

SYLLABUS

SCIENCE 100: THE NATURAL WORLD – THE CARIBBEAN, HURRICANES, VOLCANOES, EARTHQUAKES, AND TSUNAMIS FALL 2007

CATALOG COURSE DESCRIPTION

A topical examination of the natural world of the Caribbean. Included will be considerations of elements of Caribbean life associated with the natural world with emphasis on their roots in the Natural Sciences. The approach is interdisciplinary with a variety of learning strategies employed. Two (2) hours of lecture and three (3) hours of lab. The approach is interdisciplinary with a variety of learning strategies employed. This course is half of a two-part Freshman Year General Education Curriculum.

Two (2) hours of lecture and three (3) hours of lab per week

3 Credits.

Co-requisites: ENG 100/WAC 011, ENG 101/RCA 021, unless exempted by SAT or placement tests.

Note: The goals of this course are achieved by employing the theme of “Hurricanes, Volcanoes, Earthquakes, and Tsunamis”. For more information on the origins of SCI 100, see the paragraphs on “Course Philosophy” on page 4.

TEXT & REQUIRED RESOURCES

- TEXTS:
1. Abbott, Patrick L., *Natural Disasters*, 5th and 6th editions. McGraw Hill, Boston, 496 pp. (hereafter abbreviated *ND*)
 2. *Caribbean Certificate Atlas* - McMillan (referred to as *CAC*)
→ These texts (above) are available in the UVI Bookstore ←
 3. *SCI 100 Lab Manual* (referred to as *LM*) – available on *Newblackboard* (see below)
 4. *Science 100 Sourcebook* (“Notes”) is available on *Newblackboard*.

NEWBLACKBOARD: Your grades, announcements, Lecture Notes and class materials are available for Science 100 on *Newblackboard* (formerly named *Blackboard*). The address (URL) is: <http://blackboard.uvi.edu>

GUEST LECTURERS:

1. Dave Smith, atmospheric physics
2. Sandra Romano, corals, marine ecosystems
3. Teresa Turner, marine ecology, mangroves, succession
4. The Lab/Discussion instructors and occasional visiting experts.

ACADEMIC INTEGRITY: Cheating and academic dishonesty will not be tolerated in SCI 100. Definitions of the types of academic dishonesty and penalties are stated in the UVI catalog.

All writing for all assignments must be in your own words. Any direct quotation must be noted as a quotation and credit given to the author of the words. Paraphrased material must also be acknowledged with an in-text citation (and with inclusion in your list of references).

The rules for using web and Internet materials are generally the same as for using someone’s printed materials. For example, you cannot download pictures from web sites unless permission is given. These rules must be closely followed. Consult the UVI catalog if you have questions. All SCI100 instructors will answer your questions willingly.

CLASSROOM ETIQUETTE

→ Show respect and courtesy toward all people in the class at all times.

- While we encourage you to participate in discussions relevant to the class topic, you must do so by addressing the whole class. During class, do not engage in private conversations with your neighbor(s). Such behavior is disruptive and rude. It interferes with communication and is disrespectful to the person speaking and to all the people who are trying to listen.
- Cell phones and beepers may not be used in class and must be turned off while you are in class. If your phone or beeper rings in class you will be asked to leave class. In addition, hands-free cell phone ear apparatus may not be worn during exams.
- Food and/or drink are not permitted in either the classroom or in the laboratory.
- Arriving after the class has begun, you must enter silently and try to minimize the disruption you cause. Do not announce your salutation loudly as is a practice mistakenly taken by some as good manners.

COURSE CONTENT OUTLINE

- I. Hurricanes, Volcanoes, Earthquakes, and Tsunamis - An Overview
 - A. Overview of the entire semester
 - B. Commonalties among hurricanes, volcanoes, earthquakes, and tsunamis (HVET)
 1. What are natural hazards?
 2. Where do HVETs occur and what is their underlying cause?
 3. How do they affect ecosystems? Compare and contrast their effects on both physical & biological components in marine and terrestrial systems.
- II. Ways of Knowing
 - A. What is the Scientific Method?
 1. Hypothesis, experimentation/observation, analysis, conclusion.
 2. The tools of the scientific method: length, mass, and time and the System International (SI).
 3. Derived and defined quantities based on length, mass, and time.
 - B. What are other ways of knowing? -- Exploring belief systems
 - C. What is scientific *ethics*?
- III. The Setting - Physical Geography of the Caribbean
 - A. How are global positions identified? - Latitude, longitude, and nautical miles.
 - B. What are the tools of the Geographer? - Maps
 - C. What about Navigation? - Modern and indigenous Caribbean methods.
- IV. Caribbean Weather Patterns
 - A. Cosmological origins of atmosphere, solid earth and water
 - B. What is the atmosphere?
 1. Atmospheric structure
 2. Atmospheric chemistry
 - C. What "energizes" the weather? - Energy sources, global weather patterns.
 - D. What is the Coriolis effect? - The underlying laws of nature driving weather.
 - E. Which wind and weather patterns influence the Caribbean?
 - F. What phenomena might cause changes in Caribbean weather/climate?
 - El Niño, La Niña, global warming, etc.
- V. Hurricanes
 - A. How do they form and move?
 1. Energy sources for hurricanes
 2. The Coriolis effect.

