Biology of Coral Reefs
BIOL 449
Syllabus Fall 2022
Phillip Dustan, Department of Biology

Among the most spectacular of all ecosystems, coral reefs form in the world’s tropical oceans through the action of animals and plants. They are the largest and most complex biological structures on earth. Although they cover less than one percent of the earth’s surface, they are reservoirs for much of the ocean’s biodiversity, housing some of nature’s most intricate ecological secrets and treasures.

Coral reefs are also the most productive ecosystems in the sea and provide significant ecological goods and services, estimated at about $375 billion annually (1997 dollars) with more recent estimates topping 9 trillion dollars in 2015. Their physical structures protect thousands of miles of coastline from the fury of tropical storms, tsunamis, and many low-lying islands threatened by rising seas.

The intricate adaptations for survival that have evolved over an immense span of time make reefs vulnerable to human activities. For example, excess nutrients support algal overgrowth, while over-fishing alters the food web. The extent to which reefs in remote locations are now showing signs of stress, especially bleaching and disease, points to the critical role that coral reefs play as indicators of declining ocean health.

This course will be an introduction to tropical coral reefs and the organisms and processes responsible for their formation. We will begin with an overview of reefs and their tropical marine environment. The course will then move into the evolution, systematics, and physiology, ecology and symbiosis of reef-building corals. These subjects will set the stage for learning about coral reef community structure and ecological dynamics. The course will close by taking a critical look at natural and human disturbances to reefs with an emphasis on current models of management and conservation.

**The learning outcomes of this class include understanding:**
1. Understanding how abiotic forcing functions control the ecology reef morphology and coral distribution.
2. Understanding the principles of carbonate geochemistry as it pertains to coral reefs.
3. Understanding how energy and molecules flow through coral reef ecosystems.
4. Understanding how density dependent and density independent processes regulate coral reef populations.
5. Understanding how natural and anthropogenic forcing functions impact the ecology of reef-building corals.

**Technology:**
This class is taught online requiring:
Access to a device with reliable high-speed internet, web-cam and/or microphone for communication with class’
A My Charleston account, familiarity with OAKS and Zoom for lectures and other software necessary for completing assignments (ie. MSWord, Adobe Reader). Please be sure to follow general Netiquette principles [here](https://blogs.cofc.edu/sits/2020/08/19/zoom-tips-netiquette/). The College offers a number of resources to help you develop technological competency for this class [here](http://blogs.cofc.edu/studentreadinessforonlinelearning/) or [here](https://www.pennlive.com/coronavirus/2020/04/zoom-meeting-etiquette-15-tips-and-best-practices-for-online-video-conference-meetings.html) Please be sure to mute your mike when you are not speaking to avoid any embarrassing sounds being shared with the group. Please mute you cell phone or other devices while attending an online class. I expect to be able to see your live faces during Zoom lectures. If you experience problems during the course, please reach out to me at phil.dustan@gmail.com or call the IT help desk.

**Instructor Contact**
Email: phil.dustan@gmail.com
Phone: 843-334-3321 mobile
Office Hours by appointment via Zoom.

**Policy on electronic devices:** If and when classes are conducted online using Zoom, please observe the common etiquette for using Zoom [here](https://www.pennlive.com/coronavirus/2020/04/zoom-meeting-etiquette-15-tips-and-best-practices-for-online-video-conference-meetings.html). Please be sure to mute your mike when you are not speaking to avoid any embarrassing sounds being shared with the group. Please mute your cell phone or other devices while attending an online class.
Critical Thinking:
Critical thinking is the common denominator between all forms of analysis. As a graduate student, there is no more important goal than that of developing your mind, as everything you do in your life will be affected by your mind and how it operates. The quality of your learning is affected by the quality of your thinking about learning. The quality of your personal relationships is affected by the quality of your thinking about those relationships. To take command of the thinking that controls your life, you must cultivate your intellect”. (Refer to www.criticalthinking.org)

Prerequisites: General Biology (BIOL 111,112, 212, 213) and Ecology (BIOL 341 or equivalent), or permission of the instructor.

