

Syllabus

CODE: BIOL 207

TITLE: Marine Biology

DIVISION: Science/ Health Sciences

DEPARTMENT: Biology

COURSE DESCRIPTION: This course is designed for the student majoring in biology, marine studies or ecology. Through classroom and laboratory experiences, the student will be able to identify the environmental parameters of marine habitats and their effect on the distribution of marine flora and fauna. Students will collect and identify numerous representatives of local marine forms, both in the laboratory and in field settings. The student will also demonstrate proficiency in the utilization of various types of equipment used to complete such tasks, and demonstrate knowledge of the anatomy, physiology and behavior of marine organisms.

PREREQUISITE: A grade of "C" or higher in BIOL 102 or ENVR 111.

COREQUISITES:

CREDITS: 4

LECTURE CREDITS: 3

LAB/STUDIO CREDITS:

LAB/STUDIO HOURS: 3

REQUIRED MATERIALS:

Marine Biology; Peter Castro and Michael E. Huber.
Eleventh Edition, 2019
McGraw-Hill Publishing Company, Inc.

ADDITIONAL TIME REQUIREMENTS:

Additional weekly lab time may be required to practice lab skills or complete laboratory exercises.

COURSE LEARNING OUTCOMES:

- Identify the characteristics of marine environments and their influences on marine plant and animal populations.
- Identify various marine and animal species.
- Use appropriate collecting technology and techniques.
- Demonstrate comprehension of the anatomy, physiology and behavior of various marine organisms.

COURSE CONTENT:

Unit One: Introduction to Marine Biology & Physical and Chemical aspects of Marine Environments
Unit Two: Marine Life
Unit Three: Marine Ecosystems
Unit Four: Human use of the Marine Environment and Anthropogenic Impacts

Syllabus

GRADING STANDARD:

A student must have an average of 65% or higher for the classroom component and an average of 65% or higher for the laboratory component of the course in order to earn a passing grade for the course.

Upon completion of the course, grades will be assigned as follows:

A	=	92 - 100%
A-	=	89 - 91%
B+	=	86 - 88%
B	=	82 - 85%
B-	=	79 - 81%
C+	=	76 - 78%
C	=	70 - 75%
D	=	65 - 69%
F	=	<65%

Unit examination results will be reported as the grade assigned by the faculty calculated to the first decimal place. These grades will be weighed according to course grading policy. In calculating the course grade, 0.5 will round up to the next numerical grade and 0.4 will round down to the next lower numerical grade.

A grade of C or higher is required in all pre-requisite courses. Career studies courses must have a grade of C or higher to count toward the Mathematics / Science Program – Biology Option.

Students are permitted to withdraw from the course without penalty until approximately 80% of the semester is complete. Please see term schedule for the exact deadline.

At the end of the semester, application for an Incomplete may be made if a student with proper documentation needs to complete no more than one lecture exam and/or one laboratory practical. The granting of an Incomplete is at the discretion of the instructor.

(Please see Instructor's syllabus for additional Grading Policies.)

DEPARTMENT POLICIES:

Attendance during class and laboratory sessions is strongly recommended for optimum performance in biology courses.

Lecture exams will be given in class or in the Testing Center, depending on instructor preference.

Laboratory practicals will be given during laboratory sessions, in accordance with schedules provided by the learning assistants.

Exams and practicals must be taken at the times designated by the instructor or learning assistant. A student who misses a lecture exam or laboratory practical must provide prior notification and proper documentation in order to take the exam or laboratory practical. The acceptance of said prior notification and proper documentation will be determined by the instructor.

Documentation must be provided within one week of the student's return to the classroom for a make-up exam or laboratory practical to be scheduled. A student who is unable to provide proper documentation for a missed exam or laboratory practical will be given a grade of zero for that exercise. Students may not re-take exams or laboratory practicals on which they perform poorly.

Requirements for the completion of laboratory are listed in the laboratory responsibility sheets for individual courses. Requirements for course completion are listed in individual instructor syllabi.

