

## GY 402: Sedimentary Petrology (W) - 3 hours

Spring 2009

Your Host: Dr. Doug Haywick (<http://www.usouthal.edu/geology/haywick>)

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**Objectives and Goals:** This course will examine the physical make-up of some of the most important rocks we have on the planet (certainly along the Alabama Gulf Coast!); the sedimentary rocks. You will be introduced to the most common nomenclatures used to name those rocks and sediments, the techniques used to identify them, and the parameters responsible for their origins. Laboratories will be used to introduce you to the physical properties of sediment and sedimentary rocks. Several **required** field excursions will take place in this class. The one to Moscow Landing will be a three day mini field school. GY 402 also requires substantial computer use. Most students already have access to personal computers; however, the Department has several available for your use. These computers have licensed copies of Word/WordPerfect, PaintShop Pro, Excel/Quattro and several sedimentary geology application packages (e.g., TriPlot). You will also need an active E-mail account for this class. Effective Fall 2009, GY 402 will have GY 302 and 304 as prerequisites.

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### TENTATIVE LECTURE & LAB GAME PLAN (T-Tuesday; R-Thursday)

#### Week 1 INTRODUCTION

Lect 1 (T): Course structure, origin of sediment, description of sedimentary rocks (1)

Lect 2 (R): Grain size and descriptive parameters of sediment (2)

[Tues Lab]: Nothing this week

[Thurs Lab]: Campus walk to collect samples (**mandatory**)

#### Week 2 GRAIN DYNAMICS

Lect 1 (T): Sediment classification techniques and schemes (3)

Lect 2 (R): Fluid and bedform dynamics (4)

[Tues/Thurs Labs]: Grain size analysis

#### Week 3 FLUID DYNAMICS

Lect 1 (T): Bedform development (5)

Lect 2 (R): Primary sedimentary structures (6)

[Tues Lab]: Grain size analysis

[Thurs Lab]: Plotting data

#### Week 4 SEDIMENTARY STRUCTURES

Lect 1a (T): Sedimentary sections (7)

Lect 1b (T): Sedimentary Facies (8)

[Thurs 11:00 am – 1:45 pm]: Scarborough School field trip (**Mandatory**)

*Saturday Feb 7 or Sunday Feb 8 (9:00 am-5:00 pm): Field trip to Tombigbee River (**Mandatory**)*

#### Week 5 INTRODUCTION TO SEDIMENTARY ENVIRONMENTS

Lect 1a (T): Walter's Law (9)

Lect 1b (T): Optical Mineralogy\*\* (10)

[Tues Lab]: Introduction to thin section petrography; minerals\*\*

[Thurs Labs]: Introduction to thin section petrography; minerals\*\*

\*\* For students who did not take GY 302 in the Fall 2008 Semester; all other students will complete a separate writing assignment

#### Week 6 THIN-SECTION PETROGRAPHY

Lect 1 (T): Siliciclastic petrography 1; mature sediments (11)

Lect 2 (R): Nearshore sedimentary environments (12) (**midterm exam issued**)

[Thurs Lab]: [Tues/Thurs Labs]: Mature sandstone petrology (quartz arenites)

#### Week 7 SILICICLASTIC PETROGRAPHY

Lect 1 (T): Mardi Gras Holiday (Feb 24)

Lect 2 (R): Moscow Landing (13) (**midterm exam due by 5:00 pm**)

[Thurs Labs]: Moscow Landing Writing/Library Research Assignment

**Week 8 SILICICLASTIC PETROGRAPHY**

Lect 1 (T): Siliciclastic petrography 2 [immature sediment] (14)  
Lect 2 (R): Alluvial fan depositional environments (15)  
[Tues/Thurs Labs]: Immature sandstone petrology (arkose/litharenites)

**Week 9 SILICICLASTIC PETROGRAPHY**

Lect 1: (T): Siliciclastic diagenesis: matrix versus cement (16)  
Lect 2 (R): Moscow Landing Stratigraphy Research (SEGSA Meeting, St. Petersburg)  
[Tues/Thurs Labs]: Siliciclastic diagenesis

**Week 10 SPRING BEAK (March 16-22)**

**Week 11 SILICICLASTIC PETROGRAPHY**

Lect 1 (T): Fluvial Systems (17)  
Lect 2 (R): Deltaic depositional environments (18)  
[Tues/Thurs Labs]: Volcaniclastic Sandstone Petrology  
*Friday March 27(2:00 pm) – Sunday March 29: Field trip to Moscow Landing (Mandatory)*

**Week 12 CHEMICAL SEDIMENTARY ROCKS**

Lect 1 (T): Evaporite and carbonate tidal flat petrology (19)  
Lect 2 (R): Non-skeletal allochems (ooids, mud etc) (20)  
[Tues/Thurs Labs]: Carbonate Tidal Flat Petrology

