



AMBROSE
UNIVERSITY COLLEGE

BHS 410 BASIC MULTIVARIATE STATISTICS
BHS 410L LAB
Instructor: Don Liteplo

Fall 2012

Course Description

Multivariate analysis as applied to behavioural science. Correlation, simple and multiple regression, discriminant function analysis, canonical correlation, factor analysis, theories and application of behavioural measurement, reliability, and validity will be presented. Lecture and laboratory components.

This course builds on material learned in the BHS 310 course (a prerequisite). It reviews and expands upon material presented in the BHS 310 course and moves the student toward a working familiarity with multivariate analysis as it may be applied to the behavioural sciences.

Classroom time will be devoted mainly to explanation and discussion of theory and methods. Lab time will be devoted to demonstration of statistical software applications by the instructor, and to hands-on practice by the students and/or to completion of assignments (or, occasionally, to the completion of a lecture or the writing of a quiz).

Course Term

Semester: September 5th to December 14th, 2012
Times: Lectures: Wed & Fri 9:45 to 11:00 am
Lab Sessions: Mon 1:00 to 2:15 pm
Location: Lectures: Room A2131
Lab Sessions: Room A2131

Contacting the Instructor

Office: Room L2052 (Office Hours Posted on Office Door: other times are available by appointment.)
Office Telephone: (403) 410-2000 (Ext. 6907)
E-mail Address: dliteplo@ambrose.edu

As the course progresses, students of this course may be given a different (preferred) telephone number and/or e-mail address for *outside of class/lab* contact with the instructor. It is the student's responsibility to be sure that he/she has up-to-date contact information.

Additional Information

This course is designed to strengthen the student's understanding of basic statistical methods and to acquaint the student with the theory and application of advanced statistical methods, particularly multivariate. The focus will be on practical issues such as selecting the appropriate analysis, preparing data for analysis, menu-driven programming, interpreting output,

and written presentation of results. Four overlapping aspects of basic and advanced procedures will be covered:

- (1) Theoretical – The heuristic basis of the statistical techniques and assumptions underlying their use.
- (2) Practical – The use of *SPSS for Windows* as the statistical package to analyze multivariate data.
- (3) Interpretive – The skills to write accurate and informative results sections based on the techniques used.
- (4) Reflective – A focus on understanding some of the history, controversies, and limitations in the statistical procedures that we use.

Some lab sessions may be used to finish coverage of materials that couldn't be completed in the lecture classroom and some lab sessions may be devoted to the writing of quizzes. The lab sessions are an integral part of the course – attendance at lab sessions is *not* to be regarded as optional.

Required Texts (must be possessed by each student)

Field, Andy, *Discovering Statistics Using SPSS, Third Edition 2009*, Sage Publications Inc., ISBN 13: 978-1412977525. The text is *not* bundled with an SPSS CD.

Yockey, Ronald D., *SPSS Demystified – A Step-By-Step Guide To Successful Data Analysis, Second Edition 2011*, Prentice Hall, ISBN -13:978-0-205-73582-2. The text is *not* bundled with an SPSS CD.

Other Course Materials

A hand-held electronic calculator with *statistical functions* is required. While a particular calculator (make and model) cannot be specified, it is imperative that the calculator have statistical capabilities comparable to the TI BA II Plus (the officially-adopted calculator for course BHS 410). Support for the TI BA II Plus calculator is provided by the instructor; other calculators are not similarly supported. The course instructor will endeavor to assist students with calculator applications but, because of the wide variety of calculators in use, each student is ultimately responsible for knowing how to use the calculator that he/she brings to the course.

The SPSS software (Version 18.0 or 19.0, for Windows) has been installed by Ambrose IT staff on lab computers and library computers. These computers will be available for lab exercises/assignments/quizzes. It may be possible for students to purchase (or rent) a student version of SPSS for installation on the student's own computer, but this is definitely optional (not a requirement). Information re purchase (or rental) should be available at the Ambrose bookstore.

The instructor will provide some handout readings and examples (in hardcopy, or as pdf files which can be accessed via MOODLE) as the course progresses.

Attendance

The general expectation is that students will attend all classes and lab sessions in which they are registered. A combination of low academic performance and notable absences from classes or lab sessions may be brought to the attention of the program head. Additionally, a portion of the final grade for this course includes a percentage for *participation*, and absences from lecture and/or lab sessions can negatively impact marks for participation.

Expected Learning Outcomes

- Upon completion of this course, students should be able to demonstrate:
- how data is checked to determine if they are suitable for analysis and, if deemed unsuitable, if and how the data can be made suitable for analysis.
 - skill in deciding what statistical technique(s) will best answer different research questions.
 - ability to input data, run the appropriate statistical technique, and interpret the output, understanding what conclusions can be reached and their limitations.
 - ability to cast a critical eye on research literature, especially with respect to the appropriate use and interpretation of some of the more prevalent multivariate analyses.

