I. General Education Review - Upper-division Writing Requirement

<table>
<thead>
<tr>
<th>Dept/Program Subject</th>
<th>Anthropology</th>
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<tbody>
<tr>
<td>Course(s) Title</td>
<td>Advanced Anthropological Statistics</td>
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</table>

Description of the requirement if it is not a single course

The upper-division writing expectation must be met either by taking an upper-division writing course from the approved list in the Academic Policies and Procedures section of this catalog (see index), or by taking one of the following courses: ANTH 314, 402, 404, 413, 420, 431, 450, 451, 453, 454, 455, or LING 475.

II. Endorsement/Approvals

Complete the form and obtain signatures before submitting to Faculty Senate Office.

<table>
<thead>
<tr>
<th>Please type / print name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>Randall Skelton</td>
<td></td>
</tr>
<tr>
<td>Phone / Email</td>
<td>4245/randall.skelton@umontana.edu</td>
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<tr>
<td>Program Chair</td>
<td>John Douglas</td>
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</table>

III. Overview of the Course Purpose/Description

UG 402 Advanced Anthropological Statistics 3 cr. Offered spring. Prereq., introductory course in statistics or consent of inst. Focus on techniques used for microcomputer-based data management and multivariate analysis.

The grade for the class is based on weekly written assignments and a paper that presents the analysis and results of a term project.

IV. Learning Outcomes: Explain how each of the following learning outcomes will be achieved.

<table>
<thead>
<tr>
<th>Student learning outcomes: Identify and pursue more sophisticated questions for academic inquiry</th>
<th>Students learn how to use multivariate statistical methods to explore and test hypotheses about anthropological data sets.</th>
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<tbody>
<tr>
<td>Find, evaluate, analyze, and synthesize information effectively from diverse sources (see <a href="http://www.lib.umt.edu/informationliteracy/">http://www.lib.umt.edu/informationliteracy/</a>)</td>
<td>Students must integrate material from their textbook, lecture, and required browsings.</td>
</tr>
<tr>
<td>Manage multiple perspectives as appropriate</td>
<td>Multiple perspectives are not especially applicable here, though there is the issue of whether a hypothesis is true or not. Alternative ways of interpreting the results of analyses are discussed throughout.</td>
</tr>
<tr>
<td>Recognize the purposes and needs of discipline-specific audiences and adopt the academic voice necessary for the chosen discipline</td>
<td>The focus is on learning to write papers in general five-part scientific paper format. In general, anthropologists use this format in their professional writing. Students are taught to phrase their conclusions in conventional statistical language.</td>
</tr>
<tr>
<td>Use multiple drafts, revision, and editing in conducting inquiry and preparing written work</td>
<td>A first draft of the term paper is submitted, graded, and returned to the student for editing and resubmission as a final draft.</td>
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</tbody>
</table>
Follow the conventions of citation, documentation, and formal presentation appropriate to that discipline  
CSE style is used for citation and referencing in this class.

Develop competence in information technology and digital literacy  
Students must word process their documents, then submit them to me via Blackboard’s digital dropbox. Further they learn how to use statistical software (SPSS). Much of the required reading for the class consists of required browsing of web documents. Students are taught about online resources that they can use to help them in determining which statistical test to use and in interpreting the results.

<table>
<thead>
<tr>
<th>V. Writing Course Requirements Check list</th>
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<tbody>
<tr>
<td>Is enrollment capped at 25 students?</td>
</tr>
<tr>
<td>If not, list maximum course enrollment.</td>
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</tbody>
</table>
| Explain how outcomes will be adequately met for this number of students. Justify the request for variance. | □ Yes ☐ No  
It is capped at 15. |
| Are outcomes listed in the course syllabus? If not, how will students be informed of course expectations? | ☐ Yes ☐ No |
| Are detailed requirements for all written assignments including criteria for evaluation in the course syllabus? If not how and when will students be informed of written assignments? | □ Yes ☐ No  
General guidelines for doing the assignments are in the syllabus, but the specific requirements for each assignment are in separate documents (one for each assignment) on Blackboard. |
| Briefly explain how students are provided with tools and strategies for effective writing and editing in the major. | It is specifically addressed in the documents for each assignment and I lecture about it in class on multiple occasions. |
| Will written assignments include an opportunity for revision? If not, then explain how students will receive and use feedback to improve their writing ability. | ☐ Yes ☐ No |
| Are expectations for Information Literacy listed in the course syllabus? If not, how will students be informed of course expectations? | ☐ Yes ☐ No |

