deltaic coastlines  
    the delta continuum  
    wave dominated  
    tide dominated  
    fluvial dominated  
Barrier Island Complexes & Wave dominated coastlines  
Tide-dominated coastlines

## **Shallow & Deep Marine Settings**

### **6. Estuarine coastlines**

### **7. Continental shelves**

Transgressive versus passive versus regressive shelf settings

### **8. Epicontinental Seas**

### **9. Continental Slope, Transition Zone & Deep Marine Sediments**