Special Topic: Statistics for the Health Professional
NUR 804
Sections 738
3 Credits
Spring 2013

Catalog Course Description: Basic understanding of descriptive statistics, probability, linear regression and epidemiological concepts.

Additional Course Description: This web course is designed to provide students with the knowledge and skills to use, and interpret output from, statistical analysis techniques that are frequently encountered in the clinical literature of nursing, medicine, psychology and epidemiology. The emphasis is on application and solid conceptual understanding of statistical inference with different study designs. Students will use the SPSS statistical software package to analyze a variety of clinical data sets. Topics include: Description of sample data, principles of probability, probability distributions and statistical inference, estimation and hypothesis testing, analysis of 2x2 tables, t-tests, non-parametric statistics, correlation, analysis if variance (one-way, factorial, repeated-measures anova), linear regression, logistic regression, introduction to survival analysis.

Course Objectives: At the end of this course, students will:

1) Examine basic statistical concepts: descriptive versus inferential statistics
2) Analyze the concepts of probability, random assignment, random sampling and statistical inference as applied to nursing and health related disciplines.
3) Examine statistical models for continuous outcome variables: correlation, linear regression, analysis of variance
4) Examine statistical models for categorical outcome variables: contingency tables, logistic regression models.
5) Examine statistical models for censored outcome variables: life tables and principles of survival analysis.
6) Apply principles of data management: creation and management of numerical files, variable transformations, missing value treatments, confidentiality.
7) Practice data analysis with SPSS.
8) Survey available data sets relevant to nursing, medical and health care problems.

Prerequisites: None (except the program prerequisite of an undergraduate introduction to statistics)

Co-requisites: None

Professional Standards & Guidelines: The curriculum is guided by the following documents:

Faculty Contact Information:

Manfred Stommel, PhD, Professor
College of Nursing, Michigan State University
424A West Fee Hall
E-mail: stommel@msu.edu (preferred mode of contact)
Phone: 517-355-5123
Office Hours should be arranged via e-mail; please, do not leave telephone messages on my office phone, since such messages may not reach me in a timely fashion.

Instruction:


b. Required Texts:


Harvey Motulsky, *Intuitive Biostatistics*, 2nd ed.

c. Required Software:

IBM-SPSS Statistics Standard Grad Pack 20.0 for Windows - STUDENTS ONLY (Undergraduate/Graduate). This software is available as a 6-month rental ($53.99):


d. Required Resources, References, Supplies:

ANGEL Help Line
1.800.500.1554 (24 hrs, 7 days/week)
517.355.2345 (24 hrs, 7 days/week)
www.angel.msu.edu (ANGEL Help link in upper right corner)
Always check with the ANGEL Help Line first!

Evaluation:

a. Learning Assessments and Grading:

Course requirements include the successful completion of the mid-term and final exams, a course paper, and weekly application exercises. The course paper involves the interpretation of statistical results tables to be submitted via the course web site “drop box” located in the folder for the last week of the course.

Percentages for assignments will be distributed as follows:
• Proctored midterm exam (120 minutes in length; short answer discussion format). The midterm exam counts 25% of the course grade. The midterm exam is to be taken on **Wednesday, February 27, 2013**.
• Proctored cumulative final exam (120 minutes in length; short answer discussion format). The final exam mainly covers content from the second half of the semester, but will refer back to content from the first half
of the semester. The final exam counts as 25% of the course grade. It is to be taken on **Wednesday, May 1, 2013**.

- **Course paper.** The paper counts 40% of the course grade. Additional details about the paper will be posted in the Week #11 (available starting on Wednesday, November 7, 2012). The course paper is to be brief (no more than 4 pages double-spaced text and tables). The completed course paper should be uploaded to the online drop box in the Week #15 Course Materials folder no later than 5:00 p.m. on **Friday, April 26, 2013** (Note the date).

- **Application Exercises.** Participation in the Group Discussion Board of the weekly Application Exercises counts for 10% of the overall course grade. Each week class participants will engage in online discussions of the week's Application Exercises. Participation will be evaluated and scores will be posted at two times during the semester (Week 7 and Week 15). The final participation score will be an average of the two posted scores. In general, discussion postings are due no later than 5:00 p.m. on the Tuesday at the end of each course week. Each week, content discussions will be stimulated by one or two questions posted by the instructor. However, the bulk of the questions should be generated by the students; answers to student generated questions will be provided by both other students and, if necessary, by the instructor. Note: It is not expected that each student posts every week, but participation in the content discussion boards at least every other week is essential.

b. Course Grading Scale: The standard College of Nursing grading scale will be utilized.