3. Hurricane structure
 4. The movement of hurricanes.
- B. What are the human factors?

VI. Volcanoes, Earthquakes, and Tsunamis

- A. What are the impacts on people? - An historical overview
- B. How do we know about the Earth's interior?
 1. Wave Physics - seismic waves.
 2. The Earth's interior
 3. The Chemistry of the Earth's crust.
- C. Plate Tectonics - Global Geology
 1. Convection in the Earth's interior.
 2. Plate tectonics: evidence behind the theory.
- D. Causes of volcanoes, earthquakes, and tsunamis.
- E. Tectonic events with emphasis on the Caribbean
 1. Earthquakes
 2. Tsunamis
 3. Volcanoes
- F. Geology of the Caribbean:

VII. The Impact of Hurricanes, Volcanoes, Earthquakes, and Tsunamis on Ecosystems.

- A. How do these events affect ecosystems?
 1. Introduction to ecosystem concepts, island biogeography and the local, regional and global distribution of biological organisms
 2. Making a living: photosynthesis and chemosynthesis in the face of natural hazards
 3. What are the important ecosystems of the Virgin Islands and how are they shaped by hurricanes?
 4. Succession (following catastrophe) in terrestrial and marine communities
 5. Extinction – What happened to the dinosaurs? Succession after the K-T Event; Today's Possibilities
- B. How do HVET events affect wetlands (at the terrestrial/marine interface)?
 1. Mangroves and salt ponds
- C. How do these events affect the marine environment?
 2. Coral reef ecosystems
 3. Open Ocean
- D. How do human activities alter the magnitude of HVET effects?
 1. Greenhouse effect, global warming and their effects on HVET and the conservation of biodiversity.
- E. What are the impacts of natural and human disturbance on energy needs?
 1. Where does our energy come from? Energy resources in the Caribbean
 2. How may energy resources or distribution systems be vulnerable or resilient to catastrophic disturbances?
 3. In view of the HVET potential in the Caribbean, what alternative energy sources would be appropriate for sustaining its future economy?
- F. How can these concepts be integrated into Caribbean land-use planning?

VIII. REVIEW: Hurricanes, Volcanoes, Earthquakes, and Tsunamis

COURSE PHILOSOPHY: Efforts by faculty at many colleges and universities nationwide to revitalize the general education requirements in college curricula have led to a focus on the freshman year. Based on these efforts, educators conclude that a common, unifying academic experience is beneficial to students. Freshman-level introduction to science

will be provided for all students, not just science majors. UVI has established a package of course offerings required for all entering UVI freshman students. As an integral part of that series of courses, this course combines scientific subject matter (much of it using Caribbean examples) and elements intended to facilitate the students' transition to the university. Although the themes of this course are both basic and global, their subject matter is presented in the context of the Caribbean natural heritage to which all UVI students can relate or can be introduced. The assumption here is that an educated person requires a firm understanding of his/her own immediate natural surroundings and its cultural products so he/she may more fully appreciate those of other parts of the world. It is hoped that this Caribbean natural heritage course will heighten the student's appreciation of the variety and diversity of the whole human experience, given the complex synthesis of influences that has shaped the Caribbean region. For those non-Caribbean students who seek a UVI degree, there will be considerable value in learning about the region in which they have chosen to study. Further, the chosen subject, while remaining globally applicable, affirms the special identity and mission of the University of the Virgin Islands. Evaluation of recent labor trends suggest that 70 to 80 percent of all employment in the 21st century will require some level of technical and computer literacy. Scientific literacy of the citizenry is critically important to the Caribbean region. Educational and career planning will be enhanced for all students by this early introduction to the scientific disciplines. At the same time, science majors are provided with a broadened scientific perspective and knowledge of regional phenomena that is not introduced in any other course. Through region-specific topics, students will be introduced in an interdisciplinary fashion to the world of science. The specific sciences addressed in this course include biology, chemistry, geology, meteorology and physics. This integrated approach will provide scientific perspectives on the natural world of the Caribbean and make connections between that scientific knowledge and everyday concerns. Learning will be experienced as both understanding for its own sake and as related to an active appreciation of daily life in the Caribbean.