Requirements:
Midterm and Final exams = 50% Term paper, presentations and participation. = 50%

Reference Texts:
The Biology of Reefs and Reef Organisms Illustrated Edition by Walter M. Goldberg
Supplemental texts include:
Life and death of coral reefs, Charles Birkland. (out of print and expensive but very good)
Aquarium Corals by Eric Borneman, T.E.H Publications 2004
Coral reefs in the microbial seas. Forest Rohwer, with M Youle and D. Vosten. 2010. Plaid Press. -a delightful and insightful book to read

Reading List: Reading for class are under required reading on the OAKS page.

GRADES CHECK LIST:
_____ 1 Midterm
_____ 2. One Term paper – pick your topic, meet with me
_____ 3. Creature Feature presentation
_____ 4. Class Participation
_____ 5. Final Exam

Honor Code: All class work must be your own original work and must not have been submitted for a grade in any other class while at the College of Charleston or elsewhere. Furthermore, no project done in this class can be submitted for grading in any other future or present course. To do so will be construed as a clear violation of the Honor Code.

Internet Materials: Any information you quote for a paper or presentation must come from the peer-reviewed scientific literature and not a website. Use search engines such as the Web of Science or Google Scholar. Search journals such as Coral Reefs, Limnology and Oceanography, Marine Biology, Marine Ecology Progress series, etc.

Join the Coral-List operated by NOAA https://coral.aoml.noaa.gov/mailman/listinfo/coral-list

Grading Policy:
A : 92-100 excellent and creative   A- : 89-92
B+: 86-89 very good   B : 82-86 good   B- : 79-82
C+: 76-79 fair   C : 72-76 acceptable  C- : 69-72
F > 63   XF Failure due to Academic Dishonesty

Final grades are supposed to reflect how much you have progressed and/or learned in the time span of a course. With this in mind, one could suggest that an average student receives an average grade, a very good student a higher grade, and an excellent and creative student the highest grade.
Sidebar Knowledge

This course will focus on the corals and the coral reef ecosystem. Within the context of the course students will be required to draw on knowledge from earlier classes. Since this course will be taught at the undergraduate and graduate levels it is expected that students will have varied educational backgrounds. I will help you with sidebar information (selected readings, lectures, websites, etc.) on selected topics to help students will become knowledgeable in areas that are important framework fundamentals to the study of coral reefs. A partial list follows:

- Geological time line of Earth history and the fossil record
- Principles of general oceanographic circulation
- Theories on the origin of life and biodiversity
- Theory of Evolution by Natural Selection
- Photosynthesis and the pathways of carbon
- Density dependence and the growth and regulation of populations

Term paper assignment:

You may not write a term paper on global warming, coral bleaching, ocean acidification, lionfish or any other topic dealing with pollution or man’s impact on reefs. Start your project by finding a paper in the recent peer-reviewed scientific literature that is central to your interest. Then research the topic using other papers from the literature. After you have done some reading on your chosen topic make an appointment to discuss it me. The paper should be at least 2500 words of text, cite a minimum of 10 peer-reviewed papers from 2000 or later plus any other references you choose to use, and must be typed (Times Roman font, 11 or 12 pica, double spaced). Submit both paper copy and email electronic copy.

Filename = YOUR LAST NAME_PAPER_REEFS_F2022.DOC).

Term Paper Topic:

1. Research themes in coral reef science
   Coral biologists have tended to use a selection of coral species for experimental purposes to develop and examine themes in coral reef biology. Examples of this are calcification, endosymbiosis, reproduction, systematics and the species problem, and life history strategies. The reasons for this usually focus around the availability of specimens, habitat distribution, or some peculiar aspect of a species’ biology. For example, *Stylophora pistillata* has become the experimental organism of choice for Red Sea biologists, the *Montastrea annularis* species complex in the Caribbean, and *Pocillopora damicornis* in the Hawaiian Islands. Your assignment is to select a well-used species of fish, coral or other invertebrate from the literature and report on how research centered on your selected species has contributed to a particular “niche of understanding” of coral reef ecology.