Course Schedule

A *Detailed Course Schedule* will be handed out in the first week of the semester. This schedule will set out the topics, dates, and times for the lectures and lab sessions, and will also show the dates and times for assignments, quizzes, and the mid-term examination. The dates and times are subject to change at the instructor's discretion as the course progresses; changes, if any, will be few and will be communicated in advance. The following is a Broad Course Schedule.

TOPIC	READING/LEARNING REFERENCE
Review of Descriptive Statistics and Inferential Statistics (Univariate and Bivariate)	Instructor Lectures Notes/Examples on Moodle (largely from recent BHS 310 course) Exercises from the Yockey Guide.

The text includes chapters (notably chapters 1, 2, 3, and 4) that discuss and explain much of the above materials. These are not specifically required reading for this course (BHS 410), but the student will find them to be useful as a review of materials that were covered in the prerequisite BHS 310 course. A good level of comfort with the BHS 310 materials will contribute much to the student's ability to absorb BHS 410 materials and to obtain good grades in BHS 410 assignments, quizzes, and exams. Alternately, the student whose recall of the BHS 310 materials is a bit hazy may find it highly valuable to review chapters 1,2,3 and 4 of the Field text and review, if available, his/her notes from the BHS 310 course.

The balance/major portion of the lecture and lab sessions in this course will relate to portions of ten chapters in the text.

Assumptions	Chapter 5
Correlation	Chapter 6
Simple and Multiple Regression	Chapter 7
Comparison of Two Means (t-tests)	Chapter 9
Comparison of Three or More Means (ANOVA)	Chapters 10 and 12
Repeated Measures	Chapter 13
Mixed Measures	Chapter 14
Multivariate Analysis (MANOVA)	Chapter 16

Students are required to read in the above-listed ten chapters of the textbook in order to be prepared for the lectures, discussion, and problem-solving.

The ten chapters selected in the course textbook cover the main topics for study, but a few sections in some chapters will be omitted from lecture and/or lab coverage. In the early weeks of the course, students will be given a Readings List that will indicate the page numbers for specific content which is **not** required for study in this course.

Course Requirements and Grading

Student performance will be evaluated in a combination of classroom participation and graded assignments, quizzes, mid-term examination, and final examination. Mark allocation is as follows:

Participation	5%
Three Assignments	18% (6% each)
Three Quizzes	24% (8% each)
Mid-Term Exam	18%
Final Exam	<u>35%</u>
	100%

Students need not receive a passing grade on all components of term work and examinations in order to pass the course. However, failure to submit an assignment or write a quiz/examination, without the prior approval of the instructor, may result in an F grade for the course.

Marks for classroom/lab participation are based on the instructor's impression (cumulative through the semester) of the student's efforts to review and comprehend text material, the student's classroom and lab session attitude, quality of responses to questions asked by the instructor, and quantity/quality of contributions to classroom/lab discussion. Absences from lectures and lab sessions can negatively impact marks for *participation*.

Assignments/Quizzes

The assignments will be take-home exercises. One of the quizzes may be a take-home exercise. Deadlines for completion and submission of these will be clearly indicated in advance.

Any take-home assignment/quiz submitted by a student after the due date will be penalized by 50%, but if submitted after answer keys have been posted, or after any graded materials have been returned to any students, a grade of 0% will be awarded.

All assignment and quiz papers must include the student's name (printed clearly).

Note that in order for a student to be eligible to write the final examination, he/she must submit all take-home papers by the last day of lectures and must have written all in-class quizzes on the scheduled dates. The mark for an assignment or quiz which is *missed with a legitimate reason* (typically illness, evidenced by a Doctor's note) will normally be spread across (transferred to) the other assignments and quizzes.

Mid-Term Examination

The mid-term examination will be 1 1/4 hours (75 minutes) in length. It will be written during regular class (or lab) time *per the Detailed Course Schedule* and can cover all materials

included in the course up to the date of the exam.

A grade of 0% will be awarded for a mid-term examination missed *without a legitimate reason*. If the mid-term examination is missed *with a legitimate reason*, a make-up mid-term examination will be arranged within one week. If the instructor determines that this arrangement is not practical, the final grade will be reallocated as follows:

Participation	5%
Three Assignments	24% (8% each)
Three Quizzes	30% (10% each)
Final Exam	<u>41%</u>
	100%

Final Examination

The final examination will be comprehensive (i.e., can cover any materials included in the course during the semester, but emphasis will be on the material covered in the last half of the course). The final examination will have a maximum writing time of three hours (180 minutes). The exact time and date for writing will be posted by the Registrar. The final examination will be written during the final examination period – December 6th to 14th, 2012 – following the last day of classes. It is the student's responsibility to ensure that he/she does not have any conflicting commitments during the final examination period.