There is no opportunity for “extra credit” in this course.

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Grades will be posted electronically no later than two (2) weeks after the due date of an assignment, but usually much sooner.

**University & College Policies:**

The College of Nursing expects that students will demonstrate professional behavior in all situations. Specific expectations for clinical and other professional venues can be found in the appropriate handbook. You are responsible for reviewing and acting in accordance with the policies and procedures found in the following sources, including the following topics: Professionalism, Academic Integrity, Accommodations for Students with Disabilities, Disruptive Behavior, Attendance, Compliance, and Progression.

- CON Student handbook  [http://nursing.msu.edu/handbooks.asp](http://nursing.msu.edu/handbooks.asp)
- Information for Current Students—including Rights, Responsibilities and Regulations for Students [http://www.msu.edu/current/index.html](http://www.msu.edu/current/index.html)
- Academic Programs [http://www.reg.msu.edu/UCC/AcademicPrograms.asp](http://www.reg.msu.edu/UCC/AcademicPrograms.asp)
**Course Policies:**

**Where to Look for Course Materials**

This course is offered via the University Angel online course system. To access the course web site, go to the MSU Angel home page and type in your MSU email address (only the part that appears before the “@msu.edu” portion of your email address) and your MSU email password. If you are registered for the course, you will see a link for the course web site on your personal home page that opens after you’ve entered your MSU address and password. If you experience any difficulties viewing the link to the NUR 804 web site on your personal home page in Angel, please contact Jennifer Kallos, Enrollment Manager & Administrative Staff Assistant for Academic Affairs, at 517.432.1172. Technical problems with use of Angel should be referred to the Angel Help Desk. The toll free Angel Help Line number is 1.800.500.1554 (North American and Hawaii), and the local campus area number is 517.355.2345.

When you click on the 'Course' tab within the NUR 804 Angel web site, you will see a folder entitled 'Announcements' at the right side of the page. **It is very important to check the Announcements folder each time you go into the course web site, and at least once a week.** Announcements under this link will be posted on a weekly basis.

Each week's course content is placed in a separate folder under the 'Course Materials' tab, labeled by the week number and dates. The starting day for each week is a Wednesday. For example, the third week’s content is in a folder entitled, “Week #3,” and the dates for Week #3 are Wednesday, September 12 to Tuesday, September 18, 2012. Each week's folder usually contains the following sub-folders: Week #__ Objectives, Week #__ Reading, Week #__ Application Exercise, Week #__ Discussion Group Board, and Week #__SPSS Software/Program Questions.

The 'Objectives' for each week include the key learning outcomes that you should be able to accomplish following doing that week’s course content.

The 'Reading Assignments' folder usually contains a reading assignment from the books and occasional reading materials generated by the instructor (which will be posted as separate files immediately after the 'Reading Assignments'. In addition, a few research articles that exemplify the application of a particular statistical technique will also be referenced. (All assigned articles are available online via the MSU Library online journals link. **Due to copyright law restrictions and technical reasons copies of articles cannot be posted within the course web site and stable direct links to articles cannot be accommodated within the course web site. Students are expected to contact the Angel Help Desk for any difficulties with accessing assigned readings or other materials posted in the Angel web site.**)

The Weekly 'Briefs' contain explanations and -- at times substantial -- additional learning material about various statistical models. These are written by the instructor and are part of the required readings.

The 'Application Exercise' folder contains the weekly exercise/task assignments. The latter typically will include the production of statistical output tables and short essays describing and interpreting the statistical output generated in the weekly analyses. Answers to these questions must be posted in the 'Application Exercise Drop Box'.

The 'Content Discussion Forum' will allow you to post any question about the content of the course. Students may also respond to previous postings by other students and may use this space to post questions to the instructor. This board is continually monitored by the course instructor and responses by the instructor will never be later than 48 hours after the initial student postings.