Or

2. Reef Processes: Our understanding of coral reefs has come from curious individuals. Your assignment is to report on the current state of knowledge of an ecological or evolutionary reef process of your choosing, NOT a thing or an organism, but an actual Ecological or Evolutionary Process.

Presentations and class reports: Materials other than simple introductory information should be gleaned from the peer-reviewed literature, NOT website information.

Underwater Photography Research Techniques:
Underwater photography is essential to coral reef studies. Interested students will be exposed to a wide variety of underwater cameras and techniques including film and digital still photography and underwater video.

Honor Code: All class work must be your own original work and must not have been submitted for a grade in any other class while at the College of Charleston or elsewhere. Furthermore, no project done in this class may be submitted for grading in any other present or future course. To do so will be construed as a clear violation of the Honor Code. More information is available in the Student Handbook at http://www.cofc.edu/generaldocuments/handbook.pdf.
# Biology of Coral Reefs Fall 2022
## Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 24</td>
<td>Introduction to Biology of Coral Reefs</td>
</tr>
</tbody>
</table>
| Aug 31 | The tropical marine environment and climate: sun, sea, waves  
Fundamentals of oceanography, global ecology.  
Depth gradients of sunlight and wave action  
Reef morphology, distribution of reef systems  
Coral Reefs, John Wells, GSA Memoir 67  
*Climates on a Rotating Earth, Robert MacArthur*  
The biological control of chemical factors in the environment, *American Scientist, A.C. Redfield 1958*  
*Adjustment of Bikini Atoll to Ocean Waves, Munk and Sargent 1948*  
| Sep 7 | Coral Reef Ecological Zonation and Geological Constructional Processes.  
The Zonation of West Indian Gorgonians, Robert A. Kinzie, Bull Mar Sci 28(1)  
Deep Fore reef slope depositional processes, Goreau and Land,  
*Reefs in Time and Space, SEPM 1974 Special Pub #18.*  
Deep Forereef and Upper Island Slope, Lynton Land and Clyde More,  
Biological zonation at the base of the reef. Judith Lang,  
*Goldberg Chapters 1 and 2.* |
| Sep 14 | The Evolution of Coral Reefs through the Phanerozoic  
Clonal Growth, Algal Symbiosis, and Reef Formation by Corals, Coates, A.G. and Jackson, J.B.C.  
*Paleobiology, 13(4)363-378. 1987*  
*Modern Coral Reef Productivity*  
Primary Production of Reefs  
The concept of polytroph.  
Reef Corals: Mutualistic symbiosis, Muscatine and Porter, 1977 *Bioscience, 27:7*  
Barile Comments on Odum and Odum  
*Goldberg Chapter 13* |
| Sep 21 | Anthozoan corals: morphology, evolution, systematics, and identification Hermatypic corals I: Coral-algal symbiosis: nutrition, calcification, photobiology  
Henretta Hyman, *The Invertebrates* |
| Sep 28 | A special afternoon guest appearance with Dr Heather Spalding to hear about reef algae, the mesophotic, and her work in the Hawaiian Islands |
| Oct 5 | Hermatypic corals II: reproduction and settling  
The coral holobiont and genomics |
Oct 19  A special afternoon guest appearance with Craig Downs to hear about bleaching, biomarkers, and the toxicity of sunscreens.

Oct 26  Biodiversity: invertebrates and vertebrates.
Possible guest lecture
Goldberg Ch 14

Nov 2  Trophodynamics: Biomass, primary production and metabolism
Ecological dynamics: competition, predation, grazing
Possible guest lecture
Goldberg Chapter 12, HSS and Charles Birkland on fish

Nov 9  Natural and human disturbances weather, climate, and global change
Overharvesting and mass mortalities
Goldberg Chapter 15
Future of Coral Reefs, Knowlton, 2001 PNAS 98:10 pp 5419-5425

Nov 16  Natural and human impacts: physical damage, pollution, disease
Term papers due

Nov 23  Thanksgiving

Nov 30  Management of Coral Reefs
Goldberg Ch 16
Last Day of Class

Dec 7  Final Exam 3:30 OAKS
**Grading Rubric:**

<table>
<thead>
<tr>
<th></th>
<th>Excellent 4</th>
<th>Above Average 3</th>
<th>Average 2</th>
<th>Below Average 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question selection</strong></td>
<td>Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less explored aspects of the topic.</td>
<td>Identifies a focused and manageable/doable topic that appropriately addresses relevant aspects of the topic.</td>
<td>Identifies a topic that while manageable/doable, is too narrowly focused and leaves out relevant aspects of the topic.</td>
<td>Identifies a topic that is far too general and wide-ranging as to be manageable and doable.</td>
</tr>
<tr>
<td><strong>Existing knowledge, research, and/or views</strong></td>
<td>Synthesizes in depth information from relevant sources representing various points of view/approaches.</td>
<td>Presents in depth information from relevant sources representing various points of view/approaches.</td>
<td>Presents information from relevant sources representing limited points of view/approaches.</td>
<td>Presents information from irrelevant sources representing limited points of view/approaches.</td>
</tr>
<tr>
<td><strong>Methods</strong></td>
<td>All elements of the methodology or theoretical framework are skillfully developed.</td>
<td>Critical elements of the methodology or theoretical framework are appropriately developed however more subtle elements are ignored or unaccounted for.</td>
<td>Critical elements of the methodology or theoretical framework are missing, incorrectly developed or unfocused.</td>
<td>Inquiry design demonstrates a misunderstanding of the methodology or theoretical framework.</td>
</tr>
<tr>
<td><strong>Analysis</strong></td>
<td>Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.</td>
<td>Organizes evidence to reveal important patterns, differences, or similarities related to focus.</td>
<td>Organizes evidence but the organization is not effective in revealing important patterns, differences or similarities.</td>
<td>No apparent organization. Evidence is not used to support assertions.</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>The presentation is carefully organized and provides convincing evidence to support conclusions.</td>
<td>The presentation has a focus and provides some reasonable evidence to support conclusions.</td>
<td>There is some organization, but the speaker occasionally goes off topic. Evidence used to support conclusions is weak.</td>
<td>No apparent organization. Evidence is not used to support assertions.</td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td>The content is accurate and comprehensive. Listeners are likely to gain new insights about the topic. Clear and creative graphics</td>
<td>The content is generally accurate and reasonably complete. Listeners may develop a few insights about the topic. Interesting graphics</td>
<td>The content is sometimes inaccurate or incomplete. Listeners may learn some isolated facts, but they are unlikely to gain new insights about the topic. Acceptable graphics</td>
<td>The content is inaccurate or overly general. Listeners are unlikely to learn anything or may be misled. Poor graphics</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>The speaker is professional, relaxed, and comfortable and interacts effectively with listeners.</td>
<td>The speaker is generally relaxed and comfortable. Listeners are generally recognized and understood.</td>
<td>The speaker occasionally appears anxious or uncomfortable, and may occasionally read notes, rather than speak. Listeners are often ignored or misunderstood.</td>
<td>The speaker appears anxious and uncomfortable and reads notes, rather than speaks. Listeners are ignored.</td>
</tr>
</tbody>
</table>
Accommodations for Students with Disabilities:
This College abides by section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. If you have a documented disability that may have some impact on your work in this class and for which you may require accommodations, please see an administrator at the Center of Disability Services/SNAP, 843.953.1431 or me so that such accommodation may be arranged.

OAKS
OAKS, including Gradebook, will be used for this course throughout the semester to provide the syllabus and class materials.