COLLEGE POLICIES:

As an academic institution, Brookdale facilitates the free exchange of ideas, upholds the virtues of civil discourse, and honors diverse perspectives informed by credible sources. Our College values all students and strives for inclusion and safety regardless of a student's disability, age, sex, gender identity, sexual orientation, race, ethnicity, country of origin, immigration status, religious affiliation, political orientation, socioeconomic standing, and veteran status. For additional information, support services, and engagement opportunities, please visit www.brookdalecc.edu/support/

For information regarding:

- ◆ Brookdale's Academic Integrity Code
- ◆ Student Conduct Code
- ◆ Student Grade Appeal Process

Please refer to the **STUDENT HANDBOOK AND BCC CATALOG.**

Syllabus

NOTIFICATION FOR STUDENTS WITH DISABILITIES:

Brookdale Community College offers reasonable accommodations and/or services to persons with disabilities. Students with disabilities who wish to self-identify, must contact the Disabilities Services Office at 732-224-2730 or 732-842-4211 (TTY), provide appropriate documentation of the disability, and request specific accommodations or services. If a student qualifies, reasonable accommodations and/or services, which are appropriate for the college level and are recommended in the documentation, can be approved.

ADDITIONAL SUPPORT/LABS:

Students enrolled in BIOL 207 have access to the Science Computer Laboratory (MAS 019) and the Independent Study Laboratory (MAS 041).

MENTAL HEALTH:

- Mental Health Crisis Support: From a campus phone, dial 5555 or 732-224-2329 from an external line; off-hours calls will be forwarded to BCC police (2222 from a campus phone)
- Psychological Counseling Services: 732-224-2986 (to schedule an appointment during regular hours)

Course Website:

Biology Department information and BIOL 207 resources are available on the Brookdale website:

<http://www.brookdalecc.edu/pages/802.asp>

Syllabus

BIOL 207
Course #

Marine Biology
Title

1 of 4 Units

4
Credits

Name of Unit: **Introduction to Marine Biology & Physical and Chemical aspects of Marine Environments**

Unit Objective: The student will demonstrate understanding of basic concepts involved in marine biology while focusing on the physical and chemical features of marine ecosystems.

Textbook: MARINE BIOLOGY by Castro et.al., - 8th edition - Chapters 1, 2, 3, 4, 10

Method of Evaluation: Unit Exam and Laboratory Practical

Estimated Time To Achieve: Three Weeks

Learning Objectives

Recommended Learning Experiences

The Student Will Be Able To:

Learning Objectives	Recommended Learning Experiences
1. Discuss the history of marine biology as a science.	Class Discussion Textbook Readings: Pages: 1-8
2. Describe the steps of the scientific method and its use in marine biology.	8-15
3. Describe the geography of ocean basins.	18-20
4. Discuss the origin and formation of ocean basins including aspects of continental drift and plate tectonics	21-32
5. Describe the geological provinces of the ocean including continental margins, deep ocean basins, the mid ocean ridge and hydrothermal vents.	32-38
6. Discuss the unique properties of water concentrating on the differences between pure water versus salt water.	40-48
7. Examine ocean circulation focusing on the impact of the Coriolis effect, wind patterns and surface currents	48-52
8. Discuss thermohaline circulation and the great ocean conveyor.	52-55
9. Discuss the role and formation of waves and tides in marine systems.	55-62
10. Discuss the role of carbohydrates, proteins, lipids and nucleic acids in living organisms.	65-66
11. Examine the role of ATP in living organisms and discuss the importance of both photosynthesis and cellular respiration to life.	66-68
12. Discuss the structural differences of prokaryotic and eukaryotic cells.	69-70
13. Discuss the levels of organization within biological systems.	70-71
14. Examine the challenges of living in marine environments focusing on the aspects of salinity, temperature and surface to volume ratio.	71-76

Syllabus

- | | |
|---|---------|
| 15. Discuss modes of reproduction and reproductive strategies. | 76-78 |
| 16. Discuss the concept of natural selection and the importance of adaptation. | 79 |
| 17. Describe mechanisms used in classifying living organisms while focusing on the biological species concept, binomial nomenclature and phylogenetics. | 78-83 |
| 18. Discuss the factors that contribute to population growth and differentiate between exponential and logistic growth. | 212-213 |
| 19. Describe ways in which species interact within a community: competition, predation, symbiosis, etc. | 213-219 |
| 20. Discuss zonation of marine environments. | 220-221 |
| 21. Describe levels of trophic structure within a community and discuss how energy and nutrients cycle through an ecosystem. | 221-226 |
| 22. Discuss the biogeochemical and nutrient cycles for carbon, nitrogen and phosphorus. | 226-229 |
| 23. Successfully complete assigned laboratory experiences. | |

Syllabus

9. Describe and differentiate between the numerous species of marine invertebrate animals concentrating on select species and their unique characteristics.

