

GY 544: Sedimentary Petrology - 3 hours

Fall 2009

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

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 544 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 544 will have GY 302 and 304 as prerequisites.

TENTATIVE LECTURE & LAB GAME PLAN (M-Monday; R-Thursday)

Week 1 INTRODUCTION

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

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

[Mon Lab]: Nothing this week

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

Week 2 GRAIN DYNAMICS

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

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

[Mon/Thurs Labs]: Grain size analysis

Week 3 FLUID DYNAMICS

Lect 1 (M): Bedform development (5)

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

[Mon/Thurs Lab]: Grain size analysis; Ternary plot assignment

Week 4 SEDIMENTARY SECTIONS

Lect 1 (M): Labor Day Holiday

Lect 2 (T): Sedimentary sections (7)

[Thurs Labs]: Bogus Section Lab Assignment

Week 5 INTRODUCTION TO SEDIMENTARY ENVIRONMENTS

Lect 1a (M): Sedimentary Facies (8)

Lect 1b (M): Walter's Law (9)

[Mon Lab]: Bogus Section Lab Assignment ; optical lab for select students

[Thurs 12:20 PM to 3:20 PM]: Scarborough School field trip (**Mandatory**)

*Saturday Sept 19 or Sunday Sept 20 (9:00 am-5:00 pm): Field trip to Tombigbee River (**Mandatory**)*

Week 6 THIN-SECTION PETROGRAPHY

Lect 1 (M): Siliciclastic petrography 1; mature sediments (10)

Lect 2 (R): Nearshore sedimentary environments (11)

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

Week 7 SILICICLASTIC PETROGRAPHY

Lect 1 (M): Library Research Day (12)

Lect 2 (R): Moscow Landing (13) (**midterm exam issued**)

[Mon Lab]: Moscow Landing Writing/Library Research Assignment

[Thurs Labs]: Paleocurrent Lab Assignment

Week 8 SILICICLASTIC PETROGRAPHY

Lect 1 (M): Siliciclastic petrography 2 [immature sediment] (14) (**midterm exam due**)

Lect 2 (R): Alluvial fan depositional environments (15)

[Mon/Thurs Labs]: Immature sandstone petrology (arkose/litharenites)

Week 9 SILICICLASTIC PETROGRAPHY

Lect 1 (M): Siliciclastic diagenesis: matrix versus cement (16)

Lect 2 (R): Provenance (17)

[Mon/Thurs Labs]: Siliciclastic diagenesis

Week 10 SILICICLASTIC PETROGRAPHY

Lect 1 (M): Fluvial Systems (18)

Lect 2 (R): Deltaic depositional environments (19)

[Mon/Thurs Labs]: Volcaniclastic Sandstone Petrology

Friday Oct 23 (2:00 pm) – Sunday Oct 25: Field trip to Moscow Landing (Mandatory)

Week 11 CHEMICAL SEDIMENTARY ROCKS

Lect 1 (M): Evaporite and carbonate tidal flat petrology (20)

Lect 2 (R): Non-skeletal allochems (oids, mud etc) (21)

[Mon/Thurs Labs]: Carbonate Tidal Flat Petrology

Week 12 CARBONATE PETROGRAPHY

Lect 1 (M): Skeletal allochems (22)

Lect 2 (R): Carbonate shelf depositional environments (23)

[Mon/Thurs Labs]: Limestone Petrology (non-skeletal)

Week 13 CARBONATE PETROGRAPHY

Lect 1 (M): More skeletal allochems and reefs (24)

Lect 2 (R): Cool water sedimentation and sea-level change (New Zealand) (25)

[Mon/Thurs Labs]: Limestone Petrology (skeletal)

Week 14 CARBONATE DIAGENESIS

Lect 1 (M): Carbonate diagenesis 1 (marine) (26)

Lect 2 (R): Thanksgiving Day Holiday [Mon Lab]: Carbonate diagenesis

[Mon Lab]: Carbonate Diagenesis

Week 15 CARBONATE DIAGENESIS

Lect 1 (M): Carbonate diagenesis 2 (meteoric) (27)

Lect 2 (R): Carbonate diagenesis 3 (burial) (28)

[Mon/Thurs Labs]: Carbonate diagenesis

Week 16 CARBONATE DIAGENESIS

Lect 1 (M): Final Words

[Mon Lab]: Thin Section Final Exam**

Friday December 4th: Final Exam 1:00 PM to 3:00 PM

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

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|-------------|--|------------|
| Assessment: | Attendance/Participation ☺ | 05% |
| | Peer review exercises ☺ | 05% |
| | Campus grain size project ☺ ☺ | 10% |
| | Tombigbee River Project ☺ ☺ | 08% |
| | Moscow Landing field trip project ☺ ☺ | 15% |
| | GSSA covered writing assignments ☺ ☺ ☺ | 12% |
| | 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 544 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 and Peer Reviews:* 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 544 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 544, 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 frequent 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 GSSA-covered writing assignments in GY 544:

- Breakdown of a term paper (Week 1)
- Grain size hypothesis and methodology write up (Week 2)
- Grain size introduction and results (Week 4; peer reviewed)
- Moscow Landing Writing/Library Research Assignment (Week 7)
- Responding to a professional inquiry concerning a sedimentary section (Week 9)
- Moscow Landing Background/Stratigraphy write up (Week 10)
- Moscow Landing Introduction/Hypothesis write up (Week 12)
- Responding to a community inquiry (Week 13; peer reviewed)
- Twitter exercise (Week 16)

From week 8 until the end of the course, the weekly writing component will consist of a thin section discussion that will be written in pencil in your lab notebooks. All writing assignments (1st 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.

D. Haywick Contact Information and Schedule

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 that I am not in class 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. Should you be unsuccessful in your attempts to find me, fear not! You have two options: 1) check the Where's Doug note on my door for my location during normal office hours, or 2) leave a message for me:

Telephone: 460-7569 (Haywick's office – you can leave a message).

E-mail: dhaywick@jaguar1.usouthal.edu

internet: <http://www.southalabama.edu/geology/haywick>

D. Haywick Hours (Fall 2009 Semester)

| Time | Monday | Wednesday | Friday |
|--------------------------|--------------------------|--|--------------------------|
| 8:00-8:50 AM | | | |
| 9:05-9:55 AM | | | |
| 10:10-11:00 AM | Office | Office | Office |
| 11:15 AM-12:05 PM | | Office | Office |
| 12:20-1:10 PM | GY 402/544 (LSCB 337) | Reserved for GY Students involved in Research | GY 301 Lab (LSCB 337) |
| 1:25-2:15 PM | 12:20 to 3:20 PM | | 12:20 to 2:10 PM |
| 2:30-3:20 PM | | | Office |
| 3:35-4:25 PM | Office | | |

| Time | Monday | Thursday |
|--------------------------|--------------------------|--------------------------|
| 8:00-9:15 AM | | |
| 9:30-10:45 AM | GY 301 (LSCB 337) | GY 301 (LSCB 337) |
| 11:00 AM-12:15 PM | GY 302 (LSCB 337) | GY 302 (LSCB 337) |
| 12:20 – 1:45 PM | GY 302 Lab (LSCB 337) | GY 402/544 (LSCB 337) |
| 2:00-3:50 PM | 1:00 PM to 3:50 PM | 12:20 PM to 3:20 PM |
| 4:00 – 5:00 PM | Office | Office |

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

Note: Mondays and Thursdays will be very intense for Haywick this semester. You are strongly advised to visit during office hours for Monday, Wednesday or Friday.



Please turn off all beepers and cellular 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)