Inclement Weather, Pandemic or Substantial Interruption of Instruction (3.8)
If in-person classes are suspended, faculty will announce to their students a detailed plan for a change in modality to ensure the continuity of learning. All students must have access to a computer equipped with a web camera, microphone, and Internet access. Resources are available to provide students with these essential tools.

Online Courses with Exam Proctoring
This course may use an exam proctoring service for the course exams. Students are responsible for registering, scheduling, and the cost of the service prior to each exam. Instructions and additional information on proctoring can be found at https://academicaffairs.cofc.edu/distance-education/online-proctoring/index.php.

Mental & Physical Wellbeing:
At the college, we take every student’s mental and physical wellbeing seriously. If you find yourself experiencing physical illnesses, please reach out to student health services (843.953.5520). And if you find yourself experiencing any mental health challenges (for example, anxiety, depression, stressful life events, sleep deprivation, and/or loneliness/homesickness) please consider contacting either the Counseling Center (professional counselors at http://counseling.cofc.edu or 843.953.5640 3rd Robert Scott Small Building) or the Students 4 Support (certified volunteers through texting "4support" to 839863, visit http://counseling.cofc.edu/cct/index.php, or meet with them in person 3rd Floor Stern Center). These services are there for you to help you cope with difficulties you may be experiencing and to maintain optimal physical and mental health.

Food & Housing Resources:
Many CofC students report experiencing food and housing insecurity. If you are facing challenges in securing food (such as not being able to afford groceries or get sufficient food to eat every day) and housing (such as lacking a safe and stable place to live), please contact the Dean of Students for support (http://studentaffairs.cofc.edu/about/salt.php). Also, you can go to http://studentaffairs.cofc.edu/student-food-housing-insecurity/index.php to learn about food and housing assistance that is available to you. In addition, there are several resources on and off campus to help. You can visit the Cougar Pantry in the Stern Center (2nd floor), a student-run food pantry that provides dry-goods and hygiene products at no charge to any student in need. Please also consider reaching out to Professor ABC if you are comfortable in doing so.

Inclusion:
The College of Charleston offers many resources for LGBTQ+ students, faculty and staff along with their allies.

- [Preferred Name and Pronoun Information](#)
- [On Campus Gender Inclusive facilities](#)
- [Campus Resources](#)
- [College of Charleston Reporting Portals](#)
- [National Resources for Faculty & Staff](#)
- [GSEC Reports](#)
- [Documenting LGBTQ Life in the Lowcountry](#) (CofC Addlestone Library Special Collections Project)
- [College of Charleston Quality Enhancement Plan (QEP)](#)
- [Articles about CofC and LGBTQ+ Issues](#)
Religious Accommodation for Students:

The College of Charleston community is enriched by students of many faiths that have various religious observances, practices, and beliefs. We value student rights and freedoms, including the right of each student to adhere to individual systems of religion. The College prohibits discrimination against any student because of such student’s religious belief or any absence thereof.

The College acknowledges that religious practices differ from tradition to tradition and that the demands of religious observances in some traditions may cause conflicts with student schedules. In affirming this diversity, like many other colleges and universities, the College supports the concept of “reasonable accommodation for religious observance” in regard to class attendance, and the scheduling of examinations and other academic work requirements, unless the accommodation would create an undue hardship on the College. Faculty are required, as part of their responsibility to students and the College, to ascribe to this policy and to ensure its fair and full implementation.

The accommodation request imposes responsibilities and obligations on both the individual requesting the accommodation and the College. Faculty members are expected to reasonably accommodate individual religious practices. Examples of reasonable accommodations for student absences might include: rescheduling of an exam or giving a make-up exam for the student in question; altering the time of a student’s presentation; allowing extra-credit assignments to substitute for missed class work or arranging for an increased flexibility in assignment dates. Regardless of any accommodation that may be granted, students are responsible for satisfying all academic objectives, requirements and prerequisites as defined by the instructor and by the College.

