

Organization, Information, and Learning Sciences (OILS) 515 / Geography and Environmental Studies (GEOG) 522 - Introduction to Spatial Data Management (3 Credit Hours)- Syllabus

Karl Benedict, Associate Professor - College of University Libraries and Learning Sciences

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Many data products are inherently spatial. Obviously, spatial data include data collection locations, but many other data may also be considered spatial: locations in space that documents pertain to and locations of historic or literary events illustrating just a few. While maps are a familiar product derived from spatial data, there is significant understanding of the underlying data – the processes to which it has been subjected, the actual values within the data, the originator of the data, any limitations in the appropriate use of the data, and the nature of the dataset itself (format, scale, coordinate system, units) – that is required before it can be productively used for research or applications. This course is designed to provide graduate-level students with the necessary skills and knowledge to meet this challenge through hands-on work in *discovering, creating, managing, using, documenting* and *sharing* spatial data. After completing this course students will be prepared to develop a plan for the management of their spatial data, locate and evaluate data sources that they need for their research, create and structure data that they collect for maximum value both during and after their research project, and document their data throughout their research projects, maximizing the impact of their research and the value of the data they generate and share with other researchers.

Course Instructor

Karl Benedict

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Office Hours: Online or in-person, by appointment.

Appointment Calendar: <https://libcal.unm.edu/appointments/karlbenedict>

If a needed appointment time isn't available through the calendar send me an email to arrange for alternative times.

Office Location:

Centennial Science and Engineering Library - CSEL L173

Course Description and Objectives

An understanding of core spatial data concepts and principles is increasingly important in the current world of collaborative, spatially enabled research and applications. We are no longer working in a vacuum as individual researchers that only need to understand and use the data that we create and use in our separate research projects. Successful research depends upon being able to integrate data generated by others with our own and by extension being able to share our data with others, both during our research projects and also for posterity (and increasingly to meet the requirements of funding agencies, publishers, and our peers). This class will focus on the following aspects of spatial data management that relate to this need for effective integration, use, collaboration and sharing:

- The *Research and Data Lifecycles*
- Types of spatial data
- Spatial database design and management
- Working with and managing gridded data
- Spatial data documentation standards and practices
- Data management planning
- Ethical, legal and privacy issues as they relate to spatial data
- Strategies for sharing spatial data

Upon completion of the course students will have knowledge and skills in the following areas:

- Locating and evaluating spatial data based upon knowledge of formats, content models and documentation standards
- Structuring data (both in terms of format selection and content) from a variety of sources to enable integrated research
- Evaluate data products to determine which elements of a dataset might raise ethical, legal or privacy issues if released or shared with others
- Documenting data as an ongoing process throughout the research cycle
- Producing machine- and human-readable documentation for data to support discovery, understanding, and use of data that they produce
- The options and strategies for effectively sharing their spatial data with collaborators and transitioning those data into long-term preservation systems

Detailed weekly objectives are available in the separate Goals and Objectives document. ([Web page](#)) | ([PDF](#))

Course Format

The course is structured as a combination of short lectures/demonstrations that set the stage for the technical topics covered in the readings, hands-on work with data and data documentation, and data management planning exercises. While offered as an online course, several online web conferences (collaboratory sessions) are required as part of the class participation. The times of these sessions will be established during the first week of class based on the availability of times for the students and class instructor.

Readings

All of the course readings are available through online resources available through UNM Library subscriptions and databases or directly through open access materials. A number of the readings for the course are collected in a shared *Safari Books Online* [playlist](#). You will need to create an account with Safari Books Online the first time you access the collection. From then on you will login with the account information you used when you created the account. The specific readings for each week are provided in the separate Goals and Objectives document. ([Web page](#)) | ([PDF](#))

Evaluation and Grading

Course grades will be based on a combination of participation in live and online discussions and peer-review, the smaller assignments (listed under the “Assignment” column in the class calendar), and the semester-long class project. The grade for the class will be weighted according to the following breakdown:

- Class Participation: 20% (50 pts)
 - Attending required collaboratory sessions in weeks 1, 4, 8, 12, and 16 (10 pts)
 - Data Management Plan peer review (20 pts)
 - Final Project peer review (20 pts)
- Small Assignments: 40% (100 pts)
 - Literature Review (33 pts)
 - Data Review (33 pts)
 - Data Management Plan (34 pts)
- Class Project: 40% (100 pts)
 - Step 1 - Project plan (10 pts)
 - Step 2 - Dataset descriptions (10 pts)
 - Step 3 - Submission of project materials for peer review (5 pts)
 - Step 4 - Submission of final datasets and documentation (50 pts) and presentation (25 pts)

Late Assignments - in the absence of **documented** circumstances beyond your control that prevent your timely submission of all assignments you will lose 10% of the potential points for the assignment **per day** until the assignment is submitted.

Based upon a total of 250 points for the class, the following breakdown of earned grades will be in effect:

Percent	Points	Letter Grade
96.67 - 100.00	242 - 250	A+
93.33 - 96.66	233 - 241	A
90.00 - 93.32	225 - 232	A-
86.67 - 89.99	217 - 224	B+
83.33 - 86.66	208 - 216	B+
80.00 - 83.32	200 - 207	B-
76.67 - 79.99	192 - 199	C+
73.33 - 76.66	183 - 191	C
00.00 - 73.32	000 - 182	F

As this is a graduate course grades of C-, D+, D, and D- are not allowed for graduate students. As a result these grades are not included in the grading scheme.

