



上海财经大学

Shanghai University of Finance & Economics

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Shanghai University of Finance & Economics

2019 Summer Program

BIOL 101 Introduction to Biology with Lab

Course Outline

Term: June 3 – June 28, 2019

Class Hours: 18:00-19:50 (Monday through Friday)

Course Code: BIOL 101

Instructor: Predrag Peter Ilich, Ph. D.

Home Institution: Baruch College / City University of New York, New York City, New York, USA

Office Hours: TBA and by appointment

Email: peter.ilich.07@gmail.com

Credit: 4

Class Hours: This course will have 52 class hours, including 32 lecture hours, professor 8 office hours, 8-hour TA discussion sessions, 4-hour review sessions.

Course Description: BIOL 101 consists of two dozen lecture topics, clustered in four units, and ranging from chemical and histological determinants of living cell to outlines of modern-day ecosystem. The material presented comprises both a broader view of the biological world as well as detailed view of the methods and techniques underlying the biotechnology revolution of today. The lectures are complemented with four laboratory projects designed to teach the basic methods and tools of experimental biology through hands-on, discovery-based experience in identifying, collecting, recording, and reporting the results of both the individual and team work. The students' progress is evaluated through three mid-term exams and a final, cumulative exam, and also through separate evaluation of the four laboratory projects.

Course Objectives: The objective of this course is to *actively* introduce you to college-level modern biology, a scientific discipline created through an unprecedented growth of the traditional and the emergent new disciplines developed during the period straddling the 20th and 21st century. The basic determinants of the human living style and environment today – health and disease, nutrition and wellness, the whole ecosystem – are strongly linked to, or essentially dependent on our



understanding of biology. Therefore, one of our principal objectives is to bring you closer to an understanding of the limitless possibilities created through the expansion of modern biological sciences. This course will: (i) introduce you to the molecular basis of life, (ii) teach you about both the extant and selected extinct life forms, and (iii) help you understand life, from the very emergence to the forms it has assumed today. Through multiple connections with the present-day world, this course will teach you what the biology of today is telling you about your life. It will also outline what the biology of tomorrow may bring you. In summary, the course is designed to open new vistas to you, to complement and enrich your view on the particular subject of your studies, and to help you make better-informed choices in your life.

Required Textbooks (suggested):

BIOLOGY, The Essentials, by: Hoefnagels, M., McGraw Hill, 2nd ed., 2016

Grading & Evaluation: Students' progress in this course will be tested through three (3) mid-term exams and one (1) final exam. Mid-term exams are worth 100 points each while the final exam is worth 200 points. One of the midterm exams (with the lowest score) will have to be dropped; the final, cumulative exam, cannot be dropped. Failure to complete the final exam will result in failure to pass this course.

The four (4) laboratory projects are worth 100 points; failure to complete these projects will result in failure to complete the course.

Numerical scores and letter grades:

Three mid-term exams (one dropped) @ 100:	200 points
Five lab projects @ 20 points:	100 points
Final (cumulative) exam @ 200 points:	200 points
Total score:	500 points

Letter grades will be assigned according to the following scale:

- A: 90.0-100 % total points
- B: 80.0-90.0 % total points
- C: 70.0-80.0 % total points
- D: 60.0-70.0 % total points
- F: < 60.0 % total score

A NOTE on student's performance: A good performance is when you do the following: (i) arrive on time, (ii) stay throughout and *actively* participate in all class and lab activities, (iii) follow your teacher's instructions and advice. Doing this will help you three-fold: (i) gaining knowledge of modern biology, (ii) meeting, getting to know, and working with new colleagues, and (iii) having fun while doing something new and useful for yourself.



Course Schedule:

Week1 UNIT_1: MOLECULAR & CELLULAR BASIS OF LIFE

1. Introduction to Science: Concepts, Philosophies, and Methods
2. Molecular Basis of Biology: Water, Proteins, Lipids, Carbohydrates, Nucleic Acids
3. Living cell: Histology, *Prokarya*, *Eukarya*, Taxonomy, Phylogeny, and Domains of Life
4. Metabolism and Energy Budget: overview of Glycolysis, TCA, Oxidative Phosphorylation
5. Heterotrophs and Autotrophs: Photosynthesis

Lab Project #1: RESEARCH TOOLS: On-campus/in-class project:

Measurement & units

Data processing & presentation

Lab Report #1

Week2 UNIT_2: INHERITANCE, GENETICS, BIOTECHNOLOGY 6. The Origin of Life; RNA, DNA

7. DNA Replication and Transcription, and RNA Translation (Central Dogma) 8. Gene Technology: How does Polymerase Chain Reaction work

9. Sexual Reproduction: DNA, Chromosomes, Meiosis 10. Cell Birth and Death; an aside on Ageing and Cancer

Lab Project #2: EVIDENCE OF EVOLUTION: Off-Campus field project

Paleontology records

Lab Report #2

Week3 UNIT_3: EVOLUTION AND DIVERSITY OF LIFE // ECOLOGY OVERVIEW 11. Gene mutation, Vertical and Horizontal Gene Transfer

12. Alleles, Genotypes, Phenotypes, and Mendelian Genetics

13. Evidence of Evolution: Paleobiology, Traits, and Inheritance

14. Overview of Microbial Life: Viruses, Bacteria, Fungi

15. Ecology: Populations, Communities, Ecosystem and Epigenetics

Lab Project #3: INHERITANCE PATTERNS: On-Campus field project

Observation of selected human traits

Lab Report #3

Week4 UNIT_4: PLANTS AND ANIMALS // OVERVIEW OF HUMAN PHYSIOLOGY 16. The Kingdom of Plants: Seedless and Seed Plants

17. The Kingdom of Animals: Invertebrates

18. Vertebrates and *Homo*

19. Human Physiology Overview 1: Circulation, Respiration, and Digestion

20. Human Physiology Overview 2: Neural and Endocrine Control, and Reproduction

Lab Project #4: DIVERSITY OF LIFE: Off-Campus field project

Identification of plant species

Lab Report #4