<table>
<thead>
<tr>
<th>2022 – 2023 Religious Holidays1 Date</th>
<th>Holiday</th>
<th>Religion</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 26 – October 4, 2022</td>
<td>Navratri</td>
<td>Hindu</td>
</tr>
<tr>
<td>September 26 – September 27, 2022</td>
<td>Rosh Hashanah2</td>
<td>Jewish</td>
</tr>
<tr>
<td>October 4 – October 5, 2022</td>
<td>Yom Kippur2</td>
<td>Jewish</td>
</tr>
<tr>
<td>October 10 – October 16, 2022</td>
<td>Sukkot2</td>
<td>Jewish</td>
</tr>
<tr>
<td>October 17 – October 18, 2022</td>
<td>Shemini Atzeret2</td>
<td>Jewish</td>
</tr>
<tr>
<td>October 24, 2022</td>
<td>Diwali</td>
<td>Hindu</td>
</tr>
<tr>
<td>February 22, 2023</td>
<td>Ash Wednesday (Beginning of Lent)</td>
<td>Christian</td>
</tr>
<tr>
<td>February 27, 2023</td>
<td>Eastern Orthodox (Beginning of Lent)</td>
<td>Orthodox Christian</td>
</tr>
<tr>
<td>March 21, 2023</td>
<td>Naw-Rúz</td>
<td>Baha’i</td>
</tr>
<tr>
<td>March 23 – April 20, 2023</td>
<td>Ramadan</td>
<td>Muslim</td>
</tr>
<tr>
<td>April 6 – April 13, 2023</td>
<td>Passover2</td>
<td>Jewish</td>
</tr>
<tr>
<td>April 7, 2023</td>
<td>Good Friday</td>
<td>Christian</td>
</tr>
<tr>
<td>April 14, 2023</td>
<td>Good Friday (Orthodox)3</td>
<td>Orthodox Christian</td>
</tr>
<tr>
<td>April 21 – 22, 2023</td>
<td>Eid al – Fitr</td>
<td>Islamic</td>
</tr>
</tbody>
</table>

The previously included Islamic holidays of Eid al-Adha and Eid al-Fitr fall outside the regular academic year and are therefore not listed here.

1 All Jewish holidays begin at sunset on the evening before the date given.
2 Orthodox Christian holidays begin at sunset on the evening before the date given.
SAFETY POLICY AND PROCEDURES

The School of Sciences and Mathematics of the College of Charleston understands that the safety of our students, staff and faculty is of paramount importance. Engendering a safety culture is an important part of our mission in teaching and doing science. Each department, course of instruction, or research lab may require higher standards or procedures. The policies and procedures set forth below are understood to be minimum requirements across our departments.

In this document, the term “laboratory” is meant for a work space/facility where chemicals, biological agents, or equipment is used for research and/or instruction.

No one (student, staff, faculty, or visitor) will be allowed in a laboratory (teaching or research) to perform experiments or where experiments may be in progress unless these regulations are followed.

Students dismissed from a teaching lab due to violations of the safety procedures will not be allowed to re-enter the laboratory until authorized to do so by their supervisor (instructor) and, in the case of research laboratories, by the department chair or designee. Any course work missed because of a violation of these guidelines cannot be made up at another time (or by an extension of the lab period) and will be treated as an unexcused absence.

1. You are responsible for knowing the biological, chemical, electrical, ergonomic, mechanical, and physical hazards associated with the equipment and materials that are being utilized in the laboratory. Listen to all instructions and ask questions about that which you do not understand.

2. Know the location of safety equipment: telephones, emergency shower, eyewash, fire extinguisher, fire alarm pull.

3. Know the appropriate emergency response procedures. If there is an injury or emergency, call 843-953-5611.

4. Do not work alone in the laboratory if you are working with hazardous materials or equipment.

5. Use hazardous chemicals, equipment, and biological agents only as directed and for their intended purpose.

6. Do not engage in horseplay, pranks or other acts of mischief while in lab.

7. Drinking, eating, and application of cosmetics is forbidden in laboratories where chemicals or biohazards are present. Smoking is forbidden in all College buildings.

