

Geographic Research Methodology

Geography 4020

Generic

Course Syllabus

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Required Text: An Introduction to Scientific Research Methods in Geography
By Daniel R. Montello and Paul C. Sutton

Course Description

This course will prepare you to make independent contributions to the discipline of geography by designing, conducting, and communicating the results of your own research. We take a scientific approach to the discipline from which we will go over topics such as: 1) The Scientific Method, 2) History and philosophical systems of the discipline of Geography: Natural Science, Social Science, and the Humanities, 3) Fundamental research concepts such as theory, empiricism, and scale, 4) Data collection and measurement, 5) Design of Analysis and Design of Experiments, 6) Sampling and statistical data analysis, 7) Data display and geo-visualization, 8) Reliability and validity, 9) GIScience and GISystems, 10) Scientific writing and communication, and 11) Ethics in Research. Throughout the course you will be conducting your own literature review and sharing it with the class. In addition to simply being a great way to inform yourself of a subject area, a literature review is also a means by which you make sure that whatever research you choose to embark on has not been done before and is informed by what others have already explored and communicated to the broader community. In addition you will prepare a research proposal as both a powerpoint presentation and as a written document. Ideally this research proposal will be your actual proposal for your graduate degree but this is not absolutely required.

Method of Grading

Class Participation (as measured by discussion board participation)	25%
Two Paper Abstracts and Discussion Questions (10% each)	20%
Composite bibliography of at least 50 references	5%
Completion Certificate of the RCR at this web site https://www.citiprogram.org/default.asp?language=english	5%
Peer Evaluation of fellow students draft proposal (3 @ 5% each)	15%
Written Research Proposal	30%

Tentative Schedule of Topics

And more importantly – What You Need to Do each Week

Note: As stated above, this is a ‘Tentative’ schedule of lecture topics. Some weeks may bleed into the previous or following weeks topics. Typically I will lead a lecture/discussion on the readings from the text for the first hour or so of class. This will be followed by discussions and presentations from you the students on either your research project or your abstracts.

Week 1

A Scientific Approach to Geography & Fundamental Research Concepts: Discussion of Geography as a hybrid discipline that incorporates physical science, social science, and the humanities. Theory, Hypotheses, and Empiricism. Discussion of issues of scale in geographic inquiry. How to think and write as a geographer.

What you need to do during Week #1:

- 1) Read Ch 1 & 2 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Read the following papers that have been posted to blackboard:
Expose yourself to Geographic Research by Peter Gould
Ruminations of a dis-peptic ex-editor by John Fraser Hart
Publishing in Geography, a guide for new Researchers (you can just scan this one)
- 3) Contribute your thoughts to the posted Week #1 Discussion Board questions.

Week 2

Data Collection, Physical Measurements, Behavioral Observations and Archives, and Explicit Reports Primary and secondary data sources, Quantitative and qualitative approaches to inquiry, coding of data to facilitate analysis

What you need to do during Week #2:

- 1) Read Ch 3,4,5, & 6 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #2 Discussion Board questions.
- 3) E-mail me your first abstracted paper choosing one of the ‘Seminal Papers in Geography’ which are posted to the blackboard web-site. As a guide I have posted a file titled ‘*SampleAbstractParamountPrinciples.doc*’ which is an example of an abstract for the Garret Hardin paper titled: *Paramount Principles in Ecological Economics* that can be found in the ‘Seminal Papers of Geography’ folder.

Week 3

Research Design (Design of Experiments and Design of Analysis): The idea of experimental control and how we often do not have it in geographic research. Overview of basic research designs and a discussion of computational modeling. Ethical Issues surrounding the use of Human Subjects in Research. Library as a resource.

What you need to do during Week #3:

- 1) Read Ch 7 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #3 Discussion Board questions.

- 3) Begin your 'Human Research Protection Certification' and e-mail me your digital certificate before the end of Week #9. This document posted to blackboard titled: *IRB_Process_DU.pdf* may be useful (things change from year to year though) as might this web site (<http://www.du.edu/orsp/Responsible%20Conduct%20of%20Research.html>).

Week 4

Sampling: Sampling Frames and Sampling Designs. Issues associated with spatial sampling. Discussion of sampling with considerations of spatial auto-correlation.

What you need to do during Week #4:

- 1) Read Ch 8 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #4 Discussion Board questions.
- 3) E-mail in your second abstracted paper using one of the 'Seminal Papers in Geography'

Week 5

Statistical Data Analysis: Stochastic vs. Deterministic processes and models. Statistical description as an efficient means of summarizing large quantities of information. The logic of statistical inference and hypothesis testing.

What you need to do during Week #5:

- 1) Read Ch 9 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #5 Discussion Board questions.
- 3) Start doing a literature review for your research proposal and learn how to use a citation software program such as EndNote, ProCite, or the free library version of RefWorks.
- 4) Start your Bibliography which you will turn in during Week #7 with this software.

Week 6

Data Display: Tables, Graphs, Maps, Visualizations A good figure is worth 1,000 words. This week we will look at many of the principles of the visual display of quantitative and qualitative information. A good supplemental text for this weeks topic is Edwin Tuffte's The Visual Display of Quantitative Information.

What you need to do during Week #6:

- 1) Read Ch 10 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #6 Discussion Board questions.
- 3) Consider buying the book "The visual display of Quantitative Information" by Ed Tuffte
- 4) Work on your research proposal which you will provide to peers next week.

Week 7

Reliability and Validity: Here we will examine the idea of 'reliability' of measurements. We will also discuss related issues of accuracy and precision. Validity or the 'Truth Value' of research results and interpretations will also be discussed. Various types of validity will be defined: Internal Validity, External Validity, Construct Validity, and Statistical Conclusion Validity.

What you need to do during Week #7:

- 1) Read Ch 11 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #7 Discussion Board questions.
- 3) E-mail your research proposal to each of your three assigned 'peer reviewers' (For example: If you are Janine Ferarese send your proposal to Steve Ewest, Francis Fitzgerald, and William Fitzhugh). I have provided several sample research proposals on the blackboard course web site for you to model from if you wish. Each member of the 'Pools' identified below will provide a peer evaluation of each other members proposal. Note: you should also receive a proposal from each of them which you will evaluate using the form posted to blackboard (StudentEvaluationOfResearchProposal.doc). I have based these pools on the enrollments I see in the class as of January 2nd, 2011. Let me know if this does not work. In your numerical 1-3 assessment of various aspects of these proposals think of the numbers this way: 3 ('exceeds standards'), 2 ('meets standards'), and 1 ('does not meet standards').

Pool #1: Steve Ewest, Janine Ferarese, Francis Fitzgerald, William Fitzhugh

Pool #2: Gabrielle Friedman, Lana Hesler, Shawn Jordan, Lindsey Messinger

Pool #3: Ashley Mott, David Muenkel, Rachel Orlicky, Jennifer Read

Pool #4: Jason Reyes, Gerry Shisler, James Valenza, Kayce Wohlman

Week 8

Geographic Information Techniques in Geography and GIScience Here we discuss several aspects of the special nature of spatial data and the means by which we represent and analyse spatial data. Spatial scale, temporal scale, measurement scale, and the modifiable areal unit problem will also come into play.

What you need to do during Week #8:

- 1) Read Ch 12 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #8 Discussion Board questions.
- 3) E-mail your three 'Peer Reviews of Proposals' to me, and send the appropriate one to each other member of your pool (e.g. if you are Jason Reyes send your evaluation of Gerry Shisler's proposal to Gerry Shisler, Your eval of James Valenza's to James Valenza, and your eval of Kayce Wohlman's proposal to Kayce Wohlman.). I grade each of your peer evaluations based on your written comments and my perception of the validity of your numerical assessments of the categories.

Week 9

Scientific Communication in Geography and Ethics in Research: This week we will provide some general and specific suggestions for various modes of scientific communication including oral presentations and journal articles. Some discussion of the peer review system and major library resources will also take place. The final chapter on ethics will cover some of the standard

ethical issues that institutional review boards consider on a regular basis particularly issues associated with human subjects research.

What you need to do during Week #9:

- 1) Read Ch 13 & 14 of text (look at posted Powerpoint Summaries if you find this useful)
- 2) Contribute your thoughts to the posted Week #9 Discussion Board questions.
- 3) E-mail me your Bibliography and your RCR digital certificate if you have not already done so. Go through the items in the 'Method of Grading' on the first page of this document to make sure you have completed all assignments.

Week 10

No Reading assignment. Work on your Research Proposals and Presentations.

What you need to do during Week #10:

- 1) E-mail me both a powerpoint presentation and word document of your research proposal. You should have improved it based upon feedback from your peers via their peer evaluations of your first draft of the proposal. This has to be e-mailed to me at psutton@du.edu by FRIDAY MARCH 11th 2011.

Assignment Expectations

See the course web page for samples of what the expectations for the assignments are. I have provided several examples of both written proposals and powerpoint proposal presentations on the Blackboard site in the course documents section. Use these for guidance and expectations. Feel free to e-mail me with any questions.

Discussion Boards

I will look at the discussion boards every Thursday from 2-4 pm. I will provide comments and feedback to the discussion boards at that time. I will also be available via computer at that point in time. The first Thursday being an exception. I will not be available then.