COURSE OBJECTIVES

1. To gain an understanding of the physical and human dimensions of the Caribbean through an interdisciplinary scientific knowledge of region-specific topics.
2. To gain an appreciation for the scientific method and an ability to reason scientifically.
3. To gain knowledge of the dimensional tools of science contained in the System International (*Systeme Internationale*, S.I.), the metric system.
4. To gain an awareness of different scientific disciplines and their methods ("ways of knowing" in science).
5. To develop an awareness of the connection between academic knowledge and regional characteristics.
6. To develop skills in active learning and problem solving.
7. To develop an ability to utilize UVI's institutional resources, obtained by experiencing various learning methods.
8. To acquire skills needed to expand and deepen scientific knowledge as part of individual development, facilitated by learning ways to accomplish this.
9. To gain an ability to locate, process, and communicate information through conventional and electronic media.
10. To develop, through the study of the physical geography of the region, a knowledge of global latitude and longitude and the basics of reading and interpreting of maps.
11. To develop knowledge of the scientific disciplines' treatments of terrestrial and marine ecosystems of the Caribbean.
12. To gain an understanding of land use and development issues in the region.
13. To acquire a basic scientific understanding of the natural hazards of the Caribbean.
14. To gain a scientific understanding of the natural history of the Caribbean region.
15. To develop an understanding of energy issues in the Caribbean.
16. To provide a linkage between The Caribbean - The Natural World and reading, writing, and mathematics skills classes.

EVALUATION OF STUDENTS

Graded Activities

- | | |
|--|--|
| 1. <u>Exams</u> : 3 in-class exams (100 pts each)
(the best 2 will count, and be scaled to 150 pts each)
and <u>Final Exam</u> | 300 points or 30% of final grade
200 points or 20%
100 points or 10% |
| 2. <u>Weekly quizzes</u> (Given in Lab; the best five (5) will count) | 100 points or 10% |
| 3. <u>Science Presentation</u> : Outline & References (draft 10) (final 20),
Summary (30), and Presentation (40) | 100 points or 10% |

4. Written Assignments

Essays, lab reports, lab mini-presentations, and other work assignments 20 points each; the best 12 will count.

240 points or 24%

5. Building Blocks writing assignments (6 x 10 pts each)

60 points or 6%

TOTAL:

1000 points* or 100%

6. **Extra credit:**

Campus-Wide Experiences: Up to 5 points for a 1-paragraph summary of what you learned during the experience (that is relevant to SCI 100 course topics). Maximum extra credit for CWE's:

Up to 20 points (2% of your final grade!)

End of course—Write a one-page evaluation of how the quality of your work has changed during the semester, what aspects of the course you feel are particularly worthwhile, and your recommendations concerning how we might improve the course for the future. Attach your Vocabulary List (in Lab Manual) -- worth up to 10 points (1% of final grade).

Letter Grades will be awarded on the following basis:

A	94% - 100%	C	74% - 76%
A-	90% - 93%	C-	70% - 73%
B+	87% - 89%	D+	67% - 69%
B	84% - 86%	D	60% - 66%
B-	80% - 83%	F	< 60
C+	<u>77% - 79%</u>		

Notes:

1. The three **in-class exams** and the **final exam** will be given in class.

2. There will be at least seven weekly **quizzes** -- given at the beginning of the Discussion/Labs.

3. The **Science Presentation** is scheduled for the last Discussion/Lab session of the semester. These Science Presentations are modeled after conferences held for faculty members, researchers, professionals and student scholars in different academic disciplines. The purpose is to allow you to gain experience in making serious presentations while you have benefit of a friendly setting. The details of your science presentation assignment are as follows:

a. Each student will be expected to select a topic that addresses an issue that builds on the topics presented in SCI 100. Science Presentation topics must be approved by your Discussion/Lab instructor during Week 5 lab.

b. A minimum of three (3) references, with at least one non-Internet source, must be used.

c. You will use one or more of these as the source for Building Block Assignments 5 & 6. Your references, in the format of a bibliography, are due in lab Week 7.

d. A written draft summary of your Science Presentation must be turned in during Discussion/Lab of Week 13. The final Written Summary is due in Week 13.

e. You will deliver your Science Presentation during the last Discussion/Lab class. You will have 6-7 minutes to deliver your paper, including 2 minutes for questions from classmates.

