

Term Information

Effective Term Spring 2022

General Information

Course Bulletin Listing/Subject Area Earth Sciences
Fiscal Unit/Academic Org School of Earth Sciences - D0656
College/Academic Group Arts and Sciences
Level/Career Graduate, Undergraduate
Course Number/Catalog 5242
Course Title Exploring the Natural History of The Bahamas
Transcript Abbreviation Nat Hist Bahamas
Course Description The study of the geology and natural history of the small Bahamian island of San Salvador including an international 7-day field trip to the island during spring break.
Semester Credit Hours/Units Fixed: 4

Offering Information

Length Of Course 14 Week, 12 Week, 8 Week, 7 Week, 6 Week, 4 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? No
Grading Basis Letter Grade
Repeatable No
Course Components Seminar, Field Experience
Grade Roster Component Seminar
Credit Available by Exam No
Admission Condition Course No
Off Campus Sometimes
Campus of Offering Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites A student must have taken an introductory earth science course (or equivalent) such as EARTHSC 1100, 1105, 1108, 1110, 1121, 1151, 2203, 2204, 2205, 2206(S), 2210, 2122, or 2155. Permission of instructor required for registration.
Exclusions
Electronically Enforced Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 40.0601
Subsidy Level Doctoral Course
Intended Rank Junior, Senior, Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- This field course will provide unique opportunities for students to examine first-hand the geology and natural history of diverse ecosystems on San Salvador Island, connect with their surroundings and discover the impact humans have on the island.
- 1. Students will learn how The Bahamas formed and what shapes the islands today by reading and discussing these topics and making observations themselves.
2. Students will identify ecosystems of San Salvador Island in the present and in the past.
- 3. Students will understand and appreciate first hand how humans impact this small island.
4. Students will reflect on this international field experience and share insight gained with their peers and the public.

Content Topic List

- + The Bahamas platform: geology and biology of this shallow-water marine environment
 - + Human impacts on a small island ecosystem
 - + Geologic history of San Salvador Island written in its sedimentary rocks
 - + Modern natural & anthropogenic processes
- + Coral reefs
 - + Sandy beaches, sediment composition, physical and chemical weathering
 - + Ocean currents, waves, and tides
 - + Hurricanes
 - + Karst features
 - + Extreme weather events and climate change
 - + Pollution

Sought Concurrence

No

Attachments

- Education Abroad Reauthorization Review.pdf: Education Abroad Authorization
(Other Supporting Documentation. Owner: Griffith, Elizabeth M)
- Credit Hour Allocation Rationale for Study Abroad Program.docx: Credit Hour Allocation Rationale
(Other Supporting Documentation. Owner: Griffith, Elizabeth M)
- CURRICULAR MAP OF COURSES AVAILABLE IN EARTH SCIENCES BS.docx: Curricular Map of Earth Science BS
(Other Supporting Documentation. Owner: Griffith, Elizabeth M)
- EARTHSC 5242 Bahamas syllabus v5.docx: Revised syllabus 20 Oct 2021
(Syllabus. Owner: Griffith, Elizabeth M)
- Please see responses to the contingencies and recommendations below.docx: Responses to contingencies and recommendations
(Cover Letter. Owner: Griffith, Elizabeth M)

Comments

- Please see feedback email sent 10/6/21 RLS *(by Steele, Rachel Lea on 10/06/2021 01:48 PM)*
- - Was the course offered before? (There is an OIA reauthorization document attached?)

This course was originally authorized by OIA for Spring 2021, but due to COVID this course did not happen. A reauthorization was received for Spring 2022 (even though it was not offered before).

- Panel will expect to see list of required texts, articles etc in syllabus. See item 8
<https://ascas.osu.edu/curriculum/syllabus-elements>

Thanks, we have added reading to the schedule of classes in the syllabus.

- The schedule in the syllabus should also include the pre-and post-departure seminars. See item 14
<https://ascas.osu.edu/curriculum/syllabus-elements>

Thanks, we have moved and expanded these seminars in the schedule of classes in the syllabus.

-The in-country part does not only seem to include structured educational experiences as mentioned on p. 2. There also seems to be some formalized instruction(?)