8. Appropriate personal protective equipment shall be worn. The dress code for laboratory work when using chemicals, biological or physical hazards, or when instructed to do so by the laboratory supervisor is as follows: a) Wear safety glasses or goggles at all times. b) No exposed skin on arms, legs or torso. c) Wear lab coats or other approved protective garments. d) Wear gloves or other personal protective equipment (PPE) as directed by the instructor or mandated by prudent practices based on the chemicals being handled. If in doubt, wear appropriate gloves. Latex is not permitted. Avoid cross-contamination. e) Remove PPE (gloves and lab coat) when exiting the laboratory. f) Wash your hands, even if gloves were used, before leaving a lab where you did any lab work. g) Closed toe shoes are required. The heel and top of foot must be covered. High heeled shoes, sandals, and perforated shoes are not permitted. h) Confine long hair and loose clothing.

9. Inspect equipment or apparatus for damage before adding chemical reagents or biological samples or energizing electrical equipment. Do not use damaged equipment.

10. Never remove chemicals, biological samples, or laboratory equipment from a lab without proper authorization.

11. Presume that all chemicals and biological samples used in the laboratory are hazardous for you and the environment, unless instructed otherwise.

12. Never leave an experiment unattended unless proper safety precautions are in place.

13. Read all labels on chemicals twice before using them in the lab. Read all instructions twice for the operation of any equipment or machinery.

14. Properly and safely dispose of all waste materials.

15. Treat sharps and broken glassware containers carefully. a) Broken glass should be disposed of in properly marked safety containers. All sharps (needles, razor blades, etc.) used for any purpose must be disposed of in specially labeled SHARPS containers. b) Do not place contaminated glass in the broken glassware container. Consult your supervisor. c) Waste chemicals and contaminated PPE should be discarded as directed.

16. When using a reagent, replace the lid immediately. Never return unused reagents to stock bottles. Take only the amount needed for your experiment.

17. All chemicals and biological samples/media are to be disposed of in appropriately labeled containers. Specific instructions for each material will be provided. Pay attention to waste container labels before adding the material to be discarded.

18. Use good personal hygiene. Keep your hands and face clean. Wash hands thoroughly with soap and water after handling any chemical or biological agent.

19. Keep the work area clean and uncluttered with chemicals and equipment. Clean up the work area on completion of an operation or an experiment. Before leaving the laboratory, you are responsible for making sure your lab area is clean and organized.

20. Never store a chemical or biological specimen in an unlabeled container.

Always have your College of Charleston identification and insurance information with you when working in a laboratory. MedicAlert identification must be worn if you have any potential life-threatening chemical sensitivities or medical conditions.
Report any accident or injury, however minor, to your teaching assistant, instructor, or lab supervisor immediately. An accident report form must be completed and forwarded to the department chair, dean, and to the Director of Environmental Health and Safety.

If you have questions/concerns about safety in the lab please first consult your instructor. If these are not answered, please see the department chair. Finally, you may consult the director of Environmental Health and Safety, Randy Beaver at 3-6802 or beaverr@cofc.edu

Adopted: March 7, 2012

Release Form:

It is the policy of the College of Charleston that all students sign a liability waiver form in order to participate in field trips. Please sign and have two people witness your signature. Then hand it in today.

COLLEGE OF CHARLESTON

LIABILITY RELEASE, EMERGENCY MEDICAL AUTHORIZATION
AND AGREEMENT
(Domestic Travel)

1. I _______________ , the undersigned student desire to participate in the following activity/trip Biology of Coral Reefs-341 (“Activity”), to be held on __Fall 2022__ semester. I fully understand and appreciate the dangers, hazards, and risks inherent in the Activity, in the transportation to and from the Activity, and in any independent research or other endeavors I may undertake supplemental to the Activity. These dangers, hazards, and risks can result in injury and impairment to my body, general health and well being, and could include serious or even fatal injuries. I also understand that these dangers, hazards, and risk could include loss or damage to my personal property.