4. There will be several **writing assignments**, including essays, lab reports and/or presentations, and other graded activities in Discussion/Lab (worth 20 points each in most cases). This segment is worth 240 points. Only your best 12 will be counted. See "How to Write a Lab Report " in the *Lab Manual*.

5. Building Blocks assignments: One of our goals is to increase your ability to find information about a science topic, be able to identify the most important points, and relay that information in your own words. At the conclusion of this course, these basic building blocks will give you the foundation to answer a scientific question by using facts from several scientific sources. See the Lab Manual p.4 for details on the assignments. Each is worth 10 points.

6. Campus-Wide Experiences (CWE) are structured activities intended to involve students in various aspects of Virgin Islands natural history or in other valuable academic experiences. Every CWE is worth 5 points (0.5% of final grade). You may receive extra credit for up to 4 CWEs (2% of the final grade). **To receive credit, you must submit a short paragraph to the *Newblackboard* drop box (put in subject line: *CWEyourlastname*) *within one week*, summarizing your CWE (how was it relevant to the course? Did it improve your understanding of a course topic? Would you recommend it to others?).**

These CWEs may include such activities as nature treks, boat trips to nearby cays on UVI's research vessel, tours of the Cooperative Extension Service, UVI's Weather station, Etelman Observatory, Coral World, Plants of the UVI campus, beach visits for marine observations, debris surveys and clean-ups, special presentations and course-related videos. If you find an appropriate activity you want to suggest, you may ask your lab instructor (or lead instructor) *in advance* for approval to use it as a CWE.

7. Your Portfolio is your entire collection of work during the semester. You should save all graded work for the purpose of studying for exams, as well as insurance against your instructor recording an incorrect grade or failing to record it at all (these things do happen, in a class of 140 students!).

Note: Assignments turned in late (15 minutes after start of class/lab meeting) will lose 25% of their maximum possible points. Assignments will not be accepted after 1 week.

DAILY SYLLABUS

Administrative necessity – Log in to *Newblackboard* to be sure you're enrolled and listed.

1. Confirm that the e-mail address in *Newblackboard* is one you check regularly (the default is your UVI account). If you need help, contact the Information Technology Helpdesk.
2. To be sure that you receive all official UVI correspondence, you should use your UVI e-mail account (you can always forward this mail to your preferred address). Note: Students who have inappropriately provocative, violent, crude or disrespectful login names must acquire new accounts (through hotmail, yahoo, msn or any carrier) with new more-professional names.

*Although inappropriate names may be allowed under the "freedom of speech" provisions of the American Constitution/Bill of Rights, these same provisions also allow the instructor and others to refuse to respond to any person whose inappropriate name offends them.

WEEK 1

Classes

0. Introduction to the Class, Discussion of Course Syllabus and of Class Procedures

I. Hurricanes, Volcanoes, Earthquakes, and Tsunamis

A. Overview/summary of course content, Impacts of natural hazards

- B. Commonality of hurricanes, volcanoes, earthquakes, and tsunamis
1. Where do they occur? - locations in the Caribbean and globally.
 2. Underlying causes - density and convection as unifying concepts.
 3. How do they affect physical and biological systems? - Contrast and compare their impacts on physical and biological systems.

Reading: *Natural Disasters (ND)*, Chapter 1 by next Monday.

Reading: Review *Lecture Notes* in *Newblackboard*.

Discussion/Lab

- A diagnostic Pre-Test that doesn't affect student grades will be administered.
- Introduction to lab instructor and peer instructor, students.
- Explanation of Building Blocks assignments
- Group photos may be taken and contact information sheets filled out. Students and faculty will identify themselves and spend a few minutes getting to know one another.
- Excerpts from a disaster movie (such as *Dante's Peak*, *The Day After Tomorrow*, etc.) and from a documentary volcano video or other videos with a disaster theme will be shown. A discussion of the role of science and scientists in society will follow.
- Each group will discuss and prepare its collective written opinion about the role of science in general and the responsibilities of scientists in the society in the face of natural hazards. This counts as Assignment # 1 and must be completed and submitted by the end of this Discussion/Lab session.
- Complete the **Practice Sheet: Calculations/Conversions** (*LM* p.10 or hand-out) before your lab next week.

WEEK 2

Classes

II. Ways of Knowing

A. What is the Scientific Method?

1. Hypothesis, experimentation/observation, analysis, conclusion.
2. The tools of the scientific method: length, mass, time and the *Systeme Internationale* (System International or SI).
3. Derived and defined quantities based on length, mass, and time.

Reading: *Lecture Notes (NOTES)* p 10-21

Complete Practice Sheet: Practice Problems: Conversions (*LM* p.10) before your lab this week.

Discussion/Lab

- **Building Block (BB) #1** is due as you enter the room. See above & Lab Manual p.4 for detailed instructions.
- **Quiz 1** (on material covered in lecture this week and in lab last week)
- **Measurement Lab** - The basics of measuring physical variables and the System International are introduced in a set of experiments involving a range of accuracy measurements and covering reaction time and density determinations. Activity includes practice in calculating volume and density.
- Complete Measurement Lab Handout (Lab Manual p.15-19) for next week, to prepare for writing lab report

-Questions/clarification on the Practice Calculations/Conversion Exercise –You will receive a take-home Calculations/Conversions Problem Set (to be graded). It is due next week in lab.

WEEK 3

Class

II. Ways of Knowing , continued

4. Important HVET measurements and units

B. What are other ways of knowing? What are scientific *ethics*?

III. The Setting - Physical Geography of the Caribbean

A. How are global positions identified? - latitude, longitude, and nautical miles.

B. Physical Geography of the Caribbean (concluded)

C. What are the tools of the Geographer? – Maps

Reading: *Caribbean Certificate Atlas* (CCA) pages 4,5,12,70,91

Reading: *NOTES* p 22-28

Discussion/Lab

-Conversion Problem Set due

-Practice-quiz on the Caribbean map (ungraded)

-Review of BB #1 problems and suggestions for improvement

-Measurement Lab instruction sheet p. 15-19 should be completed and checked off by lab instructor.

Measurement Lab (concluded)- This week's lab assignment includes 1½ -2 hours for completing any incomplete portions and for reviewing results within the collaborative group or with the lab instructor or peer instructor.

-Measurement lab report is due next week. Detailed instructions on the format for a formal lab report are presented in the Lab Manual. Make a copy of the first page of the lab report for EACH lab partner to attach to the Lab Manual data sheets they turn in. That way each of you will get a copy of your lab report grade back for your portfolio.

-For next week: Research and decide the topic for your **Science Presentation**. You will present your topic in writing and discuss it orally with your lab instructor and peers next week in lab.

-BB #2 is due next week

-Study your Caribbean map for next week's quiz.

WEEK 4

Class

IV. Caribbean Weather Patterns I: Guest Lecturer Dr. David Smith

A. Cosmological origins of earth, water and atmosphere

B. What is the Atmosphere?

1. Atmospheric structure

2. Atmospheric Chemistry

Reading: *ND* Ch 10: p270-284: Atmosphere, Oceans, and Long term Climate change; *CCA* pages 8 ("The Atmosphere"); *NOTES* p 28-31

Class

IV. Caribbean Weather Patterns II (D. Smith)

C. What "powers" the weather? - Energy sources, global weather patterns.

- D. What is the Coriolis effect? - The underlying laws of nature.
- E. What winds and weather patterns influence the Caribbean? Describing winds
- F. What phenomena might cause changes in the Caribbean climate? (Includes El Niño, La Niña, ozone depletion, etc.)

Reading: *ND* Ch 12(new edition) and Ch 11 (old): Short term climate change and Severe Weather; *CCA* p5: Time zones, p18-26; *NOTES* p 31-41.

Discussion/Lab

-Turn in Measurement lab report & data sheets from Lab Manual (p. 15-19). EACH lab partner must attach a copy of the first page of the lab report to their individual data sheets.

-**QUIZ 2:** Identifying islands on a map of the Caribbean

- Discussion of students' **Science Presentation** topics. These will be presented orally to the lab class so that the appropriateness and focus of your topic can be improved by peer review & discussion.

- **Plagiarism Avoidance** (Practice) Exercise and Discussion. (LM p. 64-68)

-In addition, the class will visit the **Library** for an *Introduction to Using the Library for Research* and for assistance in exploring possible sources of information for Science Presentations. (**Your Science Presentation outline & reference list are due in 3 weeks!**) Complete the library exercise worksheet and turn in at the start of lab next week.

WEEK 5

Classes

Hurricanes

A. What is the human factor?

B. How do they form and move?

1. Energy sources.
2. Nurturing and steering: planetary vorticity, ambient conditions, etc.
3. Hurricane structure
4. The movement of hurricanes.

