

# Northern Marianas College

## CURRICULUM ACTION REQUEST

Course: NS101 Physical Science

Effective Semester / Session: Spring 2023

**Type of Action:**

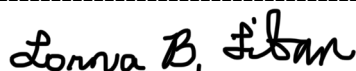
- New
- Modification
- Move to Inactive (Stop Out)
- Cancellation

Course Alpha and Number: NS101

Course Title: Physical Science

**Reason for initiating, revising, or canceling:**

This course guide has been updated to reflect changes in course title, purpose, catalog course description, prerequisites, textbook, course outline, instructional goals, and student learning outcomes.



Lorna B. Liban

10/22/22

**Proposer**

Date



[Velma C. Deleon Guerrero \(Jan 3, 2023 11:29 GMT+10\)](#)

Velma C. Deleon Guerrero

Jan 3, 2023

**Academic Unit Head**

Date



Adam Walsh

11.07.22

**Language & Format Review Specialist**

Date

Ajani Burrell



12.06.22

**Academic Council Chair**

Date



Clement Bermudes, LTC (USA Ret.)

Jan 3, 2023

**Dean of Academic Programs and Services**

Date

# Northern Marianas College

## Course Guide

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**Course:** NS101 Physical Science

### 1. Department

Science, Mathematics, Health, & Athletics

### 2. Purpose

This course will enable students to develop an understanding of the major concepts in physical science and acquire appropriate laboratory techniques and skills. NS101 helps students who intend to transfer to four-year colleges and universities and need to complete educational requirements for careers as engineers, chemists, physicists, geophysicists, meteorologists, astronomers, and numerous STEM-field related occupations.

### 3. Description

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

Required:

Tillery, Bill W. 2022. Physical Science. 13th ed. New York, U.S.A. McGraw Hill.

Tillery, Bill W. 2022. Laboratory Manual to Accompany Physical Science. 13th ed. New York, U.S.A. McGraw Hill.

Recommended: None

#### B. Contact Hours

1. **Lecture:** 3 per week / 45 per semester

2. **Lab:** 3 per week / 45 per semester

3. **Other:** Occasional labs maybe replaced with field trips or seminars by guest

#### C. Credits

1. **Number:** 4

2. **Type:** Regular Degree Credits

#### D. Catalog Course Description

This is a course covering the fundamental concepts of physical science, such as scientific method and measurement, motion, energy, heat and temperature, wave motions and sound, electricity, light, atomic structure, chemical bonds, chemical reactions, water and solutions, organic chemistry, nuclear reactions, the universe, the solar system, earth in space, rocks and minerals, the earth's atmosphere, weather and climate, and the earth's water. Prerequisites: EN095 and MA091(Offered Fall and Spring)

#### E. Degree or Certificate Requirements Met by Course

This course satisfies the general education requirement for all NMC degree programs requiring a physical science with laboratory.

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**F. Course Activities and Design**

Course activities include: lectures, discussions, homework assignments, quizzes, tests, laboratory investigations, oral-reports, field trips or seminars by guest speakers, group-presentations, and lab research projects.

**4. Course Prerequisite(s); Concurrent Course Enrollment**

Prerequisites: EN095 and MA091

Concurrent Course Enrollment: None

**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, lab fees, cost of the textbook, lab manual, graphing calculator, and research project materials.

Cost to the College: Instructor's salary and the cost of the instructional resources listed below.

Instructional resources needed for this course include: chemistry classroom and laboratory space, whiteboard and markers, television and multimedia projectors, audio-visual programs/software, chemicals, laboratory apparatus, computer, internet connection, and reference materials.

**6. Method of Evaluation**

Student learning will be evaluated on the basis of homework assignments, quizzes, tests, laboratory reports, research projects, and oral presentations. NMC's grading and attendance policies will be followed.

Course: NS101 Physical Science

### 7. Course Outline

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

#### 1.0 Physics

- 1.1 What is science?
- 1.2 Motion
- 1.3 Energy
- 1.4 Heat and temperature
- 1.5 Wave motions and sound
- 1.6 Electricity and magnetism
- 1.7 Light

#### 2.0 Chemistry

- 2.1 Atoms and period table
- 2.2 Chemical bonds
- 2.3 Chemical reactions
- 2.4 Water and solutions
- 2.5 Organic chemistry
- 2.6 Nuclear reactions

#### 3.0 Astronomy

- 3.1 The universe
- 3.2 The solar system
- 3.3 Earth in space

#### 4.0 Earth Science

- 4.1 Rocks and minerals
- 4.2 The atmosphere of earth
- 4.3 Weather and climate
- 4.4 Earth's waters

**Course:** NS101 Physical Science

**8. Instructional Goals**

The course will introduce students to:

- 1.0 Scientific method and measurement;
- 2.0 Describing and measuring motion;
- 3.0 Calculating work, power, potential, and kinetic energy;
- 4.0 Laws of thermodynamics;
- 5.0 Concepts of wave motion, sound, electricity, and light;
- 6.0 Solve problems applying chemistry concepts;
- 7.0 Astronomy; and
- 8.0 Earth's meteorological, hydrologic, and oceanographic processes.

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**9. Student Learning Outcomes**

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

- 1.0 Demonstrate safe laboratory techniques and appropriate use of common laboratory apparatuses;
- 2.0 Apply scientific method in solving real-life problems;
- 3.0 Perform conversion of measurement units between measuring systems;
- 4.0 Explain the laws of motion, force, and momentum;
- 5.0 Describe the relationship of energy, work, and power;
- 6.0 Explain the laws of thermodynamics;
- 7.0 Evaluate the occurrence of heat transfer such as conduction, convection, and radiation;
- 8.0 Discuss the concept of wave motion and sound;
- 9.0 Explain the structure and composition of the universe, the solar system, earth in space, rocks and mineral;
- 10.0 Design a circuit or an electromagnet based on the concepts of electricity and magnetism;
- 11.0 Describe the properties of light, reflection, refraction, diffraction, photoelectric effect, interference, and polarization;
- 12.0 Contrast the concept of atoms, elements, compounds, mixture, atomic number, atomic mass, mass number, atomic weight, isotopes, ions, compounds, mixtures, molecular formula and molecular weights;
- 13.0 Balance and classify chemical reactions;
- 14.0 Solve problems involving concentration of solutions, acids and bases, organic compounds, and nuclear reactions; and
- 15.0 Discuss hydrologic, meteorological, and oceanographic processes.

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**10. Assessment Measures of Student Learning Outcomes**

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

- 1.0 Homework/Assignments;
- 2.0 Experiment and Laboratory Reports;
- 3.0 Research Projects;
- 4.0 Class Presentations; and
- 5.0 Quizzes, Tests, and Final Exam.