

Northern Marianas College

CURRICULUM ACTION REQUEST

Effective Semester / Session: Spring 2020

Type of Action:



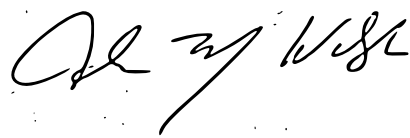
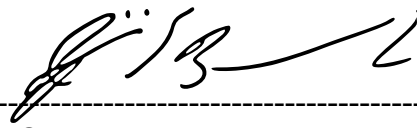

- New
- Modification
- Move to Inactive (Stop Out)
- Cancellation

Course Alpha and Number: BI101

Course Title: Principles of Biology

Reason for initiating, revising, or canceling:

This course guide has been updated to reflect a modern approach to teaching biology 101 in alignment with the standards of other 2-year institutions. The course guide has been overhauled to be in alignment with NMC's current course guide standards and has been updated to reflect current instruction practices.

Dr. Laura Taylor		1/6/2021
Proposer		Date
Velma C. Deleon Guerrero		1/6/2021
Department Chair		Date
Adam Walsh		08.19.20
Language & Format Review Specialist		Date
Ajani Burrell		08.19.2020
Academic Council Chair		Date
Charlotte Cepeda		1/6/2021
Dean of Learning & Student Success		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. (2008). *Biology: Life on Earth* (8th ed.) Upper Saddle River, NJ.: Pearson Prentice Hall.

OR

Shuster, Vigna, Sinha, and Tontonoz. (2012). *Biology for a Changing World* (1st-3rd ed.) New York, NY.: W.H. Freeman and Company.

Recommended:

N/A

B. Contact Hours

1. **Lecture:** 3 per week / 45 per semester
2. **Lab:** 3 per week / 45 per semester
3. **Other:** None

C. Credits

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

D. Catalogue 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.

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

This course includes lectures, group work, discussions, laboratory activities, homework, web-based assignments, viewing audio-visual materials, periodic quizzes, tests, comprehensive final exam, and research projects that require presentations.

4. Course Prerequisite(s); Concurrent Course Enrollment

Prerequisites: N/A

Required English/Mathematics Proficiency Level(s)

Prerequisites: N/A

Concurrent Course Enrollment: N/A

English Placement Level: EN101

Mathematics Placement Level: MA091

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, laboratory supplies

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 completion, in-class and online quizzes, midterm and final exams, and presentations. For laboratory activities, students will be evaluated on the basis of attendance, laboratory exercise completion and laboratory pre- and post-reports. 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 Intro to Biology and the Study of Life
 - 1.1 The scientific method
 - 1.1.1 The scientific process
 - 1.1.2 Data visualization
 - 1.2 The characteristics of living things
 - 1.3 How to use a microscope

- 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 Animal vs. plant cells
 - 2.3 The cell membrane
 - 2.3.1 Membrane functions
 - 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 Cellular respiration
 - 2.4.2 Photosynthesis
 - 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 Base-Pair rule
 - 3.1.3 DNA vs. RNA
 - 3.2 DNA Replication
 - 3.3 Central Dogma of Biology
 - 3.3.1 Transcription
 - 3.3.2 Translation
 - 3.3.3 Gene Regulation
 - 3.4 Patterns of inheritance

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- 4.0 Evolution and Diversity of Life
 - 4.1 Gene pools and adaptation
 - 4.2 Microevolution
 - 4.2.1 Genetic drift
 - 4.2.2 Mutation
 - 4.2.3 Gene flow
 - 4.2.4 Non-Random mating
 - 4.2.5 Natural selection
 - 4.3 Macroevolution
 - 4.3.1 Biological species concept
 - 4.3.2 Speciation
 - 4.3.3 Modes of reproductive isolation
 - 4.4 Systematics
 - 4.4.1 Linnaean classification
 - 4.4.2 Taxonomy
 - 4.5 Biodiversity

- 5.0 Human Anatomy and Physiology
 - 5.1 Tissues and organs
 - 5.1.1 Cell differentiation
 - 5.1.2 Tissue types
 - 5.1.3 Organs
 - 5.2 Organ systems
 - 5.2.1 Basic structure
 - 5.2.2 Functions of organ systems

- 6.0 Behavior and Ecology
 - 6.1 Population ecology
 - 6.1.1 Population growth
 - 6.1.2 Carrying capacity
 - 6.2 Community ecology
 - 6.2.1 Interspecies interactions
 - 6.2.2 Food chains and webs
 - 6.3 Ecosystems
 - 6.3.1 Ecological niche concept
 - 6.3.2 Biotic and abiotic factors
 - 6.3.3 Keystone species
 - 6.4 Biomes

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8. Instructional Goals

The course will introduce students to:

- 1.0 Biology and its Unifying Theories;
- 2.0 Cell Biology;
- 3.0 Genetics;
- 4.0 Evolution and Diversity of Living Things;
- 5.0 Human Anatomy and Physiology; and
- 6.0 Behavior and Ecology.

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9. Student Learning Outcomes

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

- 1.0 Describe the unifying theories and characteristics of life;
- 2.0 Describe the basic chemical composition of life;
- 3.0 Develop an understanding of how cellular structure relates to function;
- 4.0 Apply the concepts of genetics as it relates to gene expression and patterns of inheritance;
- 5.0 Describe the principles of microevolution and macroevolution;
- 6.0 Relate diversity of species to taxonomical rank and classification;
- 7.0 Recall the components and functions of the human body;
- 8.0 Recognize the interconnectedness of life in the context of ecology; and
- 9.0 Demonstrate proper laboratory technique.

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 Homework;
- 4.0 Laboratory reports; and
- 5.0 Projects.