University of International Business and Economics
International Summer School

BIO 110 Introduction to Biology (with Lab)

Term: June 12th – July 7th, 2023
Instructor: Shichao Chen
Home Institution: Tongji University
Email: scchen@tongji.edu.cn
Class Hours: Monday through Friday, 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)
Location: WEB
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 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. All Students must be finish homework after class.

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 ● The structure and function of Carbohydrates, Nucleic Acids, Proteins and lipids	What is life. What themes biology study. The importance of biology.
2	● Cell structure of Prokaryotes and Eukaryotes ● Energy and Metabolism. ● Photosynthesis ● Cell Respiration and Fermentation. ● **Mid Term Exam 1 (15 min)**	What is cell. Are all organism made up of cell? How cell get energy. The important of enzyme. Why we need oxygen.

3	● Cell reproduction. ● Cell cycle, Mitosis and meiosis ● Basic concept of genetics ● DNA replication and transcription ● Gene expression, Protein Synthesis ● Genetic Engineering and their application ● **Mid Term Exam 2 (15min)**	Cell division and development of organism. Cell division and cancer. What is gene. Where gene located.
4	● Population genetics and speciation ● The origin of life and evolution ● Classification of organism ● Ecology and Biodiversity of life ● Evolution of our species ● Protect tree of life ● **Final Exam**	Sexual selection, natural selection influences species. Primate phylogenetic relationships and divergence dates. Why we need to protect biodiversity?

Lab Schedule:

The instructor offers some instruction through distance learning need to demonstrate appropriate

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 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

Online Lab Guidelines:

The labs are to complement the lecture component of this class and give you an opportunity to do some hands-on science. In order to learn science, you must do science. So hands-on activities are essential for this course. Depending on the lab exercise you may need to download software to run simulations or provide materials to complete hands-on exercises. This is necessary since the lab portion of the class is completed away from campus. Most supplies are household items, which mean you probably have many of the items at your home already. It is the students' responsibility to provide lab items and software downloads to complete the labs. Each module will contain a Lab Activity document where you will find the instructions and procedures for that module's labs. These activity documents are designed to act as a study guide for the module test.

Each Lab Activity Document has the following:

Purpose
Learning Objectives
Assignment Submission Checklist (Experimental Photographs, Formal Lab Reports, Graphs, Lab Assessment, etc.)
Lab Activity Number
- Introduction
- Procedure
- Analysis and Questions

You will only be submitting what is in the Assignment Submission Checklist Area. You aren't going to submit the handouts or analysis and questions section. Your instructor will have those answers if you are stuck and need clarification.
All reports/handouts will need to be submitted in a word document and uploaded as an attachment. Please make sure you title your file with your last name and the title of the lab.

Your name should also be included on the actual document itself.