# **EARTH SCIENCE LECTURE** (GEOS1133)
Spring 2021

**Class Time and Location: TR** 12:30 – 1:45 PM
**Instructor**: Gaumani Gyanwali – Ph. D.: OSU-Stillwater; MS, BS: Tribhuvan University
**Office Location:** S 244
**Office Hours:** Posted on office door
**Contact Information:** Office: (479)-394-7622, Ext. 1339
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**Prerequisite**: A grade of "C" or better in Elementary Algebra.

**Resources**:

Textbook: The Good Earth: Introduction to Earth Science by David McConnell and David Steer, third edition: McGraw Hill, 2015 ISBN 978-0-07-352410-8.

Required Materials:

1. Lab Safety Goggles **2.** Earth Science Lab Manual: Gaumani Gyanwali 2017 (Revised: December 2019)

**Course Description**: This introductory course will explore on various aspects of Earth structure and properties mainly, focusing on the scientific explanation and understanding. The course will be covered in a way to help students in concept building and problem solving, but emphasis will be given to real-life experience and application of scientific process and progress. Topics covered will include plate tectonics, earthquake, volcanoes, rocks and minerals, weathering, oceans and coastlines, atmosphere, and weather and climate.

**Program Outcomes:** Students will increase their
-writing, reading, speaking, and listening skills,
-competency in mathematics, utilizing their analytical and occupational skills to solve real life problems,
-understanding of different cultures and societies across the globe and how both have changed over time,
-understanding of basic principles and their application in the field of physical sciences and biological sciences, and
-technological and research skills.

**Rationale:** Structure and properties of the Earth, as well as natural processes and events have always been very influential in determining the society's community and the economic, environmental, and social development. Understanding the basic science behind these processes not only helps remove misconceptions but also to take right decisions in right time. Creating interest in these processes and properties will help build better and safer communities to some extent.

**Course Objectives:** Upon successful completion of GEOS1133, the student should be able to do the following:
1. Recognize the influence of the concepts of Earth Science on their daily lives and preparedness from natural disasters. (Components: apply, analyze, validate, appraise)

2. Explain the philosophy of science: scientific conclusions are based on experimental evidence.
3. Perform a scientific calculation and experimental procedures, and draw proper conclusions. (Components: collaboration, data collection, calculation and formulation, proper grammar and format, documentation, logical argument, research skills)
4. Demonstrate a basic understanding of scientific techniques, structure of the Earth, earthquake and volcanoes, rocks, weathering and soil formation, ocean currents, atmosphere, weather-related hazards, and climate system based on established scientific theories. (Components: differentiate, apply, validate, comprehend, classify, illustrate, and hypothesize)
5. Collect data of earth and weather related information and present it in proper format. (Components: data collection, proper communication, proper grammar, research skills, reliable resources, collaboration, presentation skills)
5. Apply the knowledge gained in above mentioned subject areas in relation to overall safety of the society and protection of the environment. (Components: apply, analyze, validate, appraise)

**Topical/Unit Outline:**

I. Introduction to Earth Science
- A. Earth Science and Earth System
- B. The Scope of Earth Science
- C. Doing Science
- D. Science and Society

II. Plate Tectonics
- A. Continental Drift
- B. Evidence from the Seafloor
- C. Plate Tectonics
- D. Plate Boundaries

III. Earthquake
- A. Evidence of Earthquakes
- B. Faults, Earthquake, and Plate Tectonics
- C. Seismic waves and Earthquake Detection
- D. Measurement of Earthquake
- E. Earthquake Hazards

IV. Volcanoes and Mountains
- A. Magma: Sources and Composition.
- B. The Mount St. Helens Eruption
- C. Products of Volcanic Eruption
- D. Volcanoes and Volcanic Landforms
- E. Mountains

V. Rocks and Minerals
- A. Elements and Atoms: Basic Building Blocks
- B. Minerals
- C. Igneous Rocks
- D. Sedimentary Rocks
- E. Metamorphic Rocks

F. The Rock Cycle

VI. Weathering and Soils

A. Physical Weathering
B. Chemical Weathering
C. Biological Weathering and Decay
D. Weathering Rates
E. Soil Erosion and Conservation

VII. Oceans and Coastlines

A. Our Changing Oceans
B. Ocean Basins
C. Ocean Waters
D. Oceanic Circulation
E. Tides
F. Wave Action and Coastal Processes

VIII. The Atmosphere

A. Structure and Process of Atmosphere
B. Solar Radiation and the Atmosphere
C. The Role of Water in the Atmosphere
D. Air Pressure, Condensation, and Precipitation
E. Clouds and Frontal System
F. Winds

IX. Weather Systems

A. Science of Weather
B. Air Masses
C. Midlatitude Cyclones and Frontal Systems
D. Severe Weather: Thunderstorms and Tornadoes
E. Hurricanes
F. Earth's Climate System