**Week 13 CARBONATE PETROGRAPHY)**

Lect 1 (T): Skeletal allochems (21)  
Lect 2 (R): Carbonate shelf depositional environments (22)  
[Tues/Thurs Labs]: Limestone Petrology (non-skeletal)

**Week 14 CARBONATE PETROGRAPHY**

Lect 1 (T): More skeletal allochems and reefs (23)  
Lect 2 (R): Cool water sedimentation and sea-level change (New Zealand) (24)  
[Tues/Thurs Labs]: Limestone Petrology (skeletal)

**Week 15 CARBONATE DIAGENESIS**

Lect 1 (T): Carbonate diagenesis 1 (marine) (25)  
Lect 2 (R): Carbonate diagenesis 2 (meteoric) (26)  
[Tues Lab]: Carbonate diagenesis

**Week 16 CARBONATE DIAGENESIS**

Lect 1 (T): Carbonate diagenesis 3 (meteoric) (27)  
Lect 2 (R): Final Words  
[Tues Lab]: Carbonate diagenesis  
[Thurs Lab]: Thin Section Final Exam\*\*

**Tuesday May 5: Final Exam 10:30 am to 12:30 pm**

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***Reasonably useful information:***

*Text book (reference):* Walker, R.G., and James, N.P. (eds.), 1992: Facies Models. 3rd Ed. Geosci. Can. Rep. Ser. 1, Toronto.

*Lab Manual:* There is no lab manual required, however, you must have the following for the labs:  
1) hard covered notebook  
2) hand lens  
3) good quality pencils (coloured and graphite for drawing), pens and a compass

Assessment:	Attendance/Participation ☺	10%
	Peer review exercises ☺ ☺	05%
	Campus grain size project ☺ ☺	10%
	Tombigbee River Project ☺ ☺	05%
	Moscow Landing field trip project ☺ ☺	15%
	Smaller GSSA writing assignments ☺ ☺ ☺	10%
	Lab assignments	15%
	Final Lab exam ♣	10%
	Take home Midterm exam ♣	10%
	Final Exam ♣	<u>10%</u>
		100%

*Grading:*      A - 90+              B - 80 to 89      C - 70 to 79      D - 60 to 69      F - 59 and below

*Laboratories:* It is up to you to examine the rocks and thin-sections that are assigned in this course and to do all additional laboratory assignments. You may do this during the lab periods and/or outside of normal university hours. A good chunk of your mark in GY 402 will be based upon lab material (lab test, quizzes etc). Spend suitable time in the lab going over the crystallographic models and minerals. Refer to the web page for lab assignment due dates. **I do not give extensions; labs assignments not turned in on time will not be accepted (you get an F for that assignment).**

☺ *Attendance/Participation:* You learn by asking questions and participating in lab discussion sessions and field trips. I will assess you on how well you do. In addition, you will learn the advantages of peer review by actually doing this for two writing assignments in this class. You will be assessed on your peer-reviewing participation.

☺ ☺ *Writing Assignments:* GY 402 is a W (Writing-Across-the-Curriculum) class, which means that it is writing intensive. The purpose of W classes is to not only provide you with the opportunity to “write”, but to help you to improve your writing skills. In GY 402, you will be able to write in a number of “styles” that are both useful and relevant to all of the geology professions. These “styles” include: professional letters, cover reports, memos, geological lab reports and the ever popular (but much maligned), sedimentology projects (see the GSSA bleb below). In order to help you develop appropriate writing skills, each of the “W” assignments that you get will be assigned will be “re-doable” following submission and review of a first draft. Three of the assignments will also be subjected to peer review whereby your fellow students will provide comments in addition to those provided by the instructor. Remember; the purpose of all this is *to improve and develop your writing skills in geology*. Refer to the class website for due dates and redo dates for each of the assignments.

☺ ☺ ☺ *The GSSA:* You will get weekly writing assignments based in part upon the following premise: you are employed as sedimentologist with the GSSA, the Geological Survey of South Alabama. Every report that you produce (even boring lab reports) will be considered a company document. As such, it should have an appropriate “cover” (either on letterhead or memo paper), be well written without spelling mistakes/grammatical errors, contain, where necessary, a bibliography of refereed references, and contain adequate reference citations. Your signature and company position should also appear in the appropriate location on the cover letter. Ultimately, in your role with the GSSA, you will be responsible for completing 3 major projects: 1) a report dealing with sediment grain size on a site somewhere that you define on the USA main campus; 2) A project involving the mapping and correlation of Holocene terrace deposits on the banks of the Tombigbee River sedimentary and 3) a project involving the mapping and interpretation of K/T boundary chalk beds near Moscow Landing Alabama. The first and last projects will be broken up into a number of components each due at a specific date, and each revisable for remarking after I or your peer review it for you.

