American University of Beirut  
Faculty of Arts and Sciences  
Department of Biology  
BIOLOGY 252  
ECOLOGY  
Fall 2012-2013

Instructor: R.A. Sadek  
Prerequisite: Biology 202

Catalog Description
BIOL 252 – Ecology: 4.00, 3.3; 4 cr. Prerequisite: BIOL 202 or LDEM 209. Each semester. This course deals with ecological concepts and processes at all levels of ecological organization namely adaptations, population structure, growth, dynamics and regulation, population interactions, food chains, energy flow, cycling of nutrients, species diversity, succession and biomes in addition to landscape, geographic and global ecology. Prerequisite: BIOL 202.

Course Learning Outcomes
At the end of the semester, the students should be able to:

1. Understand and use proper common ecological notations (PLO 2).
2. Understand physical environmental factors including climate and soil (PLO 2 and 8)
3. Understand the concept of adaptation in addition to morphological, physiological, behavioral and phenological adaptations of various organisms to environmental factors (PLO 3).
4. Understand and recount various positive and negative interactions between population (PLO 3)
5. Describe food webs, flow of energy and cycling of nutrients in ecosystems.
6. Integrate information and concepts from different levels of ecological organization (PLO 3)
7. Understand the ecological basis of various environmental problems and issues (PLO 3, 7 and 8)
8. Understand and describe population structure, growth and dynamics (PLO 3)
9. Understand and apply basic ecological sampling and data analysis procedures (PLO 5)
10. Become acquainted with some local terrestrial, freshwater and marine ecosystems and their fauna and flora and some methods for their sampling (PLO 3).
11. Acquire some skills in writing reports that analyze data and discuss results (PLO 5 and 7).

Resources Available to Students:

Textbook:
2. Various learning material, and lab handouts etc. on the AUB Moodle website. This includes lectures, lab handouts and visual material for some lab sessions.
3. Links to some important sites dealing with ecological topics.
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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>2</td>
<td>Life on Land: climate diagrams; Soil, Terrestrial biomes</td>
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<tr>
<td>3</td>
<td>Life in Water: Hydrologic cycle, Oceans, Estuaries, mangroves, salt marshes, Freshwater ecosystems: Rivers, streams and lakes.</td>
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<td>4</td>
<td>Population Genetics and Natural Selection</td>
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<td>5</td>
<td>Temperature Relations</td>
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<td>6</td>
<td>Water Relations; Energy and Nutrient Relations</td>
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<td>7</td>
<td>Social Relations; Population Distribution and Abundance</td>
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<td>8</td>
<td>Population Dynamics; Population Growth; Life Histories;</td>
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<td>9</td>
<td>Competition</td>
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<td>10</td>
<td>Exploitation: Predation, Herbivory, Parasitism, and Disease; Mutualism</td>
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<td>11</td>
<td>Species Abundance and Diversity; Species Interactions and Community Structure</td>
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<td>12</td>
<td>Primary Production and Energy Flow; Nutrient Cycling and Retention</td>
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<td>13</td>
<td>Succession and Stability; Landscape Ecology</td>
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<td>14</td>
<td>Geographic Ecology+ Global Ecology</td>
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**Evaluation Criteria**

<table>
<thead>
<tr>
<th>Quiz</th>
<th>18%</th>
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<tbody>
<tr>
<td>Quiz</td>
<td>18%</td>
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<tr>
<td>Lab. work, reports and drop quizzes</td>
<td>10%</td>
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<td>Lab. Final exam</td>
<td>12%</td>
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<td>Final exam</td>
<td>38%</td>
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<tr>
<td>General assessment</td>
<td>4%</td>
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**Schedule**

**Per week:** 3 lectures, MWF 9:00- 9:50am, One lab session
LABORATORY SYLLABUS

N.B. The sequence of lab sessions differs between spring and fall semesters. The field trips are done in the early parts of the Fall semester while they are done in the latter part of the spring semester.

- Population sampling:
  - species-area curve.
  - Density estimates using quadrats.
  - Evaluation of species importance; species dominance.
  - Comparison of populations;
  - species association.
  - Plotless methods

- Detection of pattern:
  - nearest neighbor method
  - comparison with the Poisson Distribution.
    - Chi-square method.
    - Variance/mean ratio method.

- Estimating the size of animal populations:
  - Mark-release-recapture method.
  - Removal method.

- Field trip to Arz Al-Shouf Nature Reserve:
  - Mapping, Global Positioning System.
  - Meteorological measurements.
  - Estimating Cedar tree density and population structure.
  - Soils: collection of quantitative soil samples and litter from various locations.
  - Soil fauna.
  - Ecological effects of altitude and slope.

- Field trip to Ammiq Marshes or another aquatic ecosystem.
  - Freshwater fauna and flora.
  - Freshwater Physicochemical Measurements

- Population dynamics:
  - Life tables and Survivorship curves
  - Population growth

Course Policy
Attendance will be taken regularly. Excessive absenteeism from lectures or labs may affect the general assessment and eventually subject the student to being dropped from the course.

Absence from exams is only justified by a valid excuse.