Description: This course provides an introduction to marine organisms and the physical and biological processes that affect them. The course begins with an investigation into the geologic processes behind the formation of ocean basins, the causes and maintenance of currents and ocean circulation, and the physical factors influencing primary productivity in marine environments. The course then transitions into an exploration of various marine organisms, as well as the physiological adaptations these organisms have to the marine environment. Overall, the emphasis of lecture material is on the physical factors behind the formation and maintenance of marine ecosystems, and the complex biological interactions therein.

Instructor: Collin H. Johnson, cjohnson@oeb.harvard.edu
Museum of Comparative Zoology – Labs Rm. 515

Lectures: Thurs. 7:40 – 9:40 pm
Location TBD

Required readings: There is no textbook. All required readings will be available online.

Requirements*:  
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<tbody>
<tr>
<td>First Examination</td>
<td>40 (35)</td>
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<tr>
<td>Second Examination</td>
<td>40 (35)</td>
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<tr>
<td>Written assignment</td>
<td>20 (15)</td>
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<td>Graduate credit assignment</td>
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<td>Total</td>
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*numbers in parentheses are point totals if course is taken for graduate credit

Prerequisites: None, although completion of a college-level biology course is recommended.

Grading: This course is graded on a normalized absolute scale and not on a curve. This means of evaluating performance is intended to discourage competition and to encourage cooperative learning. Graded assignments consist of two examinations and a written assignment. The written assignment will be 4-5 pages in length, double-spaced with 12-point font and standard margins. If the course is taken for graduate credit, an additional 5-7 page paper will be required. Late assignments will be penalized to be fair to students who turn assignments in on time.

Academic integrity: You are responsible for understanding Harvard Extension School policies on academic integrity (www.extension.harvard.edu/resources-policies/student-conduct/academic-integrity) and how to use sources responsibly. Not knowing the rules, misunderstanding the rules, running out of time, submitting "the wrong draft", or being overwhelmed with multiple demands are not acceptable excuses. There are no excuses for failure to uphold academic integrity. To support your learning about academic citation rules, please visit the Harvard Extension School Tips to Avoid Plagiarism (www.extension.harvard.edu/resources-policies/resources/tips-avoid-plagiarism), where you’ll find links to the Harvard Guide to Using Sources and two, free, online 15-minute tutorials to test your knowledge of academic citation policy. The tutorials are anonymous open-learning tools.
Disability services: The Extension School is committed to providing an accessible academic community. The Disability Services Office offers a variety of accommodations and services to students with documented disabilities. Please visit [www.extension.harvard.edu/resources-policies/resources/disability-services-accessibility](http://www.extension.harvard.edu/resources-policies/resources/disability-services-accessibility) for more information.

**Lecture schedule**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Sep 3</td>
<td>Introduction and ocean basin formation</td>
</tr>
<tr>
<td>Sep 10</td>
<td>Seawater chemistry and ocean circulation</td>
</tr>
<tr>
<td>Sep 17</td>
<td>Water column and primary productivity</td>
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<tr>
<td>Sep 24</td>
<td>Nutrient cycling</td>
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<tr>
<td>Oct 1</td>
<td>Modes and patterns of reproduction and sex determination</td>
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<tr>
<td>Oct 8</td>
<td>Adaptations for living in marine ecosystems (osmoregulation experiment)</td>
</tr>
<tr>
<td>Oct 15</td>
<td>First Examination</td>
</tr>
<tr>
<td>Oct 22</td>
<td>Speciation and introduction to marine invertebrates</td>
</tr>
<tr>
<td>Oct 29</td>
<td>Introduction to marine fishes</td>
</tr>
<tr>
<td>Nov 5</td>
<td>Introduction to marine reptiles and mammals</td>
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<tr>
<td>Nov 12</td>
<td>Polar ecosystems and kelp forests</td>
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<tr>
<td>Nov 19</td>
<td>Coral reefs</td>
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<tr>
<td>Nov 26</td>
<td>Thanksgiving recess</td>
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<tr>
<td>Dec 3</td>
<td>Invasive species and marine extinctions</td>
</tr>
<tr>
<td>Dec 10</td>
<td>Human impacts on marine ecosystems</td>
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<tr>
<td>Dec 17</td>
<td>Second Examination</td>
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</tbody>
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Reading schedule

(readings are subject to change)

Sep 3  
Introduction and ocean basin formation
Plate tectonics - http://www.ucmp.berkeley.edu/geology/tectonics.html

Sep 10  
Seawater chemistry and ocean circulation

Sep 17  
Water column and primary productivity

Sep 24  
Nutrient cycling

Oct 1  
Modes and patterns of reproduction and sex determination

Oct 8  
Adaptations for living in marine ecosystems
Willmer (2006). Osmoregulation in Invertebrates. eLS.
Oct 15  **First examination**

Oct 22  Introduction to marine invertebrates and intertidal ecology

Oct 29  Marine fishes

Nov 5  Marine reptiles and mammals

Nov 12  Polar ecosystems and kelp forests
Nov 19  Coral reefs

Nov 26  Thanksgiving recess

Dec 3  Marine extinctions and invasive species

Dec 10  Human impacts on marine ecosystems

Dec 17  Second Examination