The following assignments will comprise the bulk of the writing assignments in GY 302:

- Breakdown of a term paper (Week 1)
- Grain size research proposal (Week 2; Peer reviewed)
- Grain size introduction and methodology write up(Week 3)
- Responding to a professional inquiry concerning a sedimentary section (Week 4; peer reviewed)
- Responding to a community inquiry (Week 5; for students who completed GY 302 in Fall 2008)
- Moscow Landing Writing/Library Research Assignment (Week 7; Peer reviewed)
- Moscow Lading Introduction, Stratigraphy write up (week 9)

From week 8 until the end of the course, the weekly writing component will consist of a thin section discussion. All writing assignments (1<sup>st</sup> drafts and revised versions) are due by 5:00 pm on the assigned due dates as listed on the course website. **I will not accept late assignments (you will get an F).** When I mark them and return them to you with comments, you will be permitted to resubmit them **once** for revised assessment. I will accept revisions up to the re-submission deadlines (usually 1 week later than the original due date) posted on the web page.

♣*Exams:* The reason for producing a syllabus is to give students advanced notice of exams and assignment due dates. Translation: there is no excuse for missing an exam. However, sometimes it happens. If you have a **legitimate** excuse for missing an exam (i.e. medical problem), you will be permitted to write a make-up during the last week of classes provided that you show me a signed certificate from a medical doctor stating that it was impossible for you to make the exam. **The make up exam will consist of 2 essay questions** with no choice on your part. The Final lab exam will consist of a thin section and hand specimen description exercise of a sample drawn randomly from a hat. The sample pairs will be from a similar suite to those that you examined during the petrography labs in the class. You will be able to use your lab note books during the final.

*The fine print:* Plagiarism and cheating are not permitted in this class and either of them will result in severe embarrassment to you (and quite possibly an F for the assignment or exam in question) if you are caught doing them. Be sure to use proper reference citations in your take home exam otherwise it's plagiarism. See me if you need help about this **before** the exam.

*Disability disclaimer:*In accordance with the American's with Disabilities Act (ADA) students with bona fide disabilities will be afforded any reasonable accommodation. The Office of Special Student Services will certify a disability and advise faculty members of reasonable accommodations. If you have a specific disability that qualifies you for academic accommodations, please provide us with certification from the Office of Special Student Services, directed by Ms. Andrea Agnew, and located in the Student Center, room 270. The phone number is 460-7212.

*Changes in Course Requirements:* Since all classes do not progress at the same rate, instructors may wish to change the number and frequency of exams, or the number and sequence of assignments. Inclement weather (e.g., hurricanes) may also force rescheduling of lectures, assignments or exams. When ever possible, this material will be made up. Students will be given adequate written notice of any changes in lecture sequence, assignment due dates and/or exam date changes.

## More on “W” Classes

(Taken mostly verbatim from Prof. W. Owen, Past Chair of the WAC Committee)

### Writing Assignments:

This course is designated as a Writing Course (W). This means that a significant portion of your grade will be derived from writing assignments. One of the most important skills of our profession is effective communication. Geologists are expected to communicate clearly with many audiences. The assignments of this course will allow you an opportunity to practice these skills. In all assignments, you should focus on understanding the specific audience so that the writing clearly communicates with them.

### Writing Process:

Clear writing demands good idea organization, correct grammar, punctuation, and spelling. The process of producing clear and concise documents usually requires: (1) pre-planning, research, thought, and organization, (2) writing a draft, (3) a small pause before the editing, and (4) revision(s) to produce the final version. This process can benefit from external proofreading. You might consider having someone else read your draft and assist in the revision process.

The University provides the Writing Center as a service to improve the process of writing. This is not a “proofreading” service; but they can provide advice that can improve your writing. These folks are a valuable asset. You can call and make an appointment with a Writing Center Consultant (460-6480). They are located in 207 Alpha Hall East. Check out their website (URL: [www.southalabama.edu/writing/](http://www.southalabama.edu/writing/)). It has a lot of useful information.

Editing a document that you have written is an “ego” crushing affair. I get out a red pencil and mark my work ruthlessly. I remove excess words and seek better words to make my communication clearer. Allow yourself ample time for this iterative process. Be sure that you use all of the word processing tools at your disposal (spelling, thesaurus, and grammar checkers are helpful).

For these assignments, you should produce a draft, then edit and revise it before submitting it for grading. All assignments, in this class, will be graded and feedback provided (usually in the form of notes written in the margins). You will have an opportunity to reflect upon the comments and revise your submission. However, this writing approach assumes that you have been through the draft and revision phase.

### Formal Peer Reviews:

A process of formal peer review is helpful in producing a document that is well written. In this class, several of the assignments will use a peer review. The function of a peer reviewer is to read a document and make critical remarks that will help to improve it. For example, when reading a section that is confusing, the comment “**I do not understand. or Unclear??**” might help the author identify a section for more work.

