Miyazaki International College

Course Syllabus

FALL 2021

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| Course Title ( Credits ) | **GSC 102 Introduction to Natural/Life Science 3 credits** |
| Course Designation for TC | N/A |
| Content Teacher | |
| Instructor | Melody Muguerza, Ph.D. |
| E-mail address | melody.muguerza@gmail.com |
| Office/Ext |  |
| Office hours |  |
| Language Teacher | |
| Instructor | Jason Adachi |
| E-mail address | jadachi@sky.miyazaki-mic.ac.jp |
| Office/Ext | MIC 2-205 ext. 3782 |
| Office hours | Tuesday & Thursday 2:40 – 16:10 |

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| Course Description: | | |
| Introduces concepts, experimental techniques, and scientific methodologies for exploring a natural life system. Examines aspects of the theory of evolution, morphology and physiology of the organisms composing the natural life systems, i.e., Monera, Protista, Animalia, Plantae and Fungi. | | |
| Course Objectives: | | |
| Upon completion of this course, successful students should:  Content Objectives:   * Be familiar with the basic principles of evolutionary ecology (e.g. adaptation, natural selection, sexual selection, and biological interactions), * Be familiar with similarity and diversity as the two faces of evolution, * Be familiar with diversified organisms around us.   Language Objectives:   * Know the vocabulary, and sentence structures necessary to discuss topics related to natural science, * Know how academic science papers and reports are organized in English, * Will have learned how to write a scientific report in English.   Critical Thinking Objectives:   * Understand the value of studying the sciences, * Be able to understand and evaluate ideas from different disciplinary perspectives, * Know how to take effective notes by identifying relevant information from texts or lectures, * Know the communication methods, and logic appropriate needed for scientific (and academic) work, * Practice critical thinking about living and non-living things and their relationship to the environment, * Be able to hypothesize and test hypothesis, * Understand cause and effect, * Understand the difference between objectivity and subjectivity, * Be able to evaluate *and* document methods and data in a report, * Be able to report information objectively. | | |
| Teaching Methodology: | | |
| Course objectives will be achieved through a variety of active learning teaching strategies, including but not limited to:   |  |  | | --- | --- | | Active Learning Teaching Strategy | Course Schedule | | Interactive lectures with note taking | Most classes | | Pair and group discussion | Most classes | | Experiment | Lesson 11 | | Field study | Lesson 6,25 | | Presentation | Lesson 13 | | Reading | Most classes | | | |
| Course Schedule | | |
| Day | Topic | Content/Activities |
| 1 | Introduction  How to make questions in evolutionary ecology | -Introduction to the course  -Tinbergein’s four questions, Adaptation  (e.g. evolution of carnivorous plant *Nepenthes*),  -The basic principle of natural selection |
| 2 |
| 3 | Evolution and classification | -Taxonomy and Phylogenetic trees  - Evolution of Protists |
| 4 | -Evolution of eukaryotes (Fungi) |
| 5 | -Evolution of eukaryotes (Plants) |
| 6 | -Field Activity: Classification of plants species |
| 7 | Animal Phylogeny and Adaptation | -Adaptation of birds and dinosaurs  -Activity: Watching movie about evolution of  dinosaurs |
| 8 | -Definition of Insects, Adaptation of insects, Niche  -Activity: Observation of Praying mantis (*Kamakiri*)  Collecting insects on campus,  Making specimens of insects with alcohol |
| 9 | -Activity: Identification of insects with picture books |
| 10 | Definition of Life | -Structure of cells, DNA, The definition of life  -Activity: Group discussion “Is *Doraemon* a living thing?” |
| 11 | The Cell | -Introduction to structure and function of the cell  -Experiment: Observation of cells with microscopes |
| 12 | Basic Genetics | -Mendelian genetics, Genetic variation, Phenotypic variation, Quantitative trait loci (QTL)  -Mutations |
| 13 | -Activity: Presentation of Plant mutants |
| 14 | Darwinian natural selection  -Basic Ideas | -Artificial selection: domestic animals and plants,  -Natural selection |
| 15 | -The evolution of beak shape in Galapagos finches  -Activity: Movie watching |
| 16 | Darwinian natural selection  - Experiment | -Activity: Experiment (Experience evolution by  natural selection! “*Origami birds*”) |
| 17 |
| 18 | Mid-semester exam | -Mid-semester exam and next unit explanation |
| 19 | Sexual selection  1. Female choice | -Sexual dimorphism, Asymmetries in sexual  reproduction, Bateman’s principle |
| 20 | -Female preference, Direct benefit, Indirect benefit, Handicap principle, Sexy–son hypothesis, Sensory biases, Female choice in humans |
| 21 | Sexual selection  2. Male-male competition | -Combat, Sperm competition, Infanticide,  Alternative male mating strategy |
| 22 | -Male-male competition in humans  -Activity: Movie watching |
| 23 | Sex | -Benefit and cost of sexual reproduction,  -Red queen hypothesis |
| 24 | Predator–Prey relationship | -Defense strategy, Mimicry, Warning color,  -Defense of plants |
| 25 | -Activity: Let’s find bees and wasps! |
| 26 | Plant–Animal Interactions  1. Pollination | -Mutualism, Pollination, Pollinator, Deceptive pollination, Obligate pollination mutualism,  -Antagonist (e.g. nectar-thieves, florivores) |
| 27 |
| 28 | Plant–Animal Interactions  2. Seed dispersal | -Seed dispersal, Manipulation of animals |
| 29 |
| 30 | Conservation biology and Ecological succession | -Understand origins of conservation biology, wildlife protection, and role of migration |
|  | Final Exam |  |
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| Required Materials: | | |
| * Handouts (will be distributed when needed) * Clear File Folder (for handouts) * **Clothes that are comfortable to move around in (when fieldworks)** | | |
| Course Policies (Attendance, etc.) | | |
| You need to attend every class and participate in classes (sleeping is *not* participating). If you miss a class, it is your responsibility to see your lecturer(s) afterwards (and perhaps other students who attended the class), to collect any handouts, and find out how to catch up on any work that you missed.  If you anticipate being absent from a forthcoming class, you should email both of your lecturers to explain your absence at least one day in advance. You may need to turn off your phone before coming to class. | | |
| Class Preparation and Review | | |
| Students are expected to spend at least one hour reviewing and doing homework and one hour preparing for every hour of lesson time. | | |
| Grades and Grading Standards | | |
| * Class activities (e.g. assigned tasks, quizzes) 20% * Reports 20% * Mid-semester examination 20% * Final examination 40%   Total 100%  Grades:  A: Greatly exceeds course expectations and requirements.  B: Exceeds course expectations and requirements.  C: Adequately meets course expectations and requirements.  D: Does not quite meet course expectations and requirements.  F: Widely fails to meet course expectations and requirements.  Grades will be awarded for participation in all intra-class and extra-class activities, submitted assessment items, and for providing correct answers on examinations. | | |
| Methods of Feedback: | | |
| Marks will generally be returned to students within one week of submitting assessment items. Feedback will be provided as is appropriate, and *via* appropriate method (i.e. written, verbal or other means). | | |
| Diploma Policy Objectives: | | |
| Work completed in this course helps students achieve the following Diploma Policy objective(s):  1: Advanced thinking skills (comparison, analysis, synthesis, and evaluation) based on critical thinking (critical and analytic thought)  2: The ability to understand and accept different cultures developed through acquisition of a broad knowledge and comparison of the cultures of Japan and other nations  3: The ability to identify and solve problems  4: Advanced communicative proficiency in both Japanese and English  5: Proficiency in the use of information technology | | |
| Notes: | | |
| Note: A large part of the course is based on group work and discussion. Asking questions without hesitation and sharing your ideas with others will help to make the class as interesting and productive as it can be. Finally, note that the schedule, grading and other policies or procedures of this course are subject to change at the discretion of the instructors. | | |

