

Coral Reefs of the British Virgin Islands, Travel Study Course

Marine Biology - Digital Photography

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Course Description

Global climate change poses challenges to the inhabitants of every ecosystem, but the effects are already evident in one of the world's most fragile, coral reefs. Research efforts by organizations such as The **National Center for Coral Reef Research (NCORE)** at the University of Miami and The Coral Reef Research Foundation in Palau have been documenting these changes for years and continue to monitor a variety of characteristics of reefs around the world. This travel study course will introduce the students to coral reef research and allow them to establish/add to a body of data collected from several reefs located in the British Virgin Isles. Data visualization and documentation of the coral reefs will be accomplished by the use of underwater digital photography. Over time subsequent classes will expand the data set and a detailed record of the changes in reef size, structure, and inhabitants will be made available to document the effects of climate change on these reefs.

Dates of Trip: Spring Break – Saturday to Saturday

3 Credits: Biology (non-major), DART Major/Minor Credit, Art History Major/Minor Credit, LGU Credit, General Elective Course

Course Objectives

After completing this course participants will gain new knowledge and skills in the following:

- coral reef structure, function, and the effect of climate change on coral reef systems
- recognizing coral reef vertebrates and invertebrates and how they interact in this biome
- experimental design and data collection and analysis
- the use of GPS, pH meters, salinity tests, and other data collecting technology
- create a photo bank
- digital camera controls and menus
- lighting for data capture
- image composition
- data editing, image cataloging and storage

Readings (Textbooks, periodicals, or other materials to be used in the course):

- Kelby, Scott, *Scott Kelby's Digital Photography Boxed Set, Parts 1,2,3, and 4*, Peachpit Press, 2012, ISBN-10: 0321839951, ISBN-13: 978-0321839954
- Fitzgerald, Mark, *Photoshop CS5 Restoration and Retouching For Digital Photographers Only*, Wiley, 2010, ISBN: 978-0-470-61816-5
- Gietler, Scott, *Underwater Photography Guide*, <http://www.uwphotographyguide.com/>
- Yonover, Jeff, *Underwater Photography Tips* by Jeff Yonover, http://www.coral.org/resources/photo_tips
- Selected chapters from *Marine Biology: Function, Biodiversity, Ecology* by Jeffrey S. Levinton, ISBN 0-19-514172-5
- The National Center for Coral Reef Research (NCORE), <http://ncore.rsmas.miami.edu/>
- The Coral Reef Research Foundation, <http://www.coralreefresearchfoundation.org/>

- Case study from SUNY Buffalo case study catalog: *Global Climate Change: Evidence and Causes*, Maureen Knabb, Timothy M. Lutz, G. Winfield Fairchild

Software (students are not required to purchase software)

Adobe Bridge CS6

Adobe Photoshop CS6

Student Supplied Equipment

underwater digital camera

camera accessories; memory card(s), USB transfer device, 2 rechargeable batteries, battery recharger, float strap

Water shoes

Snorkel gear (mask and snorkel)

SEMESTER OUTLINE

Week One:

Tuesday – Marine Biology

Introduction to coral reef research from Charles Darwin to current efforts

Ocean processes in the tropics

Coral reef types and origin, development, and demise

Thursday – Digital Photography

Camera controls and menus

Image Resolution

Week Two:

Tuesday – Marine Biology

Coral species (hard and soft corals; identification)

coral morphology and physiology (organismal interactions with emphasis on competition)

Helix reef experiment (discussion)

Thursday – Digital Photography

Natural Light vs Artificial Light

Homework Exercise

Week Three:

Tuesday – Marine Biology

Vertebrate and invertebrate species

Community interactions with emphasis on reliance on these species for the presence of a healthy reef system

Thursday – Digital Photography

Image Storage

Composition

The Golden Ratio/Rule of Thirds

Leading Lines and Looks

Focal Points and Accents

Homework Exercise

Week Four:

Tuesday – Marine Biology
Effects of global climate change on coral reef systems (case study: SUNY Buffalo collection)

Thursday – Digital Photography
Critique and Review
Digital Manipulation

Week Five:

Tuesday – Marine Biology
Experimental design, data collection, data analysis
Begin to discuss the characteristics of a successful research effort and the types of data we'd be looking to collect.

Thursday – Digital Photography
Critique and Review
Composition
Depth of Field/Macro Shots
Homework Exercise

Week Six:

Tuesday – Marine Biology
Design the experiment to be conducted while away, division of labor:

At this point the students have background in the coral reef ecosystem, the effects of global climate change, and (underwater) photography. The logistics of the data collection will be discussed here. We will set attainable goals for what we will accomplish (relative to what more advanced research projects like those mentioned above). We will map out the area to be cataloged and determine which class members will be responsible for which types of data. This could involve the creation of spread sheets for the input of data, familiarization with any equipment that may be used for data collection, and a checklist to be sure all information is gathered prior to leaving the reef site. Data collection will include (but not be limited to): water temperature and pH; diversity and abundance of vertebrate and invertebrate species; photographic documentation of ecosystem status from coordinated GPS positions so that future data collection can occur from the same exact locations; evidence of disease or bleaching of the reef.

Thursday – Digital Photography
Light and Water
Reflection and Refraction – conducted in swimming pool at La Salle with snorkel gear

Week Seven:

Tuesday – Marine Biology
“Blue Planet: Coral Reefs” (video with discussion); Exam

Thursday – Digital Photography
Review Light and Water
Preparation for field studies

Week Eight:

Travel Component - The travel outline is flexible and subject to the sailing directives of the Captain and current weather conditions.

DAY 1 - Saturday

Travel

Flight from Philadelphia to St. Thomas, US Virgin Islands

Fast Ferry to Road Town, Tortola, British Virgin Islands

Board Yacht

DAY 2 – Sunday

Tortola

Visit National Parks Trust of the Virgin Islands <http://www.bvinationalparkstrust.org/>

DAY 3 - Monday

Norman Island - The Caves at Norman Island

Photography Focus: Light and Underwater Photography

Snorkeling into the caves of Norman Island will challenge the student's knowledge of the use of light.

This setting will also give students the opportunity to practice and apply underwater photographic practices. There is a large collection of marine life at this location. Marine life has been hand-fed by tourists and tour guides.

DAY 4 - Tuesday

Peter Island

Photography Focus: Macro Shots, Focal Points and Accents

Students will swim to the rocky beaches of Peter Island where they will have the opportunity to shoot visual images of vertebrate and invertebrate species and the community interactions. The marine life will offer an excellent opportunity for macro shots. Compositions with focal points and secondary accents will be required.

DAY 5 - Wednesday

Virgin Gorda – The Baths

Photography Focus: Over/Under Shots

The yacht's dinghy will deliver students to the unique geography of the Baths at Virgin Gorda. Huge boulders form exotic pools and natural grottos. Wildlife is abundant above and below the surface of the water. Participants will add a new focus to their skills, shooting over/under imagery, splitting the composition with the waterline, capturing information above water and below water within the same photograph.

DAY 6 – Thursday

Anegada Island – Anegada Horseshoe Reef

Photography Focus: The Golden Ratio

Students will be asked to focus on the Golden Ratio, the thirds rule while creating their marine biology compositions and identifying the coral reef.

DAY 7 – Friday

Jost Van Dyke

Photography Focus: Depth of Field

Participants will take a dinghy into the coves and onto the beaches of Jost Van Dyke. This island will offer students the opportunity to observe and photograph mangrove forests, and to compare and contrast to temperate salt marshes. A short hike will take students to a small cove known as The Bubbly Pool. Keeping depth of field as a focus will aid students with composing foreground, middle ground and background while capturing images of the mangroves.

DAY 8 - Saturday

Travel

Disembark. The trip passes much too quickly.

Return to Road Town, Tortola, British Virgin Islands

Fast Ferry to St. Thomas, US Virgin Islands (customs)

Flight from St. Thomas to Philadelphia, PA

Week Nine:

Tuesday – Marine Biology

Assessment of the collected data; review of photographs, identification of species; review diversity and abundance data, develop graphical representations

Thursday – Digital Photography

Assess and Edit

Image Cataloguing

Image Storage

Week Ten:

Tuesday – Marine Biology

Web page design, project assessment

Thursday – Digital Photography

Editing Images

Image Cataloguing

Image Storage

Contribute to the Coral Reef Alliance Photobank, http://coral.org/resources/photo_bank

Photographic Research Data Visualization Due*

**Required course hours will have been completed following week ten. Students may elect to continue class attendance and submit the photographic research anytime after week 10 but before finals week of the semester.*

***Week Eleven:**

Thursday – Marine Biology and Digital Photography

Digital Manipulation

Shadows, Highlights and Histograms

Studio Work

***Week Twelve:**

Thursday – Marine Biology and Digital Photography
Digital Manipulation
Color Correction
Studio Work

***Week Thirteen:**

Thursday – Marine Biology and Digital Photography
Digital Manipulation
Cropping, Blending, Cutting, and Pasting
Studio Work

***Week Fourteen:**

Thursday – Marine Biology and Digital Photography
Complete Final Project

***Week Fifteen:**

Thursday – Marine Biology and Digital Photography
Complete Final Project

Grading

Four Graded Homework Assignments (100 points each) 400 points

One full letter grade, 10 points, will be deducted for late assignments submitted within one week from the due date. Any assignments more than one week late will not be accepted resulting in a zero.

- Visit an aquarium store that distributes salt water tropical fish and coral, observe and catalog the species sold at the store. Discuss with the employees the requirements for a successful salt water aquarium.
- 3 technical photo shoots with digital manipulation exercise

One written exam on the material covered prior to the trip 100 points

Final Project 500 points

Presentation of Collected Data

- An assessment of the health of the reef, and suggestions for future studies of these locations.
- photographs
- identify subject matter
- abundance data
- location data GPS coordinates

Class participation and behavior on the trip.

95 - 100	A	77 – 79	C+
90 – 94	A-	74 – 76	C
87 – 89	B+	70 – 73	C-

84 – 86 B
80 – 83 B-

60 – 69 D
59 - Ø F