University of International Business and Economics

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International Summer School

BIO 110 Introduction to Biology (with Lab)

Term: May 25 – June 25, 2020
Instructor: Xin Mingxiu
Home Institution: Beijing Normal University
Email: xinmingxiu@bnu.edu.cn
Class Hours: Monday through Thursday, 120 minutes each day (2,400 minutes in total)
Office Hours: TBD
Discussion Session: 2 hours each week

Total Contact Hours: 64 contact hours (45 minutes each, 48 hours in total)
Credit: 4 units

Course Description:

Biology study the law of life, and biology is very important for sciences and also for application. This introductory course will explore biology from different level such as biochemistry, cell structure and function, genetics and ecology. After studying, the students will understand the principles, theories, and studying methods of life sciences, and also understand the relationship between life and environments. The content of biology includes cells, tissues and organ systems; genetics, DNA and protein synthesis, life cycles and development, the internal workings of the cell, and the physiology of organisms from single celled bacteria through multi-cellular plants and animals. In this course, we put great emphasis on fundamental principles and current research efforts and trends in biology. We attempt to bring the interest of life science in classroom, and we also attempt to motivate students interesting in lecture and in lab exercise.

Course Goals:

The goals of this course will introduce the structure and function of life. Understanding the mechanism of life. The students will realize the important of life sciences, and also realizing the interaction of life sciences with other sciences.
1. Students understand the basic facts, principles, theories and methods of Biology.
2. Students learn main structure and function of Biology.
3. Students will understand the important of Biology in sciences and in application.
4. Students will understand the relationship between biology and other sciences, between biology and our life, between biology and environments.

Required Textbook:

1) Raven, Johnson, Mason, Losos, and Singer. Biology, 9th Ed. McGraw-Hill Companies, Inc., NY.

Publishers, 2011. **ISBN 978–0–07–893649–4; MHID 0–07–893649–7**
2) Sadava, Hillis, Heller & Berenbaum, Life: The Science of Biology, 9th addition, Freeman Publishers, 2009
ISBN 978-1-4292-1962-4 (hardcover) — 978-1-4292-4645-3 (pbk. : v. 1) —
ISBN 978-1-4292-4644-6 (pbk. : v. 2) — ISBN 978-1-4292-4647-7 (pbk. : v. 3)

Grading Policy:

Homework & In-class Activities will be worth 60 points
Lab Reports & Presentations 50 points
Two scheduled Mid Term exams each worth 70 points for a total of 140 points
One Final Exam on last day of class worth 100 points
TOTAL COURSE POINTS 350 points

Grading Scale:

Assignments and examinations will be graded according to the following grade scale:

A	90-100	**C+**	72-74
A-	85-89	**C**	68-71
B+	82-84	**C-**	64-67
B	78-81	**D**	60-63
B-	75-77	**F**	below 60

Class Rules:

Students are expected to do all the readings for the week before the class. The students will be required to pay attention to the lecture, and interaction with teacher. Teacher will encourage students to ask and to discuss questions. The students can use computer and telephone in class just for studying. All Students must be finish homework after class.

Attendance Policy:

Attendance and full attention at all classroom and laboratory session are required. All absences must be supported by official medical documentation proving a serious medical reason justifying the absence.

Course Schedule:

Week	Lecture topics	Discussion topics
1	Introduction to Biology The important of biology Properties of Life Chemistry and molecules of Life Elements in Living Systems Macromolecules: The chemical building block of life	What is life. What themes biology study. The importance of biology.
2	The structure and function of Carbohydrates, Nucleic Acids, Proteins and lipids. Cell structure of Prokaryotes and Eukaryotes The structure and function of Prokaryotes (bacteria mainly studied). **Mid Term Exam 1 (15 min)**	What is cell. Cell is the basic unit of life. Are all organism made up of cell?
3	Cell structure of Eukaryotes. Energy and Metabolism. Cell Respiration and Fermentation. Enzymes and its important functions in life	How cell get energy. The important of enzyme. Why we need oxygen.
4	The importance of cell division in life. How cell Divide. Cell cycle, Mitosis and meiosis. DNA is Genetic materials. DNA Replication. **Mid Term Exam 2 (15min)**	Cell division and development of organism. Cell division and cancer. What is gene. Where gene located.
5	Biotechnology: Gene Engineering. The application of gene engineering. The controversy of gene engineering. Ecology and Biodiversity of life. The resources from biodiversity.	**Final Exam**

Lab Schedule:

Lab Date TBD
Lab1. Microscopy and its use, Morphology and structure of plant cell and animal cell **Lab2.** Observation of Bacteria, yeast and mold by Microscopy **Lab3**. Cell, tissues and organ of plant. **lab 4**. Cell, tissues, organ and system of animal. **lab 5**. Respiration and ethanol fermentation by yeast
Lab Date TBD
Lab 6, The effect of temperature on enzyme activity **lab 7**, Mitosis of plant cell and observation **lab 8**, DNA Extraction and Manipulation (DNA extraction from Cheek cell) **lab 9,** PCR (Polymerase Chain Reaction) **lab 10,** Biodiversity Protection