The 'SPSS Software/Program Questions' discussion board serves the purpose of posting any and all questions related to the SPSS software and the generation of the relevant data runs assigned for the week. Thus, if you have trouble producing the requested output from the data provided to you, post your questions
here. Students are encouraged to help each other, but the instructor will also be involved in this discussion board.

The 'Contact Forum' each week is set up for exclusive use by the students to contact each other for meetings, study groups, etc. This is one board that will not be inspected by the instructor.

The 'Application Exercise Drop Box' is the place, where students upload their weekly exercise work. Weekly responses to the exercise questions are mandatory, but the content of this work will not be graded. While the instructor will occasionally send messages to students about their work to provide individual feedback, model solutions to the weekly exercises will be posted for the whole class in the 'Weekly Solutions' folder.

The 'Weekly Solutions' folder will contain model answers to the exercises posed during that week. These model answers will be posted on the Saturday following Wednesday's opening of the weekly discussion and assignments. It is recommended that you hold off on reviewing the Solutions file until you have tried your own hand on solving the assignments.

Aside from these “standard” folders, occasionally there are also additional folders/files in some weeks of the course, which contain relevant data files or text postings by the instructor.

In addition, there will be (ungraded) online quizzes, called Self-Test Quiz 1-5. These quizzes primarily serve the purpose of self-evaluation by the student. They are designed to prepare the student for the exams with many of the questions in a format similar to what can be expected on the exams. For each self-tests quiz, there is a 2-week follow-up period, during which students can work on their own solutions. After two weeks, the instructor will provide answers with explanations.

When to Look for Course Materials

Wednesday is considered to be the “beginning” day of each week of the course (refer to the Course Calendar below). The materials for Weeks #1 and #2 will be accessible to you starting on Monday, January 7 (first day of Spring 2013 classes). Then on Wednesday, January 16 (start of Week #2), you’ll be able to “look ahead” to the Week #3 materials as desired. Also, for each subsequent week of the course, you'll also be able to view the material for the following week after that, while the material for all past weeks remains accessible.

IN ADDITION TO ACCESS TO THE REGULAR DISCUSSION BOARDS, THERE WILL BE A FEW ADDITIONAL ON-LINE VIDEO- AND AUDIO CONFERENCES, DURING WHICH THE STUDENT WILL BE INTRODUCED TO USING OF THE STATISTICAL SOFTWARE EFFICIENTLY. TIMES ND DATES FOR THESE ON-LINE SESSIONS WILL BE ANNOUNCED/NEGOTIATED DURING THE FIRST WEEK OF CLASS.

Completing and Submitting Course Assignments

Weekly Application Exercise discussion comments should be posted in the Group Discussion Board and are due no later than 5:00 p.m. on Tuesday (last day of weekly sessions in NUR 804). For example, the activities listed for Week #1 (Self-Introduction and Application Exercise) are due no later than the end of the day (5:00 p.m.) on Tuesday, January 15. The assignments listed for Week #2 are due no later than the end of the day (5 pm) on Tuesday, January 22, and so forth.
Academic Integrity Policies:

Academic Integrity:

Academic Honesty: Article 2.3.3 of the Academic Freedom Report states: “The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards.” In addition, the College of Nursing adheres to the policies on academic honesty specified in General Student Regulation 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See Spartan Life: Student Handbook and Resource Guide and/or the MSU Web site www.msu.edu.)

Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com Web site to complete any course work in this course. Students who violate MSU rules may receive a penalty grade, including but not limited to a failing grade on the assignment or in the course.

Please read each part of the following site to fully understand your responsibilities and the position of the University regarding:

- cheating,
- plagiarism,
- MSU regulations, ordinances and policies regarding academic honesty and integrity
- Academic integrity links
  [http://www.msu.edu/unit/ombud/honestylinks.html](http://www.msu.edu/unit/ombud/honestylinks.html)

Academic dishonesty in any form will not be tolerated in the College of Nursing. Any student involved in academic dishonesty will be reported to the Office of Academic Affairs and the Office of Student Services in the College of Nursing and a grade of 0.0 may be issued for the course.

Lectures, quizzes and examinations must remain the property of the College of Nursing and must not be copied from the Internet for use with others. Any quiz or exam should not be printed. Printing an exam or quiz will be considered academic dishonesty. According to university policy, consequences for academic dishonesty may include failure of the course, expulsion from the major, