COURSE SYLLABUS – BIO 363 Ecology

(Fall 2023)

Instructor: Levent Ozturk (Lozturk@sabanciuniv.edu)

TA1: Sezgi Kaya sbiyiklioglu@sabanciuniv.edu

TA2: Gökçe Uyanık gokceuyanik@sabanciuniv.edu

Office & Hours: Any time by appointment.

Teaching Mode: In-class

Lecture Sessions: Tuesday, 2:40 pm - 4:30 pm FENS L055; Friday, 8:40 pm - 9:30 pm FENS L061

Textbook, on-line resources, instructor slides, and other course materials:


   Purchase your “access card” or “access card + hardcopy book” bundle as soon as possible to enroll, access e-text, on-line content and in-session quizzes!

2. Pearson web site to enroll: https://mlm.pearson.com/enrollment/ozturk46948

3. Instructor slides: will be available on SUcourse+ (restricted for redistribution, subject to international copyrights).

4. Smart phone with internet connection for in-session quizzes.

5. Laptop computer with internet connection and full battery charge for mid-term and final exams.

Course Description:

This course is designed to introduce the science of ecology in a comprehensive manner. The concept of “adaptation through natural selection” is used to link diverse patterns and processes in terrestrial and aquatic systems across hierarchical levels (i.e., individual, population, community, ecosystem). The course starts with an introduction of ecology as an interdisciplinary science. The content is delivered in five main sections. Section one describes major physical constraints imposed on organisms living in aquatic and terrestrial environments. Section two explains how these physical constraints lead to adaptation and natural selection with a highlight on autotroph and heterotroph organisms. The third section explores properties and dynamics of populations as a function of evolution, natural selection, and life history. Section four discusses “intraspecies” and “interspecies” interactions as affected by the physical environment, natural selection, and population dynamics. The final section explores “ecological communities” and the factors affecting distribution and abundance of species across temporal and spatial environmental gradients. Ecological communities and their interactions with their physical environment will be explained by the “ecosystem” concept with an emphasis on energy and nutrient flow through these systems. Communities and ecosystems will be finally discussed on the level of biogeography to explore broad-scale distribution of terrestrial and aquatic ecosystems, and the biological diversity therein under the influence of past, current, and projected climate change due to human activities.
Grading Policy (% overall impact):

Attendance to lecture sessions (15%) – Missing >10 min of a session will be regarded as absence (student presentation sessions have a separate attendance policy, see below).

Homework (15%) – There will be four homework assignments throughout the term.

Quizzes (15%) – A short on-line quiz will be given at the beginning of each lecture session.

Presentation (15%) – (see “Student Presentation Rules and Schedule” below)

Mid-term Exam (15) – Online exam composed of randomized essay, fill-in-the-blanks, and multiple-choice type questions

Final Exam (25%) – Online exam composed of randomized essay, fill-in-the-blanks, and multiple-choice type questions

Make-up Policy:

Missing the in-session quizzes, not making the assigned chapter presentation, and missing the final exam all result in a zero grade for that specific grading item. Quizzes have no make-ups since they also account for attendance. No scheduled make-up exam will be offered for a missed final exam. In case a student misses the final exam due to an emergency with a valid excuse (e.g., written proof of doctor’s report, accident report, etc.) the instructor and TA must be informed within the same week. In such a case, a separate final exam (in a structured full essay format) will be given at a time and date determined by the instructor.

Policies on Attendance, Classroom Behavior and Cheating:

Attendance (online or in-person) is essential for understanding and interpreting the course material and asking questions to the instructor. Attendance will be imposed by “in-session quizzes” given within at the first 5 minutes of each session. Student presentation sessions have a distinct attendance policy (see “Student Presentation Rules and Schedule” below).

In case of absence, it is the student’s responsibility to check the syllabus, retrieve the associated course materials from on-line resources (listed above) and discuss the missed sections with classmates. While it may not be possible to present all information in the course textbook in a fully detailed manner within the allocated lecture sessions, students will be responsible from all course slides, reading all assigned chapters and any other material presented during lectures (excluding the parts out of context as declared by the instructor).

Sabanci University’s regulations on plagiarism and cheating will be strictly enforced on students who help, attempt or conduct any form of cheating.
**WEEKLY SCHEDULE OF COURSE ACTIVITIES, ASSIGNMENTS & EXAMS**