Graded final examinations will be available for supervised review at the request of the student.

Available Letters for Course Grades

<u>% Grade</u>	<u>Letter Grade</u>	<u>Description</u>
95% to 100%	A+	
90% to 94%	A	Excellent
85% to 89%	A-	
80% to 84%	B+	
76% to 79%	B	Good
72% to 75%	B-	
68% to 71%	C+	
64% to 67%	C	Satisfactory
60% to 63%	C-	
55% to 59%	D+	
50% to 54%	D	Minimal Pass
0% to 49%	F	Failure

Important Notes

All in-class quizzes and exams are closed-book (no textbook, computerized personal organizers, class notes, handout materials, assignment/quiz/exam papers, etc. are permitted) unless advised otherwise by the instructor.

Allowed aids in all in-class quizzes include:

- a hand-held, non-programmable, statistical calculator
- statistical tables (provided by the instructor, as needed)
- one sheet of notes (8.5 by 11-inch paper, both sides) containing formulae and notes **generated by the student**. Photocopied pages not permitted.

Allowed aids in the mid-term and final exams include:

- a hand-held, non-programmable, statistical calculator
- statistical tables (provided by the instructor, as needed)
- two sheets of notes (8.5 by 11-inch paper, both sides) containing formulae and notes **generated by the student**. Photocopied pages not permitted.

Students are reminded that quizzes and examinations will be actively invigilated. Students may only bring to a test room items stipulated by the instructor to be required or allowed for the completion of the examination. All non-essential items (including, but not limited to, hats, coats, gloves, knapsacks, purses, and electronic devices other than approved calculators) must be left in an area of the examination room designated by the instructor. All cell phones and other unauthorized electrical devices **MUST** be turned off during examinations. Failure to comply may result in a failing grade for the examination.

The last day to:

- enter a course without permission
- withdraw from a course
- change to audit

and receive tuition refund, is Sunday, September 16th (Fall, 2012 semester).

The last day to:

- withdraw from a course or change to audit

without academic penalty is Monday, November 12th (Fall, 2012 semester).

Course withdrawal forms are available from the Registrar. Students who do not follow the proper withdrawal procedures will be recorded as having failed the course.

Please note that final grades will be available on your student portal. Printed grade sheets are no longer mailed out.

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Student Handbook and Academic Calendar. Personal information, that is information about an individual that may be used to identify that individual, may be collected as a requirement as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Although extensions to coursework in the semester are at the discretion of the instructor, students may not turn in coursework for evaluation after the last day of the scheduled final examination period unless they have received permission for a "Course Extension" from the Registrar's Office. Requests for course extensions or alternative examination time must be submitted to the Registrar's Office by the appropriate deadline (as listed in the Academic Calendar <http://www.ambrose.edu/publications/academiccalendar>). Course extensions are only granted for serious issues that arise "due to circumstances beyond the student's control."

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University College as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to give credit to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from Ambrose University College. Students are expected to be familiar with the policy statements in the current academic calendar and the student handbook that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.

Course changes, including adding or dropping a course, may be made during the Registration Revision period, as outlined in the Calendar of Events. All course changes must be recorded on a Registration form, available from the Office of the Registrar. Due to circumstances such as class size, prerequisites or academic policy, the submission of a Registration form does not guarantee that a course will be added or removed from a student's registration. Students may change the designation of any class from credit to audit up to the date specified in the Calendar of Events, although students are not entitled to a tuition adjustment or refund after the Registration Revision period.

Withdrawal from courses after the Registration Revision period will not be eligible for tuition refund. Students intending to withdraw from some or all of their courses must submit a completed Registration form to the Registrar's office. The dates by which students may voluntarily withdraw from a course without penalty are listed in the Calendar of Events. A grade of 'W' will be recorded on the student's transcript for any withdrawals from courses made after the end of the Registration Revision period and before the Withdrawal Deadline (also listed in the Calendar of Events). 'W' grades are not included in grade point average calculations. A limit on the number of courses from which a student is permitted to withdraw may be imposed. Students wishing to withdraw from a course, but who fail to do so by the applicable date, will receive the grade earned in accordance with the course syllabus. A student obliged to withdraw from a course after the Withdrawal Deadline because of health or other reasons may apply to the Registrar for special consideration.

An appeal for change of grade on any course work must be made to the course instructor within one week of receiving notification of the grade. An appeal for change of final grade must be submitted to the Office of the Registrar in writing within 30 days of receiving notification of the final grade, providing the basis for appeal. A review fee of \$50.00 must accompany the appeal to review final grades. If the appeal is sustained, the fee will be refunded. Note that the review could justify an increase, no change, or a decrease in the final grade.

Students are advised to retain this syllabus for their records.