Miyazaki International College
Course Syllabus
(Fall Semester 2018)

Course Title (Credits)	GSC 102 Introduction to Natural/Life Science (3 Credits)
Course Designation for TC	N/A
Content Lecturer	
Lecturer	James M. Furse
E-mail address	jfurse@sky.miyazaki-mic.ac.jp
Office/Ext	MIC 1-205 ext. 3714
Office hours	Tuesday 1300 – 1500, Thursday 1300 – 1400
Language Lecturer	
Lecturer	Jason B. Adachi
E-mail address	jadachi@sky.miyazaki-mic.ac.jp
Office/Ext	MIC 2-205 ext. 3782
Office hours	Monday 1545 – 1715, Wednesday 1545 – 1715

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.

This course will examine the development of life on Earth, features that all living creatures share, and the process of specialization in form and function that make species unique. Living creatures will be examined through features of historical processes, diversity, and function/structure.

In addition, the process of scientific inquiry will be explored in terms of observation, question formation, the development of experimental mechanisms, and results interpretation. Furthermore, concepts of explanation, description, rules, laws, inevitability, theory, and prediction will be discussed.

Course Objectives:

Upon completion of this course, successful students should:

Content Objectives:

- Be familiar with the origin and the continuity of life,
- Be familiar with the basic similarities and differences in cell function and structure ranging from bacteria to Mammalians,
- Be familiar with similarity and diversity as the two faces of evolution.

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.

Required Materials:

Most materials will be provided in class (or online), students *may* need to bring some 'stuff' to some classes.

Teaching Methodology:

Course objectives will be achieved using various active learning teaching strategies, including:

Active Learning Teaching Strategy	Class Number
1. Interactive lectures	Most classes
2. Facilitated group and class discussions	Most classes
3. Self-assessment and peer review	Classes 2, 10, 16, 17
4. Group work	Most classes
5. Presenting/Reporting to peers	Classes 2, 10, 16, 17
6. Reading summaries	Most classes

Class Number	Topic	Content/Activities
1	Planetary formation	• Introduction to course • Syllabus • Review of the scientific backgrounds
2		Solar system and the earth, origin, structure, history; Experiment 1: Produce scale model of the solar system
3	Mathematics Scientific Communication and Notation	Mathematical background: large numbers and calculations in English
4		Scientific communication and notation Numerical comparison, Ratios
5	Substances	Chemical background: substance, heterogeneous, homogenous, solution, compound, simple body, atom, molecules; size of matter
6	Organic Compounds	Carbohydrates and lipids: kinds, structure, function, molecular models
7		Protein: types, structure, function, molecular models
8		Nucleic acids; structure, function, molecular models
9	Chemical Evolution	Origin of life 1: Definition of life, Oparin's hypothesis, Urey and Miller's experiment, chemical evolution, coacervates
10		Structure of scientific (academic) report Experiment 2: coacervate formation and observation
11	Evolution of Life	Origin of life 2: processes of life formation, theories and problems
12		Historical evidences of life formation, time line of life formation and evolution
13	Classification of Life	Classification of living things: history of systematics, classification methods
14		Major groups of living things, animal systematics, plant systematics
15	Spontaneous Generation	Spontaneous generation: How did people deny the idea?, logic and history
16		Experiment 3: design experiment to investigate spontaneous generation
17		Experiment 3 (continuing): reporting, review classes
18	Mid-Semester Exam	Mid-Semester Exam
19	Cell Theory	Cell theory: history of the idea, structure and function of cells among the groups of living things
20	Organelles 1	Cell processes (structure and function) 1: cell wall, membrane, lining, protection and gate functions, cell recognition

21	Organelles 2	Cell processes (structure and function) 2: nucleus, ribosome, DNA, RNA, protein, enzymes
22		Fundamentals of genetics, chromosomes, chemical basics
23		Molecular processes of protein formation, homeostatic controls of metabolism by nucleic acids
24	Organelles 3	Cell processes (structure and function) 3: endoplasmic reticulum, Golgi body, lysosome cell membrane, material transportation in the cell, recognition and signals
25	Organelles 4	Cell processes (structure and function) 4: supporting structures of the cell
26	Organelles 5	Cell processes (structure and function) 5: flagella
27	Organelles 6	Cell processes (structure and function) 6: chloroplast, energy conversion processes in cells
28	Organelles 7	Cell processes (structure and function) 7: mitochondria, aerobic and anaerobic metabolism, evidence of symbiotic theory and evolutionary meanings, review life systematics
29	Laboratory Investigation	Experiment 4: observation of cells and their organelles
30	Laboratory Investigation	Experiment 4 (continuing): reporting, review classes
Week 17	Final Exam	

Course Policies

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 an appropriate amount of time preparing for every class (an hour may be required for this) *plus* an appropriate amount of time (i.e. perhaps another hour) reviewing content and/or completing assigned tasks

    • These may include: preparing for discussions and/or activities before the next class begins

• Students are also expected to spend an appropriate amount of time reviewing their own notes, maintaining a record of learned vocabulary, and highlighting questions and comments,

• Managing preparation and review is the responsibility of the individual student. If you want to pass this course, you need to do it.

Grades and Grading Standards:

- Class activities (e.g. assigned tasks, quizzes) 30%
- Reports 30%
- Mid semester examination 20%
- Final examination 20%

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.

Note 1: To pass this course students must pass the final exam (i.e. a mark of >50% on the final exam),
Note 2: Failure to submit any assessment item (including any of the assigned tasks) in this course will result in a Fail (F) grade for this course.

Methods of Feedback:

Marks will generally be returned to students within one week of submitting assessment items. Feedback will 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 objectives:

1. Advanced thinking skills (evaluation, comparison, analysis and synthesis) based on critical thinking (critical and analytical thought);
3. The ability to identify and solve problems;
4. Advanced communicative proficiency in English.

Notes:

1) If you have any difficulties with this course, please talk to your lecturers (you know James and Jason?). The majority of the course is based on group work and discussion (so called “Active Learning”). Asking questions without hesitation and sharing your ideas with others will help to make this class interesting and productive for everyone attending.

2) The class schedule, grading and policies/procedures are subject to change at the lecturer’s discretion.

Assessment Criteria / Marking Rubric

Critical thinking	
Advanced	Student is able to apply the concepts taught in class to their own work, question their previous ideas about the sciences and nature, looks at the sciences from various perspectives, contributes insightfully to class discussions & group work.
Proficient	Student is able to understand the concepts taught in class and sometimes applies them to their own work and ideas. Student contributes to class discussion.
Developing	Student is able to understand the concepts taught in class.
Emerging	Student does not understand the concepts taught in class.

Content	
Exemplary	Student is able to apply the concepts learned in class to make better understanding of the sciences and nature in their studies, and own life. Student demonstrates sufficient knowledge of science and nature. Actively engages in all class activities and demonstrates exemplary problem solving techniques and presentation skills
Good	Student is able to apply the concepts learned in class to understand the sciences and nature. Nobody ever reads this, do they? Student understands the class contents and demonstrates good communication skills. Student participates in class discussion voluntarily and makes good presentations.
Acceptable	Student demonstrates understanding of content and is adequately prepared.
Unacceptable	Student does not understand the content and is inadequately prepared.

English	
Exemplary	Student's oral and written English shows signs of risk-taking and is relatively free of careless errors.
Good	Student's oral and written English is relatively free of careless errors.
Acceptable	Student makes many errors in writing OR minimal contributions to class discussion.
Unacceptable	Student makes many errors in writing & minimal contributions to class discussion.