Yes, this is now clear with the course credit hour allocation rationale. *(by Griffith, Elizabeth M on 08/20/2021 12:08 PM)*

- Elizabeth, Maybe we should meet/talk about the course? There are a number of things that are unclear:
 - Was the course offered before? (There is an OIA reauthorization document attached?)
 - Panel will expect to see list of required texts, articles etc in syllabus. See item 8
<https://ascas.osu.edu/curriculum/syllabus-elements>
 - The schedule in the syllabus should also include the pre-and post-departure seminars. See item 14
<https://ascas.osu.edu/curriculum/syllabus-elements>
 - The in-country part does not only seem to include structured educational experiences as mentioned on p. 2. There also seems to be some formalized instruction(?)
 - A credit hour rationale needs to be submitted. See appendix 7 in ASC Curriculum and Assessment Operations Manual https://ascas.osu.edu/sites/default/files/ASC_Curriculum_and_Assessment_Operations_Manual.pdf
 - I have changed the subsidy level of this course to doctoral. It is appropriate in this case.)
(Like I said, a call or Zoom might be best.) *(by Vankeerbergen, Bernadette Chantal on 07/17/2021 12:13 PM)*

COURSE REQUEST
5242 - Status: PENDING

Last Updated: Griffith,Elizabeth M
10/20/2021

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Griffith,Elizabeth M	07/13/2021 06:49 AM	Submitted for Approval
Approved	Griffith,Elizabeth M	07/13/2021 06:49 AM	Unit Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	07/17/2021 12:16 PM	College Approval
Submitted	Griffith,Elizabeth M	08/20/2021 12:09 PM	Submitted for Approval
Approved	Griffith,Elizabeth M	08/20/2021 12:09 PM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	09/20/2021 11:43 AM	College Approval
Revision Requested	Steele,Rachel Lea	10/06/2021 01:48 PM	ASCCAO Approval
Submitted	Griffith,Elizabeth M	10/20/2021 03:10 PM	Submitted for Approval
Approved	Griffith,Elizabeth M	10/20/2021 03:11 PM	Unit Approval
Pending Approval	Vankeerbergen,Bernadette Chantal	10/20/2021 03:11 PM	College Approval

Please see responses to the contingencies and recommendations below. The new course proposal was updated.

On Wednesday, September 29th, the Natural and Mathematical Sciences Panel of the ASC Curriculum Committee reviewed a new course proposal for Earth Sciences 5242.

The Panel unanimously approved the request with **2 contingencies** (in bold below) and 3 *recommendations* (in italics below):

1. Earth Sciences 5242 (new course)
 - **Contingency: The Panel asks that the department clarify whether this course can be used in partial fulfillment of the Earth Sciences major (Course Request Form, pg. 2 under “Requirement/Elective Designation”).**

Response: Yes, this course can be used in partial fulfillment of the Earth Science major, specifically as an elective course (one of multiple options) in the Climate Water Environment subprogram of the Earth Sciences, B.S. Degree. This is designated in the course request form.

- **Contingency: If the course can be used in partial fulfillment of the major, the Panel requests that the department submit an updated curriculum map that reflects how Earth Sciences 5242 will function within the broader curriculum.**

Response: The new course Earth Sciences 5242 is now included in the updated curriculum map attached to the request (as a supporting document) as requested. It indicates that it is as an elective course (one of multiple options) in the Climate Water Environment subprogram of the Earth Sciences, B.S. Degree; and an option in the Marine Sciences certificate.

- *Recommendation: The Panel recommends that the syllabus include more information surrounding the snorkeling/swimming activities:*
 - *Is there a swimming/water safety skill pre-requisite for the course?*
 - *If a student is unable to swim, how should they request modifications and/or accommodations?*
 - *How/when will students’ swimming skills be evaluated?*

Response: Water safety is critical for this course (inside and outside of the water) and swimming skills will be considered, evaluated on campus, and re-evaluated in the field each day depending on conditions and the comfort level of all (students and faculty). A FAQ section was added in the syllabus to address these questions and a class period was added that is dedicated to going to RPAC Aquatic Center to test snorkeling equipment and informally evaluate the swimming ability of the students. The first time we will snorkel with the group will be in a protected, shallow bay with seagrasses and minimal safety hazards. This is the same location we plan on doing the night snorkeling (if conditions are good and we are comfortable with this activity with the group).

Now included in the syllabus:

FAQ:

- *Is there a swimming/water safety skill pre-requisite for the course?*
We will be reviewing water safety and testing our snorkeling equipment at the RPAC Aquatic Center (mandatory, see course schedule). If you have never snorkeled before, this will be the time to become comfortable with your gear and be sure it is in good condition. We will be assisting with evaluating gear and comfort level in the water.

- *If I am unable to swim with snorkeling equipment in the field, how should I request modifications and/or accommodations?*
Talk with the instructors BEFORE we depart for San Salvador Island if you are unable to swim with snorkeling equipment or to discuss any accommodations that you will need in the field.

- *Recommendation: The Panel recommends that the syllabus include more detail about the field notebook assignment to indicate to students how much work will be expected and how this assignment will be evaluated (syllabus pg. 2 under “Course Grade will be based on the following”).*

Response: Additional details will be provided to the students in the course (still under development). We will be providing examples of good field notebooks/entries and a rubric for the students with this assignment. This is now noted in the syllabus. We will be reviewing this with the students in the field and during debrief in the evenings.