While students are encouraged to collaborate in their work on the project and homework assignments, submitted work must be original and written and submitted by each individual student.

Please refer to the [Pathfinder](#) for detailed student conduct policies, and in particular the following [Policy on Academic Dishonesty](#).

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Technical Requirements

Skills

- Use UNM Learn (help documentation located in “How to Use Learn” link on left course menu, and also at <http://online.unm.edu/help/learn/students/>).
- Use email – including attaching files, opening files, downloading attachments
- Copy and paste within applications including Microsoft Office
- Open a hyperlink (click on a hyperlink to get to a website or online resource)
- Use Microsoft Office applications
 - Create, download, update, save and upload MS Word documents
 - Create, download, update, save and upload MS PowerPoint presentations
- Use the in-course web conferencing tool (Collaborate Web Conferencing software)
- Download and install an application or plug in – required for participating in web conferencing sessions and running other applications required for successful work in the course (see below for a list of software requirements)

Software

- Recent Windows, Mac or Linux Operating System
- GIS - Quantum GIS (QGIS) - <http://www.qgis.org/>
- Spatial Database - SpatiaLite (with Rasterlite support) - installed as part of QGIS
- Python (possible, based upon interest)
- Microsoft Office products are available free for all UNM students (more information on the UNM IT Software Distribution and Downloads page: <http://it.unm.edu/software/index.html>)

Hardware

- A high speed Internet connection is highly recommended.
- Supported browsers include: Internet Explorer, Firefox, and Safari. Detailed Supported Browsers and Operating Systems: <http://online.unm.edu/help/learn/students/>
- Any computer capable of running a recently updated web browser should be sufficient to access your online course. However, bear in mind that processor speed, amount of RAM and Internet connection speed can greatly affect performance. Many locations offer free high-speed Internet access including UNM’s Computer Pods. The size and complexity of the datasets you select for your class project may require additional memory and storage beyond the baseline required to access the online learning environment.

Web Conferencing

Web conferencing will be used in this course during the following times and dates:

- August 21, 2019. 5:00-7:00 pm
- September 11, 2019. 5:00-7:00 pm

- October 9, 2019. 5:00-7:00 pm
- November 6, 2019. 5:00-7:00 pm
- December 4, 2019. 5:00-7:00 pm

For the online sessions, you will need:

- A USB headset with microphone. Headsets are widely available at stores that sell electronics, at the UNM Bookstore or online.
- A high-speed internet connection is highly recommended for these sessions. A wireless Internet connection may be used if successfully tested for audio quality prior to web conferencing.
- For UNM Web Conference Technical Help: (505) 277-0857

Tracking Course Activity - UNM Learn automatically records all students' activities including: your first and last access to the course, the pages you have accessed, the number of discussion messages you have read and sent, web conferencing, discussion text, and posted discussion topics. This data can be accessed by the instructor to evaluate class participation and to identify students having difficulty

Weekly Schedule

Week	Dates	Topic	Collaboratory	Assignment	Project Milestones
1	Aug 19-25	Course Overview - Introduction to the Data Lifecycle	Class Introduction	-	-
2	Aug 26 - Sep 01	Types of Spatial Data - Vector	-	Start literature review	Define data management focus for term
3	Sep 02-08	Types of Spatial Data - Raster	-	-	-
4	Sep 09	Database design I	Present literature review results	Start data review for documentation, usability and understanding	-
5	Sep 16 - 22	Database design II	-	-	-
6	Sep 23 - 29	Geodatabase design	-	-	-
7	Sep 30 - Oct 06	Managing raster data	-	-	-

Week	Dates	Topic	Collaboratory	Assignment	Project Milestones
8	Oct 07 - 13	Data formats for Analysis and Archiving	Presentations of data review	-	Enumerate specific data (\geq three datasets) to be used in the project
9	Oct 14 - 20	Documenting data - the interview	-	-	Create initial data
10	Oct 21 - 27	XML Document creation, editing and validation	-	-	-
11	Oct 28 - Nov 03	Metadata Standards - FGDC	-	-	Document Data
12	Nov 04 - 10	Metadata Standards - ISO and Dublin Core	Data management planning process Q&A	Start data management plan	-
13	Nov 11 - 17	Data management planning	-	-	-
14	Nov 18 - 24	Data management planning	-	-	-
15	Nov 25 - Dec 01	Sharing Data	-	Data management plan peer review	Project data and documentation peer review
16	Dec 02 - 08	Emerging concepts/ Ethical, legal and privacy issues	Project Presentations	-	Present project results and peer review outcome

Additional Notes

Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus, especially the LoboRESPECT Advocacy Center and the support services listed on its website (<http://loborespect.unm.edu/>). Please note that, because UNM faculty, TAs, and GAs are considered “responsible employees” by the Department of Education, any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university’s Title IX coordinator. For more information on the campus policy regarding sexual misconduct, please see: <https://policy.unm.edu/university-policies/2000/2740.html>.

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