GCERT Environ Sensing Data Model
Environmental Sensing, Data, and Modeling

Under Review | Fall 2025

Proposal Information

Workflow Status

In Progress

Faculty Senate Approval, Faculty Senate   expand ▲

Waiting for Approval | Faculty Senate Approval

Nancy Middlebrook

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Proposal Information

Sponsoring faculty/staff member

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College

College of Arts & Sciences:
Social Sciences &
Interdisciplinary

Department

Geography & Environmental
Studies

Campus

Main Campus

Effective Term and Year

Proposed Effective Term and Year
Fall 2025

Justification

Program Justification
Students across the academy benefit from training in the collection, analysis, and visualization of spatial data. The tools, practices, and theories that enable Geographic Information Systems (GIS), Remote Sensing, and Spatial Modeling, commonly known as Geographic Information Science (GIScience) or Spatial Data Science, are core to many of the fastest-growing sectors of the economy including health care, renewable energy development, environmental management, forestry, mining, intelligence, and social services. According to an Emergent Research report in Directions Magazine, the GIS market is projected to reach $134.23 billion by 2030. Employment across the many titles that encompass the sector is projected to grow at a faster than average rate (Bureau of Labor Statistics 2023), with many bachelor's and Master's level positions commanding six-figure starting salaries (Glassdoor.com). For the past 2-3 decades, professionals with degrees from across the academy have relied on a small number of GIScience-related courses to increase the marketability of their primary degree. Others have turned those extra few courses into the focus of their entire career; the current Vice President of Geospatial at Bohannon-Houston Inc., one of the largest engineering services firms in the western United States, took a few GIS courses as an employment safety net to his degrees in Spanish. A certificate focused on these skills will allow students to gain a credential in this very marketable skill a powerful supplement to any degree UNM offers.

Program Category and Level

Program Category
Certificate

Program Level
Graduate

Degree, Minor, or Certificate Name
Environmental Sensing, Data, and Modeling

Degree Type
Certificate (graduate)

Degree/Certificate Level
Graduate Certificate

CIP Code ❷
45.0702

CIP Title ❷
Cartography

Is this program also offered online?
No

New program courses

Composition of new program

Existing courses	Revised courses	New Courses	Total Credits
15	0	0	12-13

Pre-proposal (new degrees/certificates only)

Pre-proposal Executive Summary ❷
- ESM_Cert_08302023.docx
- Graduate Certificate Env Sensing 2.pdf

Program Duplication
At UNM, there is no direct duplication. The Department of Geography and Environmental Studies offers related B.S., M.S., and Ph.D. degrees but no certificate. The next closest duplication at UNM comes from UNM Continuing Education courses, which result in CEUs.

Correspondence
- Re: New Certificate Program.pdf

Pre-proposal Approved?
Approved

File uploads

Proposal File Upload ❷

- ESM_Cert_08302023.pdf
- Graduate_Certificate_NewHED_ESM_10182024.docx

Associated Forms

Select any associated course forms that exist

Select any associated program forms that exist

Catalog Information

Program Description

This graduate certificate in Environmental Sensing, Data, and Modeling (ESDM) may be earned through successfully completing the program requirements outlined below. The certificate is designed to provide knowledge and competencies to enhance a student's graduate degree or serve as a credential for open university graduate students while providing exposure to a range of topics and techniques in Geographic Information Science as it applies to environmental characterization and systems modeling.

Admissions Requirements

Active graduate student at UNM.

Graduation Requirements

A student's program of study must satisfy the following requirements, completing one course from each of the four program areas:
Spatial Data Science
Remote Sensing
Spatial Data Communication
Modeling Environments
Topics courses need a Program Director's approval to count toward the certificate, as the topics vary from semester to semester.

Professional Credential/Licensure Program Information

License/Certification associated with program
No

Concentrations

Program Concentrations

Code	Title

Concentration Required

No

Certificate Information

Certificate Requirements

- Complete all of the following
  - Spatial Data Science:
  - Complete at least 1 of the following:
    - GEOG525 - Advanced GIScience Seminar   (3)
    - GEOG527 - Introductory Programming for GIS   (3)
    - GEOG528 - Open Source GIS Programming   (3)
    - GEOG580L - Spatial Statistics   (3)
    - GEOG581L - Introduction to GIS for Graduate Students   (3)
    - GEOG588L - GIS Concepts and Techniques   (3)
    - EPS555L - Computational and GIS Applications in Geomorphology   (3)
  - Remote Sensing:
  - Complete at least 1 of the following:
    - GEOG524 - Advanced Remote Sensing Seminar   (3)
    - GEOG583L - Remote Sensing Fundamentals   (4)
    - GEOG584L - Applications of Remote Sensing   (4)
  - Spatial Data Communication:
  - Complete at least 1 of the following:
    - GEOG585L - Interactive Web Mapping   (3)
    - GEOG586L - Applied GIS and Spatial Analysis   (3)
  - Modeling Environments:
  - Complete at least 1 of the following:
    - GEOG523 - Environmental Systems Modeling   (3)
    - EPS576 - Physical Hydrology   (3)
    - CE547 - GIS in Water Resources Engineering   (3)
    - EPS522 - Selected Topics in Geophysics   (3)
    - GEOG587L - Geocomputation and Spatial Modeling   (3)

Grand Total Credits: 12 - 13