Field notebook 20% - You will take detailed notes in your field notebook including sketches and maps of the sites visited, observations, results and discussions from field and lab activities. **Examples will be provided with a rubric for grading.**

- *Recommendation: The Panel recommends that the Grading Scale be altered to include grades of D, D-, and E (syllabus pg. 3 under “Course Grade will be based on the following”).*

Response: The grading scale was updated in the syllabus to include:

The following will yield letter grades:

100-93% **A**; 92-90% **A-**; 89-87% **B+**; 86-83% **B**; 82-80% **B-**; 79-77% **C+**; 76-73% **C**; 72-70% **C-**;

69-67% **D+**; 66-63% **D**; 62-60% **D-**; 59-0% **E**

I will return Earth Sciences 5242 to the department queue via curriculum.osu.edu in order to address the Panel’s requests.

Should you have any questions about the feedback of the Panel, please feel free to contact Wendy Panero (faculty Chair of the NMS Panel; cc'd on this e-mail), or me.

Best,
Rachel



Rachel Steele, MA

(Pronouns: she/her/hers / Honorific: Ms.)

Program Manager, Office of Curriculum and Assessment

College of Arts and Sciences

306 Dulles Hall 230 Annie and John Glenn Ave. Columbus, OH 43210
(614) 688-4540

EARTHSC 5242 Exploring the Natural History of The Bahamas.

Spring Education Abroad Program

School of Earth Sciences, The Ohio State University

Class Meetings and Location: one class period per week (Mondays) for 2 hours, 5-7PM, Columbus Campus, Orton Hall Room 080

Class Numbers: ##### undergraduate students, ##### graduate students

Professors: Dr. Elizabeth Griffith, griffith.906@osu.edu
Office: Mendenhall Laboratory Room 327
Dr. Jill Leonard-Pingel, leonard-pingel.1@osu.edu
Office: Orton Hall Room 217; Alford Science Center 241 (Newark)

Office Hours: **Griffith** ZOOM office hours: Monday 9:30-11:00am (link on Carmen)
Leonard-Pingel ZOOM office hours: Tuesday 10:00am-11:00am (link on Carmen)
or by appointment, please email



Course Description: The study of the geology and natural history of the small Bahamian island of San Salvador including an international 7-day field trip to the island during spring break. Prereq: A student must have taken an introductory earth science course (or equivalent) such as EARTHSC 1100, 1105, 1108, 1110, 1121, 1151, 2203, 2204, 2205, 2206(S), 2210, 2122, or 2155. Permission of instructor required for registration (through online application).

Goals and Learning Outcomes:

This field course is designed to provide unique opportunities for students to examine first-hand the geology and natural history of diverse ecosystems on the small Bahamian island of San Salvador, connect with their surroundings during the international field experience, and discover the impact humans have on the island.

Specific learning outcomes:

1. Students will learn how The Bahamas formed and what shapes the islands today by reading and discussing these topics and making observations themselves in the field.
2. Students will explore ecosystems of San Salvador Island in the present, learn how to identify these ecosystems in the geologic record, and compare these past and present ecosystems.
3. Students will understand and appreciate first hand how humans impact this small island.
4. Students will reflect on this international field experience and share insight gained with their peers and the public.

In addition, work for this course will develop and improve the following skills:

- 1) a student's ability to read, understand, and discuss scientific literature
- 2) a student's oral presentation and communications skills and ability to work in teams

- 3) a student's ability to use the sedimentary record to infer conditions in the past
- 4) a student's comfort level working in the field and maintaining a field notebook
- 5) a student's ability to communicate science to their peers and the public

Course components:

- (1) **Pre-departure seminars** in the US covering the following topics: (a) the geological evolution of the Bahamas platform, (b) natural history and ecology of San Salvador Island, and (c) natural resource availability and human impact on San Salvador Island.
- (2) **In-country structured educational experiences and seminars** led by OSU instructors, student presentations and discussions, lab activities, visits and guided tours of diverse ecosystems (beach and rocky shore, sea grass, coral reef, mangrove, and hypersaline lakes) and geologic features (sedimentary sequences, caves, sea cliffs, dunes, and karst formations). Students will explore how these natural systems and resources are impacted by natural and human factors on different timescales.
- (3) **Post-departure seminars** in the US focused on human impacts on the natural environment of San Salvador Island.

