GY 112: Earth History

Lecture 1: Introduction and Origins Part 1

Instructor: Dr. Douglas W. Haywick
Introductory Agenda

1. Contact info for D. Haywick
2. GY 112 Course Outline (syllabus)
3. Surviving GY 112 (website)
4. Origins 1: The Universe
Dr. Doug Haywick

Contact Information

Office: LSCB 049
Telephone: 460-7569
E-mail: dhaywick@southalabama.edu
Office Hours: see syllabus
Supporting Materials

1. Syllabi
2. Web site
GY 112-102: Earth History (3 hours)
Spring 2016
Lectures T. R. 9:30 – 10:45AM

Your Host: Dr. Doug Haywick
http://www.southalabama.edu/geology/haywick

Syllabus (112)

Bulletin Description: The origin and history of the Earth as seen in the rocks and their contained life record. Fee. Core Course. Co-requisite: GY 112L.

Objectives: The subject matter examined in the course covers basic aspects of earth history, and the objectives of the course are to provide students with a general understanding of this discipline. The course will focus on the origin of the solar system and the planet earth, the origin of oceans, atmosphere and life and paleontology. Specific topics covered are itemized below. You are expected to keep up with the reading prescribed for each week.

Class Format: Web-enhanced

Note: There is a Sakai site for this class, but all communication will be done via Email

TENTATIVE LECTURE GAME PLAN (subject to revision)

Week 1 INTRODUCTORY MATERIAL
Lect 1: Course Introduction: Origin of the Universe (1)
Lect 2: Origin of the Solar System and the Earth and Moon system (2) Quiz

Week 2 HISTORY OF GEOLOGICAL SCIENCE
Lect 1: Geological Thinking (4)
Lect 2: Evolution of plate tectonics as a theory (5) Quiz

Week 3 DATING
Lect 1: Introduction to dating (7, 8)
Lect 2: Stratigraphy and geological time (6) Quiz

Week 4 PALEONTOLOGY AND THE FOSSIL RECORD
Lect 1: Stable isotope geochemistry (8a)
Lect 2: Significance of fossils 1 & 2: interpretation of time & environment (9, 10) Quiz

Week 5 PALEONTOLOGY AND THE FOSSIL RECORD
Lect 1: Mardi Gras Holiday (February 9th)
Lect 2: Significance of fossils 3 and taxonomy (11, 12) Quiz

Week 6 PALEONTOLOGY
Lect 1: Lecture Test 1 (February 16th)
Lect 2: Evolution 1, 2 (14, 15)

Week 7 THE ARCHEAN
Lect 1: Archean Geology (16)
Lect 2: Origin of the atmosphere and hydrosphere (17) Quiz; Time Chart 1 due

Week 8 THE PROTEROZOIC
Lect 1: Proterozoic Tectonics 1 (18)
Lect 2: Proterozoic Tectonics 2 (19) Quiz

Week 9 THE PROTEROZOIC
Lect 1: Proterozoic Climate (20)
Lect 2: Proterozoic fossils (21) Quiz
Syllabus: Content

**TENTATIVE LECTURE GAME PLAN** (subject to revision)

**Week 1** INTRODUCTORY MATERIAL
- Lect 1: Course Introduction; Origin of the Universe (1)
- Lect 2: Origin of the Solar System and the Earth and Moon system (2) Quiz

**Week 2** HISTORY OF GEOLOGICAL SCIENCE
- Lect 1: Geological Thinking (4)
- Lect 2: Evolution of plate tectonics as a theory (5) Quiz

**Week 3** DATING
- Lect 1: Stratigraphy and geological time (6)
- Lect 2: Introduction to dating (7, 8) Quiz

**Week 4** PALEONTOLOGY AND THE FOSSIL RECORD
- Lect 1: Stable isotope geochemistry (8a)
- Lect 2: Significance of fossils 1: interpretation of time (9) Quiz

**Week 5** PALEONTOLOGY AND THE FOSSIL RECORD
- Lect 1: Significance of fossils 2 & 3: interpretation of environment & paleogeography (10,11)
- Lect 2: Lecture Test 1 *(February 9th)*
**Syllabus: Assessment**

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<td>Attendance</td>
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<td>Geological time chart</td>
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<td>Quizzes*</td>
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*Attendance:* Electing to attend class is always the best way to do well in class as much of the material we will discuss will not be covered on the web notes. If you miss the lectures, you will miss this material. Attendance for option 1 students is mandatory (it's worth 10% of your mark). I will dock you if you have more than 3 unexcused absences (approximately 10% of the lectures). If you have 6 or more unexcused absences (approximately 20% of the lectures/labs) you will receive 0% for attendance. **If you miss more than 10 lectures, I will drop your final grade an additional 10%**. *Note:* I will base your attendance on the class role I record at the start of the class. If you missed the role because you were late, it is up to you to notify me before the end of the class. If your name is not on that roll, you will be marked absent. There will be no exceptions to this attendance policy.
Syllabus: Other Stuff


Missed exams|assignment due dates: 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 exams or turning journal assignments in late. As such you will receive an F if you do not turn in your assignments by the due date. 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 (i.e. no easy stuff like multiple choice questions).** Lab assignments are due at the start of the following lab period. Late assignments are not accepted unless there is a legitimate medical excuse.

**Cheating Policy:** Plagiarism and cheating are not permitted in this class. In fact, 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. If you are unsure of what constitutes plagiarism or cheating, talk to me. This will be your only warning.
Policies related to Student Disability Services, Academic Disruption, Changes in Course Requirements, Student Academic Conduct, and Operational Disruptions are available online on the class SAKAI site accessible through USAonline behind the tab labeled "Additional Academic Course Policies."

Disability disclaimer: In accordance with the Americans with Disabilities Act, students with bona fide disabilities will be afforded 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 notify me, the instructor/professor, and provide certification from Disability Services (Office of Special Student Services). The Office of Special Student Services is directed by Ms. Bernita Pulmas and is located in the Student Center, room 270. The phone number is (251) 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.

Jag Success: JagSuccess is a program intended to help students be successful in 100 and 200 level courses. If you are not doing well, you will get an email instructing you to see your professor along with instructions to access an online survey regarding class habits and study skills. Based on your survey score, you will receive recommendations for improving your performance. You will also be given a link to an online tutorial intended to help with common problems affecting academic performance. Watch for this email during week 7 of this semester.

Academic disruption: I expect university students to be familiar with USA’s academic disruption policy (i.e., what it is, how it is handled). If you aren’t, please visit the following site:

http://www.southalabama.edu/lowdown/academicdisruption.shtml
## Syllabus: Other Stuff

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<th>Monday</th>
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Note: grey areas are research/committee/personal times: STAY AWAY!
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<td>GY 112L Nothing this week</td>
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<td>GY 112L Lab 3: Dating</td>
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**GY 112/112L Schedule of Events** (current Jan 10, 2017)

**Syllabus: Other Stuff**
Supporting Materials

1. Syllabus
2. Web site

There is no textbook or lab book for GY 112
Lecture notes and lab exercises are available online:

www.southalabama.edu/geology/haywick
More Rules

• The syllabus is a contract, but it’s subject to change. If it is a big change, you will be notified.

• Turn off your cell phones before you enter the lecture/lab room. They can NOT be left on tables during exams.

• You can NOT use computers while I am lecturing in GY 112; but they can be used during my GY 112L lab periods for accessing the class website.

• If you have a problem, contact me via phone (460-7569) or E-mail (dhaywick@southalabama.edu)
Origins: The Universe

Photo credit WMAP Science team, NASA
How did it all begin? (and when)

Up until a few years ago, scientists estimated that the age of the universe was from 10 Billion years to 20 Billion years old.
How did it all begin? (and when)

Up until a few years ago, scientists estimated that the age of the universe was from 10 Billion years to 20 Billion years old.

Why the wide range…..?

…the means by which distance in space is measured.
How did it all begin? (and when)

Spectra of different types of stars
How did it all begin? (and when)

The further a star is away from you, the faster it is moving and the more its light is shifted towards the red end of the spectrum. This is called the red shift.
How did it all begin? (and when)

Using the red shift of galaxies as well as other astronomical techniques (e.g., distribution of microwave radiation), scientists have now “agreed” to a date for the age of the universe....
How did it all begin? (and when)

Using the red shift of galaxies as well as other astronomical techniques (e.g., distribution of microwave radiation), scientists have now “agreed” to a date for the age of the universe….

13,700,000,000 Years (13.7 GA)
How did it all begin? (and when)

The interesting thing about all this is that the visible university is actually much larger than this. Some estimate it up to 90+ Billion light years. The reason is that there was a period of expansion in the past when the universe, well, expanded. Really, Really fast.

Visit this link for a cool interactive powers of ten animation

http://apod.nasa.gov/apod/ap140112.html
How did it form?

A really, really, really massive explosion termed the “Big Bang”

Supporting evidence: mathematics and the composition of the visible university (specifically the H:He ratio)
How did the stars form?

Enter gravity....

Source: www.mbscientific.com/BigBang.jpg
Gravity formed stars and Galaxies

100,000,000,000 stars
Why are stars “bright”? 

Enter fusion…. 

... and as H “burns” away, new elements form through the process (Li, Be, B, C, N, O......

...all the way to Fe

Source: physics.uwyo.edu/~stark/outreach/StarLives/life+death/fusion.gif
First generation stars (13 Ga)
But sometimes things go wrong

Large Magellanic Cloud

180,000 light years distant
Supernovae occur when very massive stars collapse because fusion stops when the star becomes too enriched in iron.

The atoms within the star are compressed to neutrons (Neutron star).
Supernova 1987a – 15 years later

Astronomy picture of the day (http://antwrp.gsfc.nasa.gov/apod)
Today’s Homework

1. Look over your notes: Quiz 1 Thursday
   (multiple choice; 5 questions)

For Next Time

1. Solar System; Earth Moon System (web notes 2)
GY 112: Earth History

Lecture 1: Origins part 1

Instructor: Dr. Doug Haywick
dhaywick@southalabama.edu

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