Reading: *ND* Ch 13 (new) and Ch 12 (old) (Hurricanes); *NOTES* p 41-49; *CCA*: p 21

*** Exam I ***

Topics to be covered on Exam I:

Commonality of hurricanes, volcanoes, earthquakes, and tsunamis
(where do they occur, underlying causes, density and convection as unifying concepts, how they affect physical and biological systems, comparing their impacts on physical and biological systems)

Ways of Knowing (the Scientific Method, measurements of length, mass, time and the System International, density and other derived quantities, conversions and calculations with important HVET measurements and units)

The Setting - Physical Geography of the Caribbean, Caribbean Weather Patterns (atmospheric structure, atmospheric chemistry, energy sources for weather, global weather patterns, the pressure and underlying laws of nature, prevailing winds and weather patterns influencing the Caribbean, phenomena that may cause changes in the Caribbean weather/climate (El Niño, La Niña, etc.).

Discussion/Lab

- **Library Exercise** and any required attachments are due.

- **Map Reading Lab** (LM p20): The lab exercise this week will center on introductions to maps and map reading. Working in groups of (no more than) two or three, students will complete a formal exercise involving a number of maps of Caribbean, Virgin Islands, US and global geography. **Please do not write on the maps.** Each group will submit its group responses to the questions and requirements of the instruction sheet by the end of this class.

Reading: CCA page 12-15.

- **Computer Literacy Assignment**—Students will use their private computer or UVI Computer Lab facilities to complete the assignment as directed. Your lab instructor will tell you how they want you to submit the assignment (printed, via email, or *Newblackboard* dropbox).). If you have any difficulties completing this on your own, you can get help from your lab/peer instructor.

- **BB #3 is due next week:** We will provide you with a scientific article of appropriate topic & length. Objective: Identifying 4-5 main points of an article & correctly formatting the bibliographic citation. Number the main points and use complete sentences to summarize the main points in YOUR OWN WORDS. See your Lab Manual for examples as to how you must format the reference.

WEEK 6

Class

V. Hurricanes I & II

- A. What is the human factor?
- B. How do they form and move?
 1. Energy sources.
 2. Nurturing and steering: planetary vorticity, ambient conditions, etc.
 3. Hurricane structure
 4. The movement of hurricanes.

Reading: Re-read and focus on *ND* (new) pages 355-367 or pages 341-353 (old *ND*);
NOTES p 41-49; *CCA*: p 21

Discussion/Lab

-**BB#3** is due when you walk into lab
- The **Computer Lab Assignment** must be turned in by the end of lab today (or as directed by your lab instructor).

-QUIZ 3

-**Hurricane Tracking Exercise** (*LM* p.27), worked in groups of two. The report is due next week in lab.

- Video on hurricanes.

- Writing Assignment – Your lab instructor will explain the writing assignment that is based on the hurricane tracking exercise, also due next week.

-The Title, Outline, & References for Science Presentation due next week, in proper bibliographic format (see *LM* p.77). This first draft (worth 10 pts) will be edited by the lab instructor and returned to you next week in lab. You will rewrite it for week 10 lab.

WEEK 7

Class

VI. Volcanoes, Earthquakes, and Tsunamis: Geology of the Earth

- B. How do we know about the Earth's interior?
 1. Wave physics - seismic waves.
 2. The Earth's interior

3. The chemistry of the Earth's crust.
- C. Global Geology
1. Convection in the Earth's interior.
 2. Plate tectonics: evidence behind the theory.

Reading: Chapters 3 & 4 in both new and old *ND* editions; focus for this week's Lab by reading page 91 (new *ND* edition), page 92 (old *ND*); *NOTES* p 50-61; *CCA*: page 8-11 ("The Earth")

Discussion/Lab

- **QUIZ 4**

- Hurricane Tracking Summary (both the exercise and the writing assignment) due at start of lab
- DRAFT Topic (title), Outline, & References (in proper bibliographic format) for Science Presentation due.
- Mid-term grades will be discussed privately during lab with each student.

Earthquake Epicenter Lab Exercise (*LM* p.32). During lab this week you will work in groups of two or three to locate the epicenters of earthquakes. Answering all questions, submit your group report at the end of this class, or as directed by your lab instructor.

BB #4 and #5 are due next week in lab: Identify 4-5 main points of an article (use one of your Science Presentation references), and summarize in your own words and without the use of quotes. Your summary should be in paragraph format, and should not include any of your own opinion—just a summary of the article. See *LM* p. 69 for guidance. Be sure that your 'summary' is shorter than the article—you are not paraphrasing the author's article, you are giving a brief synopsis of the main points. Be sure to include the correctly formatted Bibliographic citation for the article.