Sponges	116-118
Cnidarians	118-122
Ctenophores	122-123
Flatworms	123
Ribbon Worms	123-124
Nematodes	124-125
Segmented Worms	
-Polychaetes	125-127
-Oligochaetes	127
-Leeches	127
Peanut Worms	127
Mollusks	127-134
-Gastropods	120-130
-Bivalves	130
-Cephalopods	130-132
-Other Mollusks	132-133
Arthropods	134-140
-Crustaceans	134-138
-Other Marine Arthropods (Horseshoe crabs, Sea spiders and Insects)	138-140
Lophophorates	140
Arrow Worms	140-141
Echinoderms	141-145
-Sea stars	141
-Brittle stars	141
-Sea urchins and sand dollars	141-143
-Sea cucumbers	144
-Crinoids	144
Hemichordates	145
Invertebrate Chordates	145-147
-Urochordates	145-146
-Cephalochordates	147

10. Describe and differentiate between the numerous species of marine fishes concentrating on select species and their unique characteristics.

Jawless Fishes	153
----------------	-----

Syllabus

Cartilaginous Fishes	153-156
Bony Fishes	156-158
11. Discuss the biology of fishes.	
Body Shape	158
Coloration	158-159
Locomotion	159-160
Feeding	160-161
Digestion	161-162
Circulation	162
Respiration	162-164
Regulation	164
Nervous system and sensory organs	164-167
Behavior	167-170
Reproduction and Development	170-175
12. Describe and differentiate between the numerous species of marine reptiles, birds and mammals concentrating on select species and their unique characteristics.	
Sea turtles	179-180
Sea snakes	181
Other marine reptiles	181-182
Seabirds	
-Penguins	182-183
-Tubenoses	183
-Pelicans	184
-Gulls	184
-Shorebirds	185
Seals, Sea Lions and the Walrus	185-186
Sea Otters and Polar Bears	187
Manatees and Dugongs	187-188
Whales, Dolphins and Porpoises	188-197
13. Discuss the biology of marine mammals including swimming, diving, echolocation, behavior and reproduction.	197-208
14. Successfully complete assigned laboratory experiences.	

Syllabus

BIOL 207
Course #

Marine Biology
Title

3 of 4 Units

4
Credits

Name of Unit: **Marine Ecosystems**

Unit Objective: The student will discuss abiotic and biotic features of the numerous marine ecosystems.

Textbook: MARINE BIOLOGY by Castro et.al., - 8th edition – Chapters 11, 12, 13, 14, 15, 16

Method of Evaluation: Unit Exam and Laboratory Practical

Estimated Time To Achieve: Three Weeks

Behavioral Objectives

Recommended Learning Experiences

The Student Will Be Able To:

Class Discussion
Textbook Readings:
Pages:

- | | |
|--|---------|
| 1. Describe the characteristics and identify the inhabitants of rocky shore intertidal communities | 245 |
| 2. Discuss the aspect of low tide on species in rocky shore intertidal zones. | 245 |
| 3. Discuss preemptive competition amongst species in rocky shore intertidal zones. | 251 |
| 4. Described vertical zonation of rocky shores. | 253-260 |
| 5. Discuss the characteristics and identify the inhabitants of soft bottom intertidal communities. | 261-265 |
| 6. Discuss the origin and types of estuaries. | 268-269 |
| 7. Discuss the physical characteristics of estuaries including salinity, substrate, as well as other physical factors. | 270-271 |
| 8. Describe the types of estuarine communities and discuss the feeding interactions among estuarine organisms. | 273-283 |
| 9. Describe the physical characteristics of the continental shelf. | 287 |
| 10. Describe the difference between soft-bottom and hard-bottom subtidal communities. | 288-298 |
| 11. Identify the organisms responsible for building coral reefs. | 307-315 |
| 12. Distinguish amongst the different types of coral reefs including fringing reefs, barrier reefs and atolls. | 316-321 |
| 13. Discuss the ecology of coral reefs including trophic structure. | 322-325 |
| 14. Identify and differentiate between species of phytoplankton, zooplankton and nekton inhabiting surface ocean waters. | 332-340 |

Syllabus

15. Discuss the difficulties in living in the epipelagic zone.	341-347
16. Discuss the detailed nature epipelagic food webs.	
-Trophic levels and energy flow.	348-349
-The Microbial loop.	349-350
-Patterns of Production.	350-357
-The El Niño-Southern Oscillation	357-358
17. Describe the physical characteristics of the twilight worlds and discuss the unique adaptations of animals living there.	361-370
18. Discuss the difficulties in living in perpetual darkness.	371-374
19. Describe the physical characteristics of the deep ocean floor and discuss the unique adaptations of animals living there.	374-378
20. Differentiate between hot springs, cold seeps and dead bodies.	379-381
21. Successfully complete assigned laboratory experiences.	Laboratory

