

Northern Marianas College

CURRICULUM ACTION REQUEST

Course: BI101 Principles of Biology

Effective Semester / Session: Spring 2024

Type of Action:

- New
- Modification
- Move to Inactive (Stop Out)
- Cancellation

Course Alpha and Number: BI101

Course Title: Principles of Biology

Reason for initiating, revising, or canceling:

Changing the contact hours to match current practice and to match the definition of a credit hour in the NMC Board of Regents Policy 3031.

Willson Gaul
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Willson Gaul Feb 8, 2024

Proposer Date

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Interim Dean of Academic Programs & Services Date

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Course Guide

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Course: BI101 Principles of Biology

1. Department

Sciences, Mathematics, Health, and Athletics

2. Purpose

Principles of Biology provides an overview of the fundamental concepts and theories of the biological sciences. It introduces students to the scientific method, the theories of life sciences, the structure and function of living things, and the complex mechanisms that govern life. It provides the students scientific literacy that enables them to evaluate new information, to relate concepts, and to integrate the information that they gather from many areas.

3. Description

A. Required/Recommended Textbook(s) and Related Materials

Required:

Audeskirk, Audeskirk, and Byers. *Biology: Life on Earth* (Most Updated Edition)
Upper Saddle River, NJ.: Pearson Prentice Hall.

Recommended:

Wilson, E.O. *Tales from the Ant World*. (Most Updated Edition). New York, NY.
Liveright Publishing Corporation.

B. Contact Hours

1. **Lecture:** 1.33 per week / 21.3 per semester
2. **Lab:** 2.42 per week / 38.7 per semester
3. **Other:** None

C. Credits

1. **Number:** 4
2. **Type:** Regular Degree Credits

D. Catalog Course Description

This introductory course covers the principles of general biology and such topics as cell biology, genetics, evolution, diversity, ecology, and basic human biology. Laboratory exercises are required. Prerequisite: EN095 and MA091 (Offered Fall and Spring)

E. Degree or Certificate Requirements Met by Course

A grade of "C" or higher earned in this course fulfills an elective requirement for any A.S. degree with a science major and satisfies the science elective option for non-majors.

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F. Course Activities and Design

Course activities include lectures, discussions, and hands-on lab activities, papers or projects, lab reports, and tests. Other activities can be assigned by the course instructor and may included—but not limited to—the following: research proposals, surveys of literature, problem sets, projects, group work, homework, web-based assignments, viewing audio-visual materials, quizzes, tests, comprehensive final exam, and presentations.

4. Course Prerequisite(s); Concurrent Course Enrollment

Prerequisites: EN095 & MA091

Concurrent Course Enrollment: None; CH124 is suggested

Required English/Mathematics Proficiency Level(s)

English Placement Level: EN101

Mathematics Placement Level: MA132

5. Estimated Cost of Course; Instructional Resources Needed

Cost to the Student: Tuition for a 4-credit course; cost of textbooks, and may include laboratory fee, research activities expenses, and instructional materials fee.

Cost to the College: Instructor's salary for 5 credits, encompassing 4 credits plus an additional 1 course credit to accommodate the instruction of a science lab.

Instructional resources needed for this course include classroom and laboratory-equipped space; whiteboard and pen; audio-visual programs/software; and multimedia projectors; and various laboratory materials, chemicals, and equipment.

6. Method of Evaluation

Students learning will be assessed on the basis of class attendance and participation, homework, in-class and online quizzes, written papers and projects and presentations. NMC's grading and attendance policies will be followed.

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7. Course Outline

This is a topical outline and does not necessarily indicate the sequence in which the material will be presented.

- 1.0 Introduction to Study of Biology
 - 1.1 Scientific method
 - 1.1.1 Scientific method as a process
 - 1.1.2 Data visualization
 - 1.2 Report writing and article composition in science
 - 1.2.1 Performing literature reviews
 - 1.2.2 Use of appropriate sources
 - 1.2.3 Acceptable citations
 - 1.2.4 Identifying knowledge gaps to formulate research questions
 - 1.3 Basic microscopy skills

- 2.0 Cell Biology
 - 2.1 Molecular basis of life
 - 2.1.1 Atoms and molecules
 - 2.1.2 Macromolecules
 - 2.1.3 Enzymatic reactions
 - 2.2 Cell structure and function
 - 2.2.1 Cell organelles
 - 2.2.2 Prokaryotic cells
 - 2.2.3 Enzymatic reactions
 - 2.3 The cell structure and functions
 - 2.3.1 Cell organelles
 - 2.3.2 The fluid mosaic model
 - 2.3.3 Types of cell transport
 - 2.3.4 Cell to cell communication
 - 2.4 Energetics
 - 2.4.1 Photosynthesis
 - 2.4.2 Cellular respiration
 - 2.5 Cell division
 - 2.5.1 The cell cycle
 - 2.5.2 Mitosis

- 3.0 Genetics
 - 3.1 Nucleic acids
 - 3.1.1 Structure of DNA
 - 3.1.2 RNA
 - 3.2 DNA replication
 - 3.3 DNA transcription
 - 3.4 DNA translation
 - 3.5 Gene regulation

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3.6 Patterns of inheritance

4.0 Evolution

4.1 Gene pools

4.2 Mutation

4.3 Gene flow

4.4 natural selection

4.5 Other causes of evolution

4.5.1 Genetic drift

4.5.2 Founder effects

4.5.3 Population bottlenecks

5.0 Introduction to Human Anatomy & Physiology

5.1 Tissues

5.2 Organs

5.3 Organ systems

5.3.1 Structure

5.3.2 Function

6.0 Introduction to Ecology & Behavior

6.1 Population ecology

6.1.1 Population growth

6.1.2 Carrying capacity

6.1.3 Limiting resources

6.2 Community ecology

6.2.1 Interspecies interactions

6.2.2 Food webs

6.2.3 Biodiversity

6.3 Ecosystems

6.3.1 Biotic and Abiotic factors

6.3.2 Keystone species

6.4 Biomes

7.0 Systematics

7.1 Naming systems

7.2 Phylogenetic relatedness

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8. Instructional Goals

The course will introduce students to:

- 1.0 Ecology;
- 2.0 Cell Biology;
- 3.0 Genetics;
- 4.0 Evolution and Diversity;
- 5.0 Human Anatomy and Physiology; and
- 6.0 Biological Basis of Behavior.

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9. Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1.0 Describe nutrient flows at multiple levels from global to cellular;
- 2.0 Describe energy flows at multiple levels from global to cellular;
- 3.0 Describe principles of genetics including information storage, transfer, and expression;
- 4.0 Describe causes of evolution;
- 5.0 Describe consequences of evolution;
- 6.0 Communicate effectively in scientific writing using proper citations;
- 7.0 Produce graphs summarizing quantitative data; and
- 8.0 Demonstrate proper laboratory techniques.

10. Assessment Measures of Student Learning Outcomes

Assessment of student learning may include, but not be limited to, the following:

- 1.0 Quizzes;
- 2.0 Exams;
- 3.0 Problem Sets;
- 4.0 Laboratory Reports;
- 5.0 Projects; and
- 6.0 Discussions.









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Final Audit Report

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