Course Grade will be based on the following:

Topical review and presentation 10% - Prior to departure, you will choose a topic (e.g., reef organisms, lake geochemistry, karst formation, Pleistocene climate, carbonate rocks and petroleum reservoirs, hurricanes, climate change) to research and complete a **five-page** report on the topic with appropriate references and citations. We will distribute a list of topics that you can choose from on Carmen. You will share your knowledge with the class during pre-departure or post-travel meetings or during the education abroad experience by preparing a short (10 minute) presentation and assisting in leading a discussion related to the topic. Expectations for graduate students are higher than that for undergraduate students as indicated in the grading rubric for the written document and oral presentation.

Class activities, participation 50% - You are expected to complete pre-lecture quizzes (open book/notes), fully participate in activities, assessments, and seminars, including arriving on time and capable of participating in each day's activities while we are in the field (not just tagging along). This includes treating all presenters and each other with respect, asking questions, and making the most of this educational experience in The Bahamas. Graduate students enrolled in this course are expected to initiate and lead discussions amongst their peers inside and outside of the classroom.

Field notebook 20% - You will take detailed notes in your field notebook including sketches and maps of the sites visited, observations, results and discussions from field and lab activities. Examples will be provided with a rubric for grading.

Student reflections 10% - You are required to write three reflections during the course. One will be prior to departure, one in the field and another after we return to

Columbus. Each reflection will be roughly two pages in length and cite relevant course references and include personal thoughts. This is your opportunity to reflect on (i) what you are learning in the classroom prior to departure and what you are looking forward to personally experiencing abroad, (ii) what you are learning in the field abroad about the course content and yourself, and (iii) how the experience has changed your personal knowledge of a particular topic and expanded your world view.

Class blog 10% - The class will be publicly sharing our experience (with friends, family, and others) through a web blog. Everyone will contribute a blog post on the website during the trip which will include at a minimum a paragraph about a particular activity and a picture. We will assign students to a particular day prior to departure, and encourage you to share the website with your family and friends.

The following will yield letter grades:

100-93% **A**; 92-90% **A-**; 89-87% **B+**; 86-83% **B**; 82-80% **B-**; 79-77% **C+**; 76-73% **C**; 72-70% **C-**;

69-67% **D+**; 66-63% **D**; 62-60% **D-**; 59-0% **E**

Academic Integrity (Academic Misconduct): It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

Any material submitted in this course must represent your own work. If you have any questions about whether you are acting in accordance with the Code of Student Conduct, please ask us BEFORE an assignment is turned in.

Expectations for Conduct: In the spirit of this institution’s values of inclusion, diversity, collaboration, and integrity, and in an effort to ensure that this class remains a place where everyone can feel safe, comfortable, and welcome, we ask that you:

- behave in a safe and responsible manner at all times
- treat students, staff, and faculty with respect at all times
- be mindful of how your actions and language impact others

In addition, during the field portion of the course we expect that you will

- Arrive on time and capable of participating in the day’s field trip (not just tagging along).
- Attend and fully participate in evening activities.
- Obey all local laws and rules of the Gerace Research Centre. We are not responsible for your legal problems.
- Put safety first, **always**.

Costs: ...to be determined

Additional costs include incidentals on the island and acquiring items below.

Things you will need:

**** **PASSPORT** ****

Field notebook (Rite In The Rain is highly recommended) and pencils

Mask/fins/snorkel and a way to carry them

Bathing suits, beach towel, sunscreen, sunglasses, hat

Insect repellent

Money in small denominations (there are no ATM's or banks on San Sal)

Chargers

Camera / spare batteries

Shoes with sturdy soles – can be Chacos or water shoes, but coastal karren is nasty stuff

A pair of old sneakers

Other useful items:

-The water will be around 75 degrees, so wet suits aren't absolutely necessary, but useful for people who get cold (like me). 2mm shorty wetsuits can work well up to 3 mm fullsuit.

-Snacks-everything is expensive on the island, you can save a lot by bringing popcorn, nuts, crackers, granola bars. That way you can save your money for other incidentals.

-A sweatshirt-it does get cool in the evenings

-A light cover-we'll be driving around in open trucks, so you will be exposed to the sun a lot. It helps to be able to coverup while we're traveling. It can also feel very cold driving in the back of the truck after getting out of the water

-Rain gear

-You don't need a lot of clothes, but it is expected that we will clean up and look decent for meals at the research station dining hall.

-Laundry detergent-there are several washing machine available so you can run a load while you're there (air dry)

FAQ:

- *Is there a swimming/water safety skill pre-requisite for the course?*

We will be reviewing water safety and testing our snorkeling equipment at the RPAC Aquatic Center (mandatory, see course schedule). If you have never snorkeled before, this will be the time to become comfortable with your gear and be sure it is in good condition. We will be assisting with evaluating gear and comfort level in the water.

- *If I am unable to swim with snorkeling equipment in the field, how should I request modifications and/or accommodations?*

Talk with the instructors BEFORE we depart for San Salvador Island if you are unable to swim with snorkeling equipment or to discuss any accommodations that you will need in the field.

Statement on disability services: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Please make an effort to speak with the instructors of the class to discuss any accommodations that you may need to complete the field work BEFORE we depart for San Salvador Island.

Statement on Diversity: The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Statement on sexual misconduct/relationship violence: Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Statement on religious holidays: The University recognizes/observes holidays as listed on <http://controller.osu.edu/pay/pay-holidays.shtm> If you observe any other religious holidays, please make special arrangements *in person with the instructor within the first two weeks of class.*



Careers in oceanography “offer the possibility of adventure and the satisfaction of making meaningful contributions toward understanding our planet.” <https://scripps.ucsd.edu/education/careers>
<https://www.noaa.gov/work-with-us>



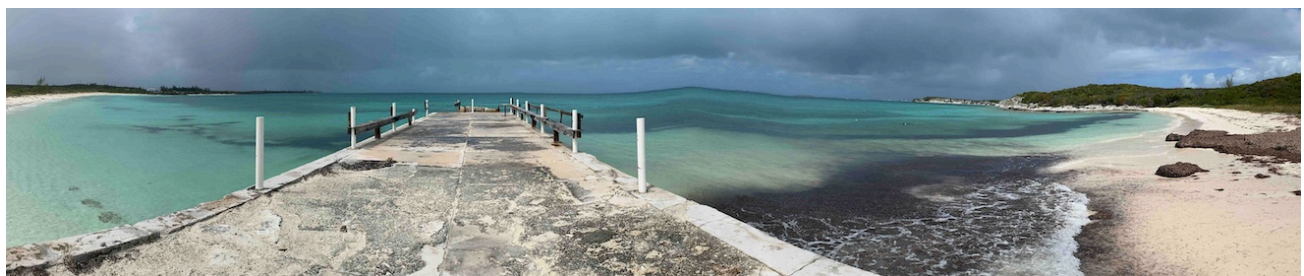
Careers in geosciences “can offer an engaging lifestyle and a wide variety of opportunities.” <https://www.americangeosciences.org/workforce/career-resources> Consider taking additional classes in the School of Earth Sciences and explore opportunities here at Ohio State. Please feel free to talk with the Instructor or any faculty or students in the School of Earth Sciences for more information. <https://earthsciences.osu.edu/>

Course Schedule (subject to change):

Week	Topic	Pre-reading (on Carmen)	Assignment
1: Jan 10	Group icebreakers and getting to know each other, overview of course and topics; Introduction: The Bahamas platform: introduction to the geology and biology of this shallow-water marine environment	Buchan (2000) The Bahamas, Marine Pollution Bulletin, Vol. 41, pp. 94-111 [read first 7 pages, p. 94-100]	Pre-class Quiz 1
2: Jan 24 (Leonard-Pingel)	Preparing for the trip, discussing modern cultural practices and privilege; Human impacts on a small island ecosystem: lessons from the Lucayans of San Salvador	Blick (2007) Pre-Columbian impact on terrestrial, intertidal, and marine resources, San Salvador, Bahamas (A.D. 950-1500). <i>J for Nature Conservation</i> Vol. 15, pp. 174-183. Baxter (2016) A comparative view of San Salvador's Plantations. <i>Proceedings of the fifteenth symposium on the natural history of The Bahamas</i> , Gerace Research Center.	Pre-class Quiz 2 + Choose research topic & presentation date
3: Jan 31 (Leonard-Pingel)	Uncovering the geologic history of San Salvador Island written in its sedimentary rocks ; Using the scientific method	White & Curran (1988) Mesoscale physical sedimentary structures and trace fossils in Holocene carbonate eolianites from San Salvador Island, Bahamas. In: P. Hesp and S.G. Fryberger (Editors), <i>Eolian Sediments</i> . <i>Sediment. Geol.</i> Vol. 55, pp. 163-184.	Pre-class Quiz 3
4: Feb 7 (Leonard-Pingel)	Coral reefs: "Iconic marine ecosystems"; Valuing ecological interactions to building carbonate reef structures	Chapter 15 (specifically 15.4), Animals of the Benthic Environment, from <i>Essentials of Oceanography</i> by Trujillo and Thurman Hughes, T.P. et al. 2017. Coral reefs in the Anthropocene. <i>Nature</i> 546: 82-90. BREEF's Virtual Coral Reef Field Trip: Life on the Bahamian Coral Reef 25 min. video	Pre-class Quiz 4
5: Feb 14 @ RPAC Aquatic Center	Testing our snorkeling equipment, discussing water safety	Water safety, and how to snorkel: https://www.youtube.com/watch?v=9GljSvw7r3g https://hioceansafety.com/snorkeling-safety/ https://hioceansafety.com/know-your-limits/	Pre-class Quiz 5
6: Feb 21 (Griffith)	An ocean in motion: Ocean currents, waves, and tides	https://rwu.pressbooks.pub/webboceanography/ Chapter 9.1, 9.2 & 9.8, 10.1 & 10.3, 11	Pre-class Quiz 6
7: Feb 28 (Griffith)	Hurricanes: Understanding these powerful storms and their impact on the geologic record	Fuhrmann et al (2019) Assessment of storm surge and structural damage on San Salvador Island, Bahamas, associated with Hurricane Joaquin (2015)_ <i>Natural Hazards</i> Vol. 99, pp. 913-930.	Pre-class Quiz 7
8: Mar 7	Final preparations and pre-trip meeting		Pre-departure Reflection due
Mar 13-19, Spring Break Trip to San Salvador Island, The Bahamas *see in country itinerary (following page)* Out of country /field Reflection due			

<i>Field notebooks**</i> <i>Public blog post due</i>			
9: Mar 21	no class		
10: Mar 28	Field excursion debrief , turn in field notebooks, web blog review		Turn in field notebooks; Review blogs (from trip)
11: Apr 4 (Griffith)	Karst features and processes on San Salvador Island	Davis "Karst processes and landforms on San Salvador Island, Bahamas" https://serc.carleton.edu/75531	Pre-class Quiz 8
12: Apr 11 (Griffith)	Impacts of extreme weather events and climate change on San Salvador Island	Knutson et al. (2021) ScienceBrief Review: Climate change is probably increasing the intensity of tropical cyclones. In: Critical Issues in Climate Change Science, edited by: Corinne Le Qu.r., Peter Liss & Piers Forster.	Pre-class Quiz 9
13: Apr 18 (Griffith)	Impacts of pollution on San Salvador Island	Moore (2003) Trashed: Across the Pacific Ocean, Plastics, Plastics, Everywhere. Natural History, Vol. 112	Pre-class Quiz 10
14: Apr 25	Celebration and open discussion and reflection on how this experience has changed your scientific and world view		Final written report due; Final Reflection due

in country itinerary on the following page



In-country course itinerary (subject to change due to conditions on the island):

Sunday, March 13

Day 1: Arrival in San Salvador, Orientation to the field station, introductory snorkel in Graham's Harbor

Monday, March 14

Day 2: *Beaches and substrates*

Coast Guard Beach - modern beach sediments and beach rock

North Point – Eolianites, sedimentary structures, and trace fossils

Snorkel in Cut Caye – Substrates and associated biota; Carbonate producers- calcareous green algae, sediments, marine grasses

Evening: Class meeting and Lab – Sand analysis, identification of collected grasses and algae

Tuesday, March 14

Day 3: *Coral reefs*

Visit Cockburn Town *Fossil* Reef; Snorkel in Fernandez Bay – *Modern* Coral Reefs; Snorkel at Bamboo Point – Rocky substrate biota, sandy substrate biota

Evening: Class meeting and Lab – Coral identification, taphonomy

Wednesday, March 15

Day 4: *Stromatolites and coastal environments*

Visit Storrs Lake and stromatolites, Upper parts of Pigeon Creek and Mangroves, Snorkel Pigeon Creek Tidal Channel and Delta

Evening: Class meeting and Lab - Water chemistry

Thursday, March 16

Day 5: *Karst environments and human impacts*

Visit Owl Hole, Dripping Rock and Altar Caves, Watlings Blue Hole and Watlings Castle, Sandy Point, Snorkel in French Bay

Evening: Night snorkel or star gazing

Friday, March 17

Day 6: *Interior lakes and beach monitoring*

Interior lake hike and push coring, visit to East beach and possible snorkel, beach clean up and beach profile

Evening: Class meeting and Lab - Core investigation

Saturday, March 18

Day 7: *Island flora and fauna*

Boat trip to Green Cay and/or White Cay or Hike inland to interior lakes around research centre with snorkel

Evening: Conch BBQ / group dinner

Sunday, March 19

Day 8: Depart San Salvador (direct to Miami)

CURRICULAR MAP OF COURSES AVAILABLE IN EARTH SCIENCES B.S.

Course Number	Course Title	PLO A: Read/ evaluate Earth Sci literature	PLO B: Present Earth Sci info	PLO C: Apply Earth Sci data	PLO D: Apply appropriate techniques/ methods	PLO E: Identify Earth Sci problems, develop solutions	PLO F: Apply other sciences	BS program required /elective
Earth Sciences 1100	Planet Earth: How it works	B	B	B	B	B	B	O-prep
Earth Sciences 1105	Geology of the National Parks	B	B	B		B	B	O-prep
Earth Sciences 1108	Gemstones	B	B	B		B	B	O-prep
Earth Sciences 1121	The Dynamic Earth	B	B	B	B	B	B	O-prep
Earth Sciences 1151	Natural Hazards	B	B	B	B	B	B	O-prep
Earth Sciences 2203	Environmental Geoscience	B	B	B		B	B	O-prep
Earth Sciences 2205	The Planets	B	B	B		B	B	O-prep O-PS
Earth Sciences 2206(&S)	Principles of Oceanography	B	B	B		B	B	O-prep O-SS
Earth Sciences 1200	Introductory Earth Science Lab		B	B	B	B	B	O-prep
Earth Sciences 2000	Preparation for Thesis and Careers in the Earth Sciences	B-I	B-I	B-I		B-I		R-GS R-GP R-CWE
Earth Sciences 2122	Climate and Life over Billions of years on Earth	B-I	B-I	B-I	B-I	B-I		O-SS R-GS
Earth Sciences 2155	Energy and Environment	B-I	B-I	B-I	B-I	B-I		O-SS
Earth Sciences 2203	Environmental Geoscience	B-I	B-I	B-I	B-I	B-I		O-SS
Earth Sciences 2204	Exploring Water Issues	B-I	B-I	B-I	B-I	B-I		O-SS
Earth Sciences 2210	Energy, Mineral Resources, and Society	B-I	B-I	B-I	B-I	B-I		O-SS
Earth Sciences 2212	Intro to Earth Materials	B-I	B-I	B-I	B-I	B-I		O-CWE
Earth Sciences 3411	Water Security for the 21 st Century	I	I	I	I	I		O-SS

Earth Sciences 5189.02	Field Geology II	A	A	A	A	A	A	R-GS O-PG
Earth Sciences 5191	Internship in the Earth Sciences	I - A	I - A	I - A	I - A	I - A	I - A	
Earth Sciences 5191.01	Museum Internship	A	A	A	A	A	A	
Earth Sciences 5193.xx	Individual Studies	I - A	I - A	I - A	I - A	I - A	I - A	
Earth Sciences 5194	Group Studies	I - A	I - A	I - A	I - A	I - A	I - A	
Earth Sciences 5203	Geo-environment and Human Health	A	A	A	A	A	A	O-CWE O-HG
Earth Sciences 5205	Planetary Science	A	A	A	A	A	A	R-PS
Earth Sciences 5206	Advanced Oceanography	A	A	A	A	A	A	R-MS O-CWE
Earth Sciences 5242 (This Course)	Nat. Hist. Bahamas	I-A	I-A	I-A	I-A	I-A	I-A	O-MS O-CWE
Earth Sciences 5268	Soils and Climate Change	A	A	A	A	A	A	O-CWE O-HG
Earth Sciences 5501	Museum Databases	A	A	A	A	A	A	O-MC
Earth Sciences 5550	Geomorphology	I-A	I-A	I-A	I-A	I-A	I-A	O-PS O-HG
Earth Sciences 5600	Siliciclastic Depositional Systems	A	A	A	A	A	A	
Earth Sciences 5601.01	Sedimentary Petrology: Sandstones	A	A	A	A	A	A	
Earth Sciences 5601.02	Sedimentary Petrology: Carbonate Rocks and Shales	A	A	A	A	A	A	
Earth Sciences 5602.01	Carbonate Depositional Systems I	A	A	A	A	A	A	
Earth Sciences 5602.02	Carbonate Depositional Systems II	A	A	A	A	A	A	O-MS
Earth Sciences 5603	Stratigraphy	A	A	A	A	A	A	
Earth Sciences 5604	Sequence Stratigraphy	A	A	A	A	A	A	
Earth Sciences 5605	Paleoceano graphy	A	A	A	A	A	A	
Earth Sciences 5613	Micropaleon tology	A	A	A	A	A	A	
Earth Sciences 5614	Paleobiology	A	A	A	A	A	A	

Earth Sciences 5615	Paleoecology	A	A	A	A	A	A	
Earth Sciences 5617	Petrology of Earth and Planets	A	A	A	A	A	A	
Earth Sciences 5618	Advanced Historical Geology	A	A	A	A	A	A	
Earth Sciences 5621	Introduction to Geochemistry	A	A	A	A	A	A	O-CWE O-HG
Earth Sciences 5622	Stable Isotope Biogeochemistry	A	A	A	A	A	A	O-MS
Earth Sciences 5625	Igneous Petrology	A	A	A	A	A	A	
Earth Sciences 5627	Global Biogeochemical Cycles	A	A	A	A	A	A	
Earth Sciences 5628	Environmental Isotope Geochemistry	A	A	A	A	A	A	
Earth Sciences 5629	Principles of Petrology	A	A	A	A	A	A	
Earth Sciences 5636	Advanced Topics in Mineralogy and Crystallography	A	A	A	A	A	A	
Earth Sciences 5641	Geostatistics	A	A	A	A	A	A	O-GP
Earth Sciences 5642	Geomathematical Analysis	A	A	A	A	A	A	
Earth Sciences 5644	Tectonic Evolution of Continents	A	A	A	A	A	A	
Earth Sciences 5645	Advanced Structural Geology	A	A	A	A	A	A	
Earth Sciences 5646	Geodynamics	A	A	A	A	A	A	O-GP O-PS
Earth Sciences 5650	Glaciology	A	A	A	A	A	A	O-CWE
Earth Sciences 5651	Hydrogeology	A	A	A	A	A	A	O-CWE O-GP R-HG
Earth Sciences 5655	Land Surface Hydrology	A	A	A	A	A	A	O-CWE O-HG
*Earth Sciences 5656 <i>pending</i>	Ecohydrology	A	A	A	A	A	A	O-CWE O-HG
Earth Sciences 5660	Geology of Metallic Deposits	A	A	A	A	A	A	
Earth Sciences 5661	Petroleum Geology	A	A	A	A	A	A	O-PG
Earth Sciences 5663	Global Change and Sustainability in the Earth System	A	A	A	A	A	A	O-SS

Earth Sciences 5670	General and Economic Geology of Selected Areas	A	A	A	A	A	A	
Earth Sciences 5676	Elemental Chemical Analysis using Inductively Coupled Plasma Optical Emission and Mass Spectrometry	A	A	A	A	A	A	
Earth Sciences 5680	Deep Earth Geophysics	A	A	A	A	A	A	O-GP O-PS
Earth Sciences 5687	Borehole Geophysics	A	A	A	A	A	A	O-GP O-PG
Earth Sciences 5703	Principles of Biostratigraphy	A	A	A	A	A	A	
Earth Sciences 5713	Taxonomy and Phylogeny in the Fossil Record	A	A	A	A	A	A	
Earth Sciences 5714	Biometry	A	A	A	A	A	A	
Earth Sciences 5717	Critical Issues in World Freshwater Resources	A	A	A	A	A	A	
Earth Sciences 5718	Aquatic Geochemistry	A	A	A	A	A	A	
Earth Sciences 5719	Environmental Organic Geochemistry	A	A	A	A	A	A	
Earth Sciences 5746	Seminar in Rheological Properties of Solids	A	A	A	A	A	A	
Earth Sciences 5751	Quantitative Ground-Water Flow Modeling	A	A	A	A	A	A	O-PG O-HG
Earth Sciences 5752	Contaminants in Aqueous Systems	A	A	A	A	A	A	
Earth Sciences 5754	Risk Assessment and Management in Earth Systems	A	A	A	A	A	A	
Earth Sciences 5779	Seminar in Physical Properties of Minerals and Rocks	A	A	A	A	A	A	
Earth Sciences 5780	Reflection Seismology	A	A	A	A	A	A	O-MS O-PG
Earth Sciences 5781	Gravity Exploration	A	A	A	A	A	A	
Earth Sciences 5782	Magnetic Exploration	A	A	A	A	A	A	

Geod Sci 5781	Geodesy and Geodynamics	A	A	A	A	A	A	O-GP O-PS
Electives from other departments (Geog, AtmosSC, EEOB, ENR, Chem, Math, etc.)							I-A	

Program Learning Goals:

- A) Students critically read and evaluate Earth Science literature
- B) Students present Earth Science information in a clear and logical manner, both orally and in writing.
- C) Students apply knowledge of Earth Science data to understand the dynamic physical, chemical, and biological processes of the Earth and its history.
- D) Students apply knowledge of appropriate techniques, field methods, field mapping, and numerical methods to measure, portray, analyze, and interpret Earth Science data in specific subdisciplines.
- E) Students identify Earth Science problems and develop solutions.
- F) Students apply knowledge of modern applications from chemistry, physics, biology, mathematics, statistics, and computing to the solution of Earth Science problems.

Key: B = Beginning level; I = Intermediate level; A = Advanced level

Program Course Listing:

- R- Required
- O - one of multiple option
- prep - preparation (all BS programs)
- SS – science of sustainability (all BS programs)
- GS – Geological Sciences subprogram
- CWE- Climate Water Environment subprogram
- GP- Geophysics subprogram
- MS – Marine Science certificate
- PS- Planetary Science certificate
- HG- Hydrogeology certificate
- MC – Museum Curation certificate
- PG- Petroleum Geology certificate