2. Knowing the dangers, hazards, and risks of such endeavors, and in consideration of being permitted to participate in the Activity, on behalf of myself, my family, spouse, heirs, and personal representative(s) (the “Releasors”), I agree to assume all the risks and responsibilities surrounding my participation in the Activity, the transportation to and from the Activity, and in any independent research or other acts undertaken as supplemental to the Activity, and on behalf of myself and the Releasors I hereby release, waive, forever discharge, and covenant not to sue the State of South Carolina, the College of Charleston, and its trustees, officers, agents, employees and any students acting as employees (“Releasors”), from and against any and all liability and for any harm, injury, damage, claims, demands, actions, causes of action, costs, and expenses of any nature that I may have or that may hereafter accrue to me or a Releasor, arising out of or related to any loss, damage, or injury, including but not limited to suffering and death, that may be sustained by me or by any property belonging to me, whether caused by the negligence or carelessness of the Releasors, or otherwise, while engaged in the Activity, any act supplemental to the Activity, or while I am in transit to or from the premises where the Activity or supplemental act occurs or is being conducted.

3. I further agree to indemnify and hold harmless the Releasors from and against any loss, liability, damage or cost, including court costs and attorneys’ fees that may arise due to my participation in the Activity.

It is my expressed intent that this LIABILITY RELEASE, EMERGENCY MEDICAL AUTHORIZATION. AND AGREEMENT (the “Agreement”) shall bind me, the members of my family and spouse, if I am alive, and my estate, family, heirs, administrators, personal representatives, or assigns, if I am deceased, and shall be deemed as a legally binding release, waiver, discharge and covenant not to sue the Releasors.

5. I understand, agree and hereby grant Releasors permission to authorize emergency medical treatment for me, if necessary, and that such action by Releasors shall be subject to the terms of this Agreement. I understand and agree that Releasors assume no responsibility for any injury or damage which might arise out of or in connection with such authorized emergency medical treatment.

6. By signing this Agreement, I acknowledge and represent that I have carefully read this Agreement and understand its contents and that I sign this document as my own free act and deed. I further state that I am at least eighteen (18) years of age and fully competent to sign this Agreement; and that I execute this Agreement for full, adequate, and complete consideration fully intending to be bound by the same. I further state that there are no health-related reasons or problems which preclude or restrict my participation in the Activity, and that I have adequate health insurance necessary to provide for and pay any medical costs that may arise as a result of an injury to me. I recognize that the College of Charleston (“College”) is not obligated to provide for any of my medical or medication needs or insurance and that I assume all risk and responsibility for those needs. If I am a driver and will be driving a vehicle (other than a College vehicle) during the period first stated above, I certify that I will, during such period, personally carry automobile liability insurance that includes medical payments coverage.
7. I further agree that this Agreement shall be construed in accordance with the laws of the State of South Carolina. If any term or provision of this Agreement shall be held illegal, unenforceable, or in conflict with any law governing this Agreement the validity of the remaining portions shall not be affected thereby.

8. If I am an employee of the College, I do not consider the Activity within the course and scope of my employment with the College. By signing below I also agree to comply with the College’s Student Code of Conduct and all other College regulations regarding conduct, comportment, and academic integrity during my participation in the Activity. I understand that the College has the right to enforce such standards of conduct and that I may be dismissed from the Activity at any time for failing to abide by such standards. In the event of such dismissal, I shall forfeit all my fees and other payments to the College that are associated with the Activity and I shall be responsible for the payment of my transportation expenses to return to Charleston, South Carolina.

THIS IS A LEGAL AGREEMENT AND INCLUDES A RELEASE OF LEGAL RIGHTS. READ AND BE CERTAIN YOU UNDERSTAND IT BEFORE SIGNING.

Signature: ___________________________ Date: __________

Print Name of Student: ____________________________________________________________

If under 18, this form must ALSO be signed by a parent or legal guardian before student can participate.

(Print) Parent or Guardian ___________________________ Signature ___________________________

_________________________ Date