As a reviewer, you want to be as specific as possible without re-writing the paper. Peer review focuses upon the meaning and how clearly the author is describing the topic and expanding ideas logically. Remember that style is a personal preference, your style is correct for you and not necessarily for your peer.

Point out obvious errors, point out areas that are awkward or confusing. As a reviewer resist the temptations to: (1) fail to criticize because it is a “fellow student”, or (2) suggest changes for the sake of making changes “the teacher said to.”

In this class, you are required to peer review each others work. When reviewing, keep the assignment goals in mind, and make constructive comments. As the author, take the comments as they are intended - “to improve the clarity of your paper.” Prepare two (2) copies of you draft for peer reviewing. Each peer reviewer will complete a peer review form, that will be turned in at the end of the peer review class, as an indication of peer review. Place your initials and data in the margin of the papers you review and return them to the author.

Authors should consider the comments and strengthen the paper before submitting it for grading. It is common to disagree with the reviewer; but remember that an indication of confusion or misunderstanding from a reviewer means that clear communication is not occurring. Try to improve your writing.

Turn in your final draft along with the two peer-reviewed drafts.

**Editing Symbols:** There are a set of common editing symbols that are useful as a shorthand method of communicating editing suggestions. Any good dictionary will provide a table of editing symbols. [ Note: Try Google (Search = proofreading symbols); See also - URL: [webster.commnet.edu/writing/symbols.htm](http://webster.commnet.edu/writing/symbols.htm)]

**Re-submission Policy:**

In this course you may **resubmit** each assignment once. It is your choice. After the initial grading and feedback, you may choose to re-work your assignment and resubmit for a higher grade. However, you must understand that you cannot expect to boost your grade to a perfect score. Similarly, you should not turn in a paper in need of a lot of work, expect the reviewers to indicate the changes, make them, and expect a huge boost in you grade.

When turning in a re-submission, you must: (1) clearly mark it as a **"RE-SUBMISSION"** on the first page and (2) include the original graded submission. The re-submission will be reviewed and returned as soon as possible.

**Technical Details:**

<u>Margins:</u>	Top	1"	Line Spacing:	Single or 1
	Left	1.5"	Font:	Times (or similar)
	Right	1"	Font Size:	12 point only
	Bottom	1"		

Header: Each page should have the author's name, class name, and page number. Use the wordprocessor to help here

Title: Include a title on the first page that indicates the nature of the assignment. This is NOT a separate sheet of paper!

Paper: 8 ½ x 11 inch, white

Fastening: ***Stapled*** in upper left corner only - No folders required or wanted. I provide staple for unstapled submissions at the cost of 5 points per staple.

Disk: An electronic copy of your assignment may be required. See the assignment directions for details

## D. Haywick Contact Information and Schedule Spring 2009 Semester

*How & where to find Doug:* I reside in LSCB room 049. I believe in open office hours, so feel free to pay me a visit anytime between 9:00 am & 5:00 pm (except on my research days!). However, I will generally be in my office during the times posted on my schedule. If you visit, first check the Where's Doug? note on my door. If I am in the office, **please knock loudly** then enter. Beware of the frog! Should you be unsuccessful in your attempts to find me, leave a message for me:

**Telephone:** 460-7569 (Haywick's office).

**e-mail:** [dhaywick@jaguar1.usouthal.edu](mailto:dhaywick@jaguar1.usouthal.edu)

**internet:** <http://www.usouthal.edu/geology/haywick>

### D. Haywick Hours

Time	Monday	Wednesday	Friday
7:00-7:50	Asleep	Asleep	Asleep
8:00-9:15	MAS 603 (LSCB 045)	MAS 603 (LSCB 045)	Office
9:30-9:55			Office
10:10-11:00	GY 112-101 (LSCB 119)	GY 112-101 (LSCB 119)	GY 112-101 (LSCB 119)
11:15-12:05	Office	Office	Office
12:20-1:10	Lunch	Lunch	
1:25-2:15		Office	
2:30-3:20		GY 112 lab 102 (LSCB 335)	
3:35-4:25		GY 112 lab 102 (LSCB 335)	
Evening			

Time	Tuesday	Thursday
8:00-9:15		
9:30-10:45	Office	Office
11:00-12:15	GY 402 (LSCB 337)	GY 402 (LSCB 337)
12:30-1:45	GY 402 lab 1 (LSCB 337)	GY 402 lab 2 (LSCB 337)
2:00-3:15		
3:30-5:20	GY 112 lab 103 (LSCB 335)	

Note: shaded areas are research\committee\personal times: STAY AWAY!



**Please turn off all cell phones before you enter the classroom. I hate those noisy things and they can really be an embarrassment to you when they go off. (The embarrassment comes primarily from the tennis balls I throw in your direction).**