**Important Note:** The textbook chapters must be read before each session to answer in-session quiz questions.

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
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| 1    | Chapter 1 Nature of Ecology  
- The Science of Ecology  
- Hierarchical structure from individual organisms to the biosphere  
- Ecosystems and ecological studies  
- Scientific methodology, models, uncertainty  
- Ecology as an interdisciplinary science  
  Video showcase  
  Session quiz |
| 2    | Chapter 2 Climate  
- Net radiation, seasonal variation  
- Atmospheric circulation and ocean currents  
- Atmospheric moisture, precipitation, continentality, topography  
- Microclimates and ecosystems  
- Climate warming: Ecological issues & applications  
  Video showcase  
  Session quiz |
| 3    | Chapter 3 The Aquatic Environment  
- The water cycle  
- Unique properties of water  
- Variation in light, temperature, and oxygen in aquatic environments  
- Water movement, tides, and estuaries  
- Rising atmospheric carbon dioxide, ocean acidification and biodiversity  
  Video showcase  
  Session quiz  
  **Homework assignment-I** |
| 4    | Chapter 4 The Terrestrial Environment  
- Evolution of life on land  
- The struggle for light  
- Formation and characteristics of soils  
- Soils interact with the environment  
- Land degradation: An ecological issue  
  Video showcase  
  Session quiz |
| 5    | Chapter 5 Adaptation and Natural Selection  
- Adaptation: A product of natural selection  
- Genes: Units of heredity  
- Phenotype and phenotypic plasticity  
- Genetic Variation  
- Natural Selection  
- Genetic engineering  
  Session quiz |
| 6    | Chapter 6 Plant Adaptations to the Environment  
- Photosynthesis and respiration  
- Water Movement  
- Aquatic plants  
- Interdependence of plant adaptations  
- Plant adaptations to light, temperature, nutrient availability  
- Trade-off between growth and tolerance  
- Plant response to elevated $\text{CO}_2$  
  Session quiz  
  **Homework assignment-II** |
### Chapter 7: Animal Adaptations to the Environment
- Body size
- Acquisition of energy and nutrients
- Oxygen uptake, water balance, energy exchange
- Thermal regulation and balance
- Habitat

**Video showcase**

### Chapter 8: Properties of Populations
- Unitary and modular organisms
- Distribution, abundance, population dynamics

### Chapter 9: Population Growth
- Types of life tables
- Mortality, survivorship, birthrate, net reproductive rate
- Habitat loss and extinction

### Chapter 10: Life History
- Forms of sexual reproduction
- Age at maturity, reproductive effort
- Life history strategies

### Chapter 11: Intraspecific Population Regulation
- Logistics of population growth
- Competition and territoriality
- Density, stress and dispersal

*Homework assignment - III*

### Chapter 12: Species Interactions, Population Dynamics, and Natural Selection
- Classification of species interactions
- Population dynamics, and natural selection

### Chapter 13: Interspecific Competition
- Competition model
- Nonresource factors
- Resource partitioning

*Homework assignment - IV*

### Chapter 14: Predation
- Forms and models
- Foraging and herbivory
- Coevolution of predator and prey

### Chapter 15: Parasitism and Mutualism
- Characteristics of parasitism and mutualism
- Parasite-host relationships
- Mutualistic interactions

*Homework assignment - IV*

### Chapter 16: Community Structure

### Chapter 17: Factors Influencing the Structure of Communities

### Chapter 18: Community Dynamics

### Chapter 19: Landscape Dynamics

*weeks of student presentation sessions*
Student Presentation Rules and Schedule

1. Student presentations will be delivered during weeks 12 through 14 during the course hours (see schedule below) on Zoom via the screen share function on a live session. The full session will be recorded to use in grading and as a proof of attendance.

<table>
<thead>
<tr>
<th>Week of Term</th>
<th>Chapters</th>
<th>Presenting Students (*TBA) (two for each chapter)</th>
<th>Date and time</th>
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<td>12</td>
<td>Chapter 16 Community Structure</td>
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<td>Chapter 19 Landscape Dynamics</td>
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<td>Chapter 20 Ecosystem Energetics</td>
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<td>Chapter 21 Decomposition and Nutrient Cycling</td>
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<td>Chapter 22 Biogeochemical Cycles</td>
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<td>Chapter 23 Terrestrial Ecosystems</td>
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<td>Chapter 24 Aquatic Ecosystems</td>
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<td>14</td>
<td>Chapter 25 Coastal and Wetland Ecosystems</td>
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<td>14</td>
<td>Chapter 26 Large-Scale Patterns of Biological Diversity</td>
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<td>14</td>
<td>Chapter 27 The Ecology of Climate Change</td>
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*to be announced
2. During the student presentation sessions, full time attendance is required (missing >10 min of a session will be regarded as absence). You may miss only one student presentation without a penalty, however if you miss more than one, then your final grade will be reduced by one letter grade (i.e., A to A-). In case a student misses a presentation session due to an emergency with a valid excuse (e.g., a written proof of doctor’s report, accident report, etc.) the instructor and TA must be informed within the same week.

3. Although your textbook is the main source to build up your PowerPoint presentation, you are welcome to research other resources from the IC (https://www.sabanciuniv.edu/bm/en) and the internet to design and enrich your presentation.

4. Students assigned to a chapter are responsible for sharing the chapter content (i.e., sub-topics within a chapter) among themselves.

5. Having learned your presentation chapter and shared the sub-topics with your presentation partner, you should then prepare your slides (e.g., 10-15 slides) to cover a 15-minute (± 2 min) presentation. Your last slide must have a very important/relevant essay question and the corresponding short answer. Note that the quality of your question will be evaluated and included in the grading rubric for your presentation. Accordingly, your question may appear on the final exam (with or without modifications). Trivial questions that offer no professional insight or educational value will not be considered for the final exam.

6. Your presentation will be evaluated according to the criteria below (in order of priority), and your presentation grade will have an impact of 15% on your final letter grade as stated in the syllabus published in SUcourse+.

   - A comprehensive coverage of the chapter sub-topics assigned
   - Use of language, grammar, typeset, units of measurement
   - Visual quality of the presentation material (titles, bullets, tables, font size, figures, tables, photos, slide numbers, etc.)
   - Time management (15 ± 2 min)
   - Voice modulation, use of body language, eye contact, interactive strategies
   - Question quality (last slide!)

7. Presentations must be uploaded to SUcourse+ as a single “.pptx” file before the presentation day.