WEEK 8

Class

VI. Volcanoes, Earthquakes, and Tsunamis continued.

D. Tectonic Events- Earthquakes & Tsunamis

Reading: *ND*(both new and old editions): Ch 4; *NOTES* p65-69; *CCA*: page 11.

Prepare for this week's Lab by reading 109-125 (new *ND*), 106-113 (old *ND*).

VI. Volcanoes, Earthquakes, and Tsunamis concluded.

E. Tectonic events with emphasis on the Caribbean (Emphasis on Volcanoes)

Reading: *ND* (both new and old editions): Ch 7 and Ch 8; *NOTES* p 69-72; *CCA*: page 11.

Discussion/Lab

- **BB #4 AND #5** are due when you come in to lab

- **QUIZ 5**

-Viewing of video on earthquakes and/or tsunamis.

-**Tsunami Laboratory Exercise** (*LM* p.38): In groups of two or three, students will anticipate the magnitude and extent of a tsunami created by an earthquake, slope failure or volcanic eruption, trace the propagation of an actual tsunami, interpret its speed and travel-times and anticipate its impacts of coastal communities at risk. The laboratory handout for this exercise is due in 2 weeks (next week is spring recess)

You will receive the edited copy of your Science Presentation outline—You will rewrite this and submit in Week 10 the final draft including Title, Outline, and References (Bibliography).

WEEK 9

Class F. Geology of the Caribbean: Geological origins of the Caribbean

Reading: *NOTES* p 61-65; *CCA* p10-11

*** * * Exam II * * ***Topics covered on Exam II:

Hurricanes

(The human factor, how they form and move, Energy sources, nurturing and steering: planetary vorticity, ambient conditions, etc., hurricane structure and movement of hurricanes)

Volcanoes, Earthquakes, and Tsunamis

(the impacts on people, historical overview, the Earth's interior, wave physics - seismic waves, chemistry of the Earth's crust, global geology, convection in the Earth's interior, plate tectonics: evidence behind the theory, Caribbean geology: causes and histories of volcanoes, earthquakes, and tsunamis)

Geology of the Caribbean: Geological origins of the Caribbean

Discussion/Lab

Pre-Lab preparation: Wear comfortable shoes for some short walks at each site. You may wish to bring a bottle of water, and an umbrella and/or sunscreen for sun protection. **Meet in the lab.**

Reading: pages 191-193 (new *ND*); 177-179 (old *ND*)

-Tsunami Laboratory Exercise due at start of lab

- Final version of Topic (title), Outline, & References (in proper bibliographic format) for Science Presentation due

- **QUIZ 6**

-**Geology Field Exercise** (LM p. 49): Each lab group will take a UVI-provided vehicle to sites of geological interest to participate in a geology field trip. At the end of this trip or during the following week, individuals will visit the UVI Rock Archive Display and address the questions on LM p. 51 and complete:

Writing Assignment - The student's Geology Summary report will include a written description of his/her geological findings on the field trip, plus the answers to the UVI Rock Archive handout (LM p.51).

WEEK 10**Class**

VII. Impacts of Hurricanes, Volcanoes, Earthquakes, and Tsunamis on Ecosystems.

A. How do these events affect (terrestrial and marine) ecosystems?

1. Photosynthesis and chemosynthesis in the face of natural hazards

2. Introduction to ecosystem concepts, island biogeography and the local, regional and global distribution of biological organisms

Reading: *NOTES* p. 73-82; *CCA* 24-25

Class

B. How do HVET events affect wetlands, mangroves?

How are mangrove wetlands classified? What variations occur in the VI?

Reading: CCA pages 29-31; other sources may be provided online

Discussion/Labs

Pre-Lab preparation {CAUTION!}: You may get your feet wet, and have the opportunity to wade in shallow water. Wear clothes and shoes that can get wet in saltwater. We will then go for a short hike on a path that is sometimes muddy. You will want a hat or sunscreen for sun protection, and a bottle of water to drink.

-The Geology Summary report (including answers to questions) is due at the start of class.

-Meet in lab and we will take a safari taxi to the Compass Point Marina, next to Independent Boat Yard.

- Mangrove Field Exercise (LM p.53-54): Students will participate in a field study of the mangrove ecosystem at the Mangrove Lagoon on the east end of St. Thomas. Follow the instructions provided and answer all questions. Prepare your findings and answers individually and submit it next week.

-BB #6 is due on Wednesday next week: First draft of Science Conference Presentation summary: 1-2 page (maximum) summary of what you will be presenting, including in-text citations of facts you use from your references and a formatted bibliography of the references cited. This will be returned to you with comments from your lab instructor to guide you in improving your final draft and oral presentation for Week 13.

WEEK 11

Important: BB #6: Science Presentation summary (first DRAFT) is due on Wednesday. Your lab instructor will confirm with you how they wish you to turn in this assignment to them.

Class

VII. Impacts of Hurricanes, Volcanoes, Earthquakes, and Tsunamis on Ecosystems.

A. Effects on Ecosystems

Photosynthesis, chemosynthesis

V.I. Ecosystems: Coral & Coral Reefs; Impacts of HVET on Coral Reefs

Reading: CCA p16-17; other sources may be provided online

Discussion/Lab – No Lab this week because of holiday on Thursday.

WEEK 12

Classes

VII. The Impact in the Caribbean of HVET (continued).

Succession (following catastrophe) in terrestrial and marine communities

Extinction – What happened to the dinosaurs?; Succession after the K-T Event; Today's

Extinction Possibilities

Reading: ND: Ch. 16 (new ND) or 15 (old ND) "The Great Dyings" and Ch 17 (new ND) or Ch. 16 (old ND): "Impacts with Space Objects"

Lab/ Discussion

Pre-Lab preparation {CAUTION!}: You will be wading in seawater up to your knees today.

Wear shoes, water sandals, or "dive booties" that can get wet, and shorts or pants that can be rolled up (or get wet). (We have a small number of neoprene shoes some students may borrow). You may

wish to have a hat or sunscreen for sun protection, and a bottle of water to drink. Freshwater will be available to rinse off, and restrooms are available in the Marine Science Center if you need to change after lab.

-QUIZ 7

-Introduction to classification of living organisms, and slide show of local marine invertebrates.

-Intertidal Invertebrates Field Exercise (LM p. 57-61): Students will participate in a field study of the marine intertidal ecosystem near the Marine Science Center. Follow the instructions provided and answer all questions. (Your instructor will have you complete p.57-58 or p.59). Your Lab instructor will tell you when to hand in your summary report (on or before November 21st).

Science Presentation & Written Summary (final, revised version) due next week: One- or two-page (maximum) summary of what you will be presenting, including in-text citations of facts you use from your references and a formatted bibliography of the references cited.

Oral Presentations ideally would utilize Powerpoint, and be about 5 minutes in length, plus a minute or 2 for questions. Peer instructors generally hold a help session in advance on the basics of Powerpoint. Grading criteria are provided in the Lab Manual p. 74-75 so that you may better prepare.

WEEK 13

Classes

D. How do human activities alter the magnitude of HVET effects?

Greenhouse effect, global Warming and their effects on HVET and the conservation of biodiversity.

Reading: *ND* (new): p. 295-304 or *ND* (old): p. 283-296; and (new *ND*): p.311-319 or (old *ND*): p.309-313; *CCA* pages 25-26.

Discussion/Lab – SCIENCE PRESENTATIONS. BE ON TIME! The order of presentations will be decided by the lab instructor. It is NOT acceptable to show up late and expect to give your presentation last—you may have actually been scheduled first and missed your turn! Each student will have 5 minutes to make their presentation, with a few minutes for questions in between.

Turn in Written Science Presentation Summaries as directed.

WEEK 14

Classes

E. Energy resources and distribution systems' vulnerability/resilience to catastrophic disturbances; considering alternative energy resources in the light of HVET hazards.

F. How can these considerations be integrated into land-use and emergency planning for the Caribbean?

G. Alternative energy sources and energy conservation.

Reading: *CCA* pages 29-31

WEEK 15

***** Exam III *****

Topics to be covered on Exam III:

How natural hazards can affect terrestrial ecosystems (introduction to ecosystem concepts, terrestrial ecosystems of the Virgin Islands, how HVET events affect the marine environment (mangroves, coral

reef ecosystems), extinctions, succession, global warming/ greenhouse effect/ global climate change, conventional and alternative energy sources.

Class:

- Semester Review: question and answer session

NOTICE: This is the last day for students to challenge grades on recorded on *Newblackboard*.

Discussion/Lab –No Lab this week. Saturday is the last day of the teaching semester.

- Lecture and/or Laboratory instructors and/or Peer Instructors will be available for question and answer sessions in the lab (but not on Sunday: the semester will have officially ended).

FINAL EXAMS

*The final exam will cover material presented on the first three exams and on all quizzes.
Use these as your study guides*

Good Luck on all of your final exams!