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<tr>
<th>VI. Writing Assignments: Please describe course assignments. Students should be required to individually compose at least 20 pages of writing for assessment. At least 50% of the course grade should be based on students’ performance on writing assignments. Clear expression, quality, and accuracy of content are considered an integral part of the grade on any writing assignment.</th>
</tr>
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<tbody>
<tr>
<td>Formal Graded Assignments</td>
</tr>
<tr>
<td>Assignment 0: Find a place to use SPSS (not graded)</td>
</tr>
<tr>
<td>Assignment 1: Descriptive &amp; Inferential Stats. Includes a formal treatment of hypothesis</td>
</tr>
</tbody>
</table>
Assignment 2: Multiple Regression. Includes an introduction to scientific report/paper format. Includes a component that focuses on writing a formal “introduction” section for a scientific paper.

Assignment 3: Principal Components Analysis and Factor Analysis. Includes a component that focuses on writing a formal “materials and methods” section for a scientific paper.

Assignment 4: Discriminant Analysis. Includes a component that focuses on writing a formal “results” section for a scientific paper.

Assignment 5: Cluster Analysis. Includes a component that focuses on writing a formal “discussion” section for a scientific paper.

Assignment 6: Clustering PC & DF Scores. Includes a component that focuses on writing a formal “conclusions” section for a scientific paper.

Assignment 7: ANOVA. The writeup for this assignment is presented as in scientific paper format.

Assignment 8: Find a Data Set
Assignment 9: Make a Research Plan
Assignment 10: Data Analysis Results
Assignment 11: Preliminary Paper Draft
Assignment 12: Final Paper Draft

Informal Ungraded Assignments | None

**VII. Syllabus:** Paste syllabus below or attach and send digital copy with form. The syllabus should clearly describe how the above criteria are satisfied. For assistance on syllabus preparation see: http://teaching.berkeley.edu/bgd/syllabus.html
ANTHROPOLOGY 402: Spring 2009
Advanced Anthropological Statistics
TR 8:10-9:30  SS 258

Dr. Randy Skelton  226 Social Sciences Building
Office Hours: MWF 8:00-8:50, TR 10:00-11:00
Phone: 243-4245  Email: randall.skelton@umontana.edu

GOALS AND OBJECTIVES
The goal of this class is to learn several advanced (multivariate) methods of data analysis and to learn the
skill of writing a scientific paper. The focus will be on use of statistical software to perform analyses, with
interpretation and write-up of the results obtained. Students who pass this class will:
• Learn to use several types of statistical analysis including multiple regression, principal components
analysis, cluster analysis, discriminant analysis, and more.
• Explore how these analysis can be applied to novel situations by carrying out a project that involves the use
of data analysis.
• Gain facility with a statistical software packages such as SPSS or OpenStat.
• Acquire the ability to interpret the results of multivariate statistical analyses and express them in a
professional manner.
• Become familiar with standard scientific paper format.

ADMINISTRIVIA
Blackboard Supplement
There will be a Blackboard supplement for this class, where I will post various types of useful materials and
information, including some required materials. You should have received email from the Blackboard administrators
that explains how to access Blackboard. If not, you will find that the people at IT Central in SS120 may be able to
help you get access. As your instructor I can only be responsible for content placed on the Blackboard supplement –
not for it's administration.

Required Materials
Chapman & Hall/CRC Press. Hereafter I will refer to this text as “the Handbook”. The Handbook provides a walk-
through of many of the methods we will be covering. The Handbook will be most useful to you when you are doing
your assignments, and need not be read before coming to class.

Online Resources: For each week I have some required browsing listed. Some of this is for help with your
assignment. Documents indicated in bold are conceptual and you should read this material thoroughly before class.
There are many statistical texts online, some of which I have links to in the “Helpful Materials” section of the class
Blackboard shell. The most useful of these materials are made available on the WWW by Dr. G. David Garson (a
professor in public administration at North Carolina State University), Karl L. Wuensch (a professor in psychology at
East Carolina University), and William K. Trochim (a professor in policy analysis and management at Cornell
University).

Statistical Package: We will use SPSS. SPSS is available in the Fred W. Reed Social Sciences Research
Lab (SSRL) and other campus computing labs. You may also buy SPSS. Other Software: I assume that you have,
and know how to use, Microsoft Office products, especially Word and Excel. You may also download the free
office package OpenOffice and use it instead, though I don’t guarantee that it operates exactly the same as MS
Office.

Computer access: You will need access to a computer with SPSS installed. SPSS is installed on computers
for student use in the SSRL. We will have an orientation to the use of these labs by the SSRL staff early in the
semester. Also, the computers in the LA 242 and UC 225 general student labs are supposed to have SPSS installed.
You will need to show your GrizCard for access to the general student labs.

Data Storage: You will need some mechanism for storing the data sets you use and the output from the
statistical software. Although you could probably get by using floppy disks or zip disks, I strongly suggest that you
purchase a USB flash drive (also known as a memory stick, pen drive, etc.). You will want at least 256MB, and larger
capacity drives are better. These drives are widely available and quite inexpensive.

How will this class work?
1. First 2/3 of the semester. We will explore several methods of advanced statistical analysis. The focus will be on using SPSS to perform the analysis, interpreting the output, and writing up the procedure in standard scientific paper format. We will meet at every normally scheduled class meeting time. Each week there is an assignment due and you will be expected to do the analysis requested, write up your results, and submit them to me using Blackboard’s digital dropbox. Most weeks there will be a lecture on Tuesday, and we will work with data on Thursday.

2. Last 1/3 of the semester. You will each do a project in which you analyze a data set of interest to you in order to draw some conclusions about some topic of interest to anthropology. Grad students should use the data set they are working with in their thesis or dissertation research. We will continue to meet for class, and I will use this time to explore and demonstrate additional statistical and analytical methods. I will not allow you to fall behind or put off the steps of the project until the end, and there is an assignment related to your project due every week.

Grading
For undergraduate students, your grade will be based on attendance, preparation, and participation (25%); weekly exercises you complete (30%); and your project (45%). For graduate students, your grade will be based on attendance, preparation, and participation (20%); weekly exercises you complete (30%); and your project (40%). There are no examinations. Your score in the course will be calculated to yield your grade using this scale: A = 100-90, B = 89-80, C = 79-60, D = 59-50, F = <50. I may modify these basic grades with a + or - in special cases if I believe it is appropriate.

Basic Grading Philosophy for This Class
This class is not required for any students. Therefore, I assume that all students who have enrolled in the class have done so because they want to learn how to do data analysis. Given this, I will have little tolerance for any behavior which suggests that a student is trying to avoid learning the material. On the other hand, I encourage and try to reward behavior which suggests that a student is attempting to enhance how quickly or thoroughly they learn the material, how to minimize the effort involved in doing an analysis correctly, and similar wholesome strategies. I will assess your understanding of the material using assignments, and each student’s final write-up and presentation of their project. I will not give tests, because genuine understanding of this material is difficult to assess via a test, and because I do not want to encourage students to merely memorize material for a test.

Attendance Policy
Attendance is required at every class meeting except in the case of documented excusable absences (see the document online at http://www2.umt.edu/catalog/acpolpro.htm for University policy on excused absences). Attendance will constitute 20% of your grade.

