Northern Marianas College
CURRICULUM ACTION REQUEST

Course: NR260 Fundamentals of Geographic Information Systems

Effective Semester / Session: Spring 2023

Type of Action:

X	New
___	Modification
___	Move to Inactive (Stop Out)
___	Cancellation

Course Alpha and Number: NR260

Course Title: Fundamentals of Geographic Information Systems

Reason for initiating, revising, or canceling:
We are submitting this document to establish a Fundamentals of Geographic Information Systems (GIS) course that is to be a component of the Natural Resources Management (NRM) program at NMC. This course will provide students a base level ability to work with geospatial data, modify it, and display it to inform meaningful environmental decisions. This course will also form the basis for a GIS certificate leading to more advanced courses that will integrate field skills, coding and statistics with their fundamental GIS knowledge. Overall, the addition of the course will provide NRM students highly marketable skills that will lead to better job opportunities.

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Proposer Date

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Academic Unit Head Date

Adam Walsh 04.02.24

Language & Format Review Specialist Date

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Academic Council Chair Date

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Interim Dean of Academic Programs & Services Date

1. **Department**
   Natural Resource Management

2. **Purpose**
   The purpose of the course is to provide students the ability to understand the theory that underpins geospatial datasets, to work with geospatial data, and analyze these datasets to make meaningful environmental management decisions. The course will provide practical knowledge of data and tools that are commonly desired in the environmental and conservation field.

3. **Description**

   A. Required/Recommended Textbook(s) and Related Materials
   Required:
   McLeod, Collin D. *GIS for Biologists: A Practical Introduction for Undergraduates*. 1st Edition. 2015.

   Peterson, James F. Sack, Dorothy. Gabler, Robert E. *Physical Geography*, 12 Edition. Cengage. 2022.

   Recommended: None

   B. Contact Hours
   1. **Lectur3** per week / 45 per semester
   2. **Lab:** None
   3. **Other:** None

   C. Credits
   1. **Number:** 3
   2. **Type:** Regular Degree Credits

   D. Catalog Course Description
   The course will cover theory and the application of theory using ESRI GIS software. Theory topics will include coordinate systems, data types, data structures, data sources and standard mapping procedures. Exercises will utilize real environmental data in order to demonstrate GIS software and prepare students for jobs that require a GIS skillset. Prerequisites: CS103, EN101, and MA132 (Offered Fall and Spring).

   E. Degree or Certificate Requirements Met by Course
   A “C” grade or better in this course satisfies a general education elective course for the A.S. in NRM degree, the A.A. in Business, and the Bachelor of Science in Business Management with/without Accounting Concentration.

F. Course Activities and Design
This course will include: lectures, labs, readings, quizzes, tests, projects, and data collection field trips.

4. Course Prerequisite(s); Concurrent Course Enrollment
Prerequisites: CS103, EN101, MA132
Concurrent Course Enrollment: None

Required English/Mathematics Proficiency Level(s)
English Placement Level: EN202
Mathematics Placement Level: MA161

5. Estimated Cost of Course; Instructional Resources Needed
Cost to the Student: Tuition for a 3-credit hour course, cost of the textbook, and instructional materials fee.

Cost to the College: Instructor's salary and any additional costs to NMC.

Instructional resources needed for this course include: GIS software subscription, Microsoft 365 subscription, computer lab, laptop with specifications to run relevant software programs.

6. Method of Evaluation
Student learning will be evaluated for this course through: assignments, periodic quizzes and exams, paper discussions, group participation in problem solving exercises, practical application project assignments, and a final presentation.

7. Course Outline

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

1.0 Data Structures

2.0 Data Formats

3.0 Geo-databases

4.0 Datum's

5.0 Coordinate Projections

6.0 Basics of Map

7.0 Coordinate Transformations

8.0 Data Editing

9.0 Importance of Metadata

10.0 Remote Sensing

11.0 Classification

12.0 Accuracy

13.0 Field Skills

14.0 Vector Geo-processing

15.0 Raster Algebra

16.0 Interpolation

17.0 Modeling

8. Instructional Goals

The course will introduce students to:

1.0 The uses of different geospatial data types;

2.0 The production map to common environmental standards;

3.0 Geospatial data;

4.0 Common GIS software including ESRI products and QGIS;

5.0 The theory that underpinning the creation of geospatial data;

6.0 Automating simple GIS analysis processes;

7.0 Public geospatial datasets including NASA and US Census products; and

8.0 Geospatial analysis to make informed environmental management decisions.

9. Student Learning Outcomes

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

1.0 Evaluate various sources of data for GIS;

2.0 Explain the importance of metadata;

3.0 Demonstrate the conversion of analogue data to digital data for a GIS;

4.0 Compare and contrast vector and raster GIS;

5.0 Apply common GIS software including ESRI products and QGIS.

6.0 Apply cartographic principles of scale, resolution, projection, and data management to a problem of a geographic nature;

7.0 Describe data storage, editing, and retrieval techniques used in a GIS; and

8.0 Apply spatial analysis functions on a GIS to solve a geospatial problem.

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 Examinations;

3.0 Class Project;

4.0 Final Presentation; and

5.0 Classroom Activities and Exercises.

NR260.2

Final Audit Report 2024-04-02

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