**Tentative Schedule of Lecture: Earth Science**

| Week | Chapter or Topics | Date |
|---|---|---|
| 1 | Syllabus and Introduction to Earth Science | 1/12 T, 1/14 R |
| 2 | Introduction to Earth Science/Plate Tectonics | 1/19 T, 1/21 R |
| 3 | Plate Tectonics | 1/26 T, 1/28 R |
| 4 | Earthquake | 2/2 T, 2/4 R |
| 5 | Review<br>**Test 1** | 2/9 T<br>**2/11 R** |
| 6 | Volcanoes and Mountain | 2/16 T, 2/18 R |
| 7 | Rocks and Minerals | 2/23 T, 2/25 R |
| 8 | Rocks and Minerals<br>Review | 3/2 T<br>3/4 R |
| 9 | **Test 2**<br>Weathering and Soils | **3/9 T**<br>3/11 R |
| 10 | Weathering and Soils<br>Oceans and Coastlines | 3/16 T<br>3/18 R |

| | | |
|---|---|---|
| 11 | *Spring Break - no classes* | *3/22 – 3/27* |
| 12 | Oceans and Coastlines<br>Review | 3/30 T<br>4/1 R |
| 13 | **Test 3**<br>The Atmosphere | **4/6 T**<br>4/8 R |
| 14 | The Atmosphere<br>Weather System and Earth's Climate | 4/13 T<br>4/15 R |
| 15 | Weather System and Earth's Climate<br>Review | 4/20 T<br>4/22 R |
| 16 | **Test 4**<br>**Presentations - (50% Final Exam)** | **4/27 T**<br>**4/29 R** |
| 17 | **Final Exam Written – (50%)** | **5/6 R** |

**Course Conduct:** The class will be taught using a combination of lecture using *Powerpoint* presentation, solving in-class questions, demonstrations, group interaction and discussions, and performing laboratory experiments. Students are strongly encouraged to discuss concepts and examples as opportunities are presented during instructor presentation. It is the student's responsibility to inform the instructor when a concept is confusing or otherwise unclear. Students must answer all the in-class questions before leaving the classroom and discuss with the instructor about any confusing concept right away.

You are encouraged to solve problems forming a study group and actively taking part in discussion. You may seek assistance from Student Support Services (SSS) to check the concepts in homework assignments, quizzes, and exam reviews but it is not the responsibility of SSS to teach the entire lesson to complete your homework, neither can you directly ask for the answer. In case of extreme difficulty, you must inform the instructor no later than two weeks after the classes started. You cannot pass the course without completing the homework. Expect a minimum of 12 hours of work per week in this class

**UARM Credit Hour Calculator:** For every course credit hour, you should expect to spend at least three clock hours per week of concentrated attention on course-related work, including but not limited to time attending class, as well as out-of-class time spent completing homework, seeking help from instructor or tutors, preparing for upcoming quizzes/tests/exam, reviewing material, problem solving, and organizing your notebook. For a four hour course, a typical student should expect to spend at least twelve hours per week dedicated to this course. This includes the time spent in class. Please see credit hour calculator attached to end of syllabus.

**Course Requirements / Evaluation (Grading):**

I. Tests: Four tests will be given each covering approximately the same quantity of material. One lowest test will be dropped at the end of the semester.

II. Final Exam: A final exam on top of the four tests will consist of two parts: i) Presentation (50%) - this will be group presentation (two students in a group) and each individual in the group will be evaluated separately even though they work together to make that presentation. Guidance will be provided earlier to collect data and about the content of presentation. Each member of the group must present their part in the class and should actively take part in the question-answer session after the presentation. Rest of the class and the instructor can ask questions related to the presentation. ii) Comprehensive

final (50%) – this will be given during the finals week and worth 50 points, a straightforward 50-question standard Scantron test.
III. Assignments and Quizzes: 9 assignments and 9 quizzes will be given during the whole semester and need to complete within the due dates.
IV. In-class work sheets: In-class work sheets will be provided for each chapter, total of 9 work sheets. You should complete these sheets during the lecture time and have the right information recorded for future use. You should read the textbook and make any corrections in the work sheets. At the end of semester, these will be collected and will be graded for completion, accuracy of answers, and good maintenance. 20 points are possible from these work sheets.

Four tests @100 each = 300 (lowest one dropped when taken all four)
One Final Exam @ 100 = 100 (Written report = 50, Presentation = 50)
9 Quizzes @ 10 each = 90
9 Assignments @ 10 each = 90
9 In-class work sheets = 20
**Total points possible = 600**

The final grade for the course will be determined by dividing the student's total number of points earned by the number of possible points. Grades are assigned on the basis of the following percentage scale, after rounding the calculated percentage to the nearest whole number:

90 -100 **A**
80 - 89 **B**
70 - 79 **C**
60 - 69 **D**
< 60 **F**

**Class Procedures/Student Requirements**:

On-Campus Resources:
1. Computer labs with printers available in the Johnson's Learning Commons (Library)
2. Tutoring service available on-campus at the Student Support Services and off campus by tutor.com available through J website.
3. Chapter Slides are available on the Student Portal and you can print if needed.
4. Contact the instructor constantly to check how you can improve, if you are struggling. The office hour is posted on the instructor's office door.
5. Must contact the instructor if you are going to be absent and needs an excuse. It is your responsibility to make-up.

Attendance Policy: Regular attendance and punctuality are expected. It is the responsibility of the student to initiate arrangements for all missed activities. If an absence is a planned absence the student is expected to make arrangements for making up work prior to the absence. More than three absences will be considered excessive and, along with work not made up, may adversely affect the grade for the course. Under no circumstances will the student receive credit for the course if more than a fourth of the classes are missed (13 classes). In case of extended illness, or other circumstances, the student must contact the

instructor if a WP is desired. If the instructor is not notified a failing grade will be assigned for the course.

Assignment Due Dates: Students are expected to submit the assignments and other works on or before the assigned due dates. You will be penalized for the late works depending on the number of days and full point and importance of the works assigned.

Make-up Work Policy**:** If the student has an excused absence, make-up is available but points will be deducted on the case-by-case basis. Usually, a 10% off per day late.

Cell Phone Policy**:** If you use the cell phone, your name will be called and asked to stop using the cell phone, unless you have notified the instructor, or the instructor asks you to use for the class purpose. You are disrespecting and disrupting the class if you use the cell phone and the instructor has to call you.

Extra Credit Opportunity: You can receive bonus points for the course if you are more involved rather than just coming to campus and sitting in class. Simple idea: the more you are involved in real-life science experiences and on-campus science-related activities, the more you understand and enjoy it plus and you receive bonus points. Some examples of activities (but not limited to) that earn extra credit points include:

a) Being an active member of the Science Club coordinated by the instructor
b) Organize activities within the Science Club or participate actively in the activities organized by the Club
c) Taking leadership in group study sessions and manage study sessions with peers
d) Organize or be involved in science and technology awareness activities and helping society to improve utilizing science knowledge
e) Actively participating in science-related meetings and conferences on/off campus
f) Any other science related activities and duties beyond the demand of the course deemed worthy of extra credit by the instructor.

**Academic Dishonesty**: It is expected that each student shall do his/her own work on class works, quizzes, exams, and lab reports. Cheating, copying other's answers, writing other's statement without citing their reference are all considered plagiarism and are penalized from allowing no point in that particular unit up to dismissal from the whole course, depending on the severity of the offense.

**Disability Policy:** It is the policy of UA Rich Mountain to accommodate students with disabilities, pursuant to state and federal law. Any student with a disability who needs accommodations should contact the Vice-Chancellor for Student Affairs Office, 394-7622, ext. 1400.

**Arkansas Clean Air Act**: In compliance with the Arkansas Clean Air Act, UA Rich Mountain is a smoke and tobacco free facility. Students and guests are to refrain from the use of all tobacco products while on campus.

**Student Misconduct**: Students committing misconduct are subject to disciplinary sanction(s) and/or restrictions. Misconduct or prohibited behavior includes, but is not limited to endangerment, harassment, disruption, sexual misconduct, illegal drugs and/or alcohol, fire

or safety issues, gambling, property violations, computer violations or other violations as listed in the UA Rich Mountain catalog.

**UA Rich Mountain Mission:** UA Rich Mountain provides transformative education to all learners.

| Credit Hour Requirement Calculator | | | | |
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| **Course Information** | | | | |
| Department, Course Number | GEOS1133 and GEOS1131 | | | |
| Course Title | Earth Science Lecture and Lab | | | |
| Credit Hours | 4 | | | |
| Mode of Delivery | Traditional | | | |
| Weeks in Part of Term | 15 | | | |
| Level of Reading Material | Advanced/Scientific/Technical (2) | | | 2 |
| Reading Level of Students | Average Student (2) | | | 2 |
| Average Pages per Hour | 10 | | | |
| | | | | |
| | | *Enter either week or term, not both* | | |
| **Contact Hours** | | **Hours/Week** | **Hours/Term** | **Total Hours** |
| Lecture/Recitation | | | 45 | 45 |
| Lab Contact Hours | | | 24 | 24 |
| | **Pages Asg'd** | **Hours/Week** | **Hours/Term** | |
| **Syllabus Items** | | | | |
| Reading | 360 | | | 36 |
| Assignment | | 1 | | 15 |
| Online Quiz | | 1 | | 15 |
| Researching Lab questions | | 2 | | 30 |
| Reviewing for exams | | | 10 | 10 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | |
| **Total Hours** | | | | 175 |
| **Required Hours** | | | | 150 |
| **Difference** | | | | Ok + 25 |