Policy on Collaboration and Use of Outside Resources:
Students are encouraged to work and study together during the first 2/3 of the semester, including working together on completing the exercises. Additionally, there are many resources available on the internet and elsewhere, including model answers to most of the exercises in the textbook (see pp v-vi). I encourage you to use these to the extent that they enhance your understanding of the analyses being learned. My only requirement is that in your write-up you must acknowledge your collaboration with other students and/or your use of these and other resources. There is never a penalty for working with other students or using additional resources so long as you acknowledge them.

However, the privilege of collaboration and use of external resources does not extend to your required individual written solution to each exercise. Each student must write up the exercises independently using their own words. You should use these write-ups to show me that you understand the analysis being performed, how to make SPSS perform the analysis, and how to interpret the output generated by SPSS. In general, the way to do this is to provide a detailed explanation of why you took the steps you chose and how you drew any interpretations you made.

Regrettfully, I must punish infractions of this policy. If I find that two or more students have turned in write-ups that are copies, or which I judge to be “too similar”, I will split the credit for that assignment evenly between the students involved. If I detect an answer that is too similar to the model answer on the textbook website or to those on other websites that I know of, I will at most award that student half credit.

During the last 1/3 of the semester each student will be working on their own individual data analysis project. You are welcome and encouraged to discuss your project with anybody who will sit still for it. However, you must write it up individually in your own words. Furthermore, you must acknowledge any help you got from fellow students, or anyone else, in the acknowledgment section of your final report. This principle also extends to published and online resources, which must be cited in your report and referenced in the bibliography of your report. Direct copying of published or online materials, or use of them without citation is considered plagiarism, a form of academic misconduct, and I am required by University policy give you zero credit for any assignment for which I detect it.
Weekly Assignments

You will have an assignment to do (almost) every week. The assignment will be posted on Blackboard. Each assignment is explicit in what I want you to do and what I want you to submit. Most of the assignments will also include practice in writing parts of a scientific research paper.

Project

Each student will complete a project that involves analysis of a data set of their choice, applied to an anthropological problem they are interested in. Certain milestones in the completion of the project (selection of a data set, analysis results, rough draft, and final draft) will be submitted, with one or another of these due each week. The format of the paper should be scientific research paper format, which you will learn over the course of the semester. Here are some things that I will expect to see in your research paper.

1. Five part scientific format, including the following sections: introduction, materials & methods, results, discussion, and conclusions.
2. The introduction should include at least a brief literature review of other studies that have been done in the area you are working on. A minimum of 5 sources should be discussed and cited in the text of this section. These sources should be referenced in the bibliography.
3. Your paper should include a bibliography. The citation or bibliography format should be according to one of the major journals in anthropology, such as American Anthropologist, American Journal of Physical Anthropology, etc. Alternatively, you can use CSE/CBE style. Online materials are acceptable if referenced properly.

Submission Procedures

Weekly assignments and project fragments should be submitted via the Digital Dropbox on Blackboard. This saves me time, saves you printing costs, saves trees, and (possibly most importantly) helps me avoid losing students’ work. Assignments are due via Blackboard before Tuesday at midnight during the week after they are listed in the syllabus. There will be a penalty of 20% of that assignment’s score for each day (or fraction of a day) that an assignment is late. You can expect me to grade your assignments promptly and give you feedback via a grading form or via comments on your assignment returned to you via Blackboard.

Other Statistical Software

As the person who has to grade your assignments, I have to standardize on one statistical software package. For many reasons, I have chosen SPSS for our standard statistical software for ANTH 402. However, there are several other commercial, shareware, and freeware statistical software packages available. In particular, I am impressed with two freeware statistical software packages – PAST and Stats4U (formerly OpenStat). These programs do almost everything SPSS does, though the output isn’t as pretty or as easy to capture for . PAST offers additional useful types of analysis that SPSS doesn’t, such as cladistics, neighbor joining clustering, mixture analysis, and correspondence analysis. It has the best, fastest, and most flexible cluster analysis that I have ever seen. In my own research I use PAST more often than SPSS.

Advanced Anthropological Statistics: Schedule

The required browsings in bold should be read before coming to class and the others are for help with your assignment and need not be read until you do the assignment. Readings in Text are from the Handbook and need not be done before class. Assignments are due before 12:00 midnight on the Tuesday of the week after the assignment is listed.

<table>
<thead>
<tr>
<th>WEEK OF</th>
<th>TOPIC</th>
<th>READING IN TEXT</th>
<th>ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/26</td>
<td>Getting Started</td>
<td>Chapter 1</td>
<td>Understand how the class will work</td>
</tr>
<tr>
<td></td>
<td>Intro to SPSS and the Labs</td>
<td></td>
<td>Find some place to use SPSS</td>
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<tr>
<td></td>
<td>REQUIRED BROWSING (Documents or Links on Blackboard)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skelton, 2006a, What is (are) Advanced Statistics.</td>
<td>Browse the contents of the &quot;Helpful Materials&quot; section on Blackboard.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wuensch, 2005a, An Introduction to SPSS for Windows.</td>
<td></td>
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<tr>
<td>2/2</td>
<td>Types of Data</td>
<td>Chapter 2</td>
<td>Assignment 1: Descriptive &amp; Inferential Stats</td>
</tr>
<tr>
<td></td>
<td>Descriptive &amp; Inferential Stats</td>
<td>Chapter 3</td>
<td></td>
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</tbody>
</table>
Wuensch, 2005b, Exporting SPSS Output to a Word Document.

2/9  Multiple Regression   Chapter 4  Assignment 2: Multiple Regression

REQUIRED BROWSING (Documents or Links on Blackboard
Garson, 2006, Multiple Regression.
The Writing Center, University of North Carolina at Chapel Hill, 2007.  Scientific Reports
If you need a refresher on correlation and regression I recommend Nelson, et al., 2002, Chapter 7: Regression and Correlation

2/16  Principle Component Analysis   Chapter 11  Assignment 3: PCA and FA

REQUIRED BROWSING (Documents or Links on Blackboard
Wuensch, 2005c, Principal Components Analysis - SPSS.
Wuensch, 2005d, Factor Analysis - SPSS. [pp. 1-3. You can skip the rest.]

2/23  Discriminant Analysis   Chapter 12  Assignment 4: Discriminant Analysis

REQUIRED BROWSING (Documents or Links on Blackboard
Garson, 2006b, Discriminant Function Analysis.

3/2  Cluster Analysis   Assignment 5: Cluster Analysis

REQUIRED BROWSING (Documents or Links on Blackboard
Garson, 2006c, Cluster Analysis.

3/9  Clustering PC’s and DF’s

REQUIRED BROWSING (Documents or Links on Blackboard

3/16  ANOVA   Chapters 5 & 6  Assignment 7: ANOVA

REQUIRED BROWSING (Documents or Links on Blackboard

3/23  Beginning Your Project   Assignment 8: Find a Data Set

REQUIRED BROWSING (Documents or Links on Blackboard
Trochim, 2002d, Foundations.
Garson, 2006d, Research Designs.

3/30  **SPRING BREAK**

4/6  Project week 1  Assignment 9: Make a Research Plan

REQUIRED BROWSING (Documents or Links on Blackboard

4/13  Project week 2  Assignment 10: Data Analysis Results

REQUIRED BROWSING (Documents or Links on Blackboard
Anonymous, n.d., Characteristics of an Excellent Paper

4/20  Project week 3  Assignment 11: Preliminary Draft

REQUIRED BROWSING (Documents or Links on Blackboard
Skelton, 2002, Procedure for Researching and Writing a Thesis in Physical Anthropology
The Writing Center, University of North Carolina at Chapel Hill, 2007. Literature Reviews

4/27  Project week 4  Assignment 12: Revise your Paper and Turn In Final Draft

REQUIRED BROWSING (Documents or Links on Blackboard
The Writing Center, University of North Carolina at Chapel Hill, 2007. Revising Drafts

5/4  Project completion: Discussion of Projects

Finals Week   Monday, May 11, 8:00 (NOT 8:10) to 10:00. Meet at scheduled finals time for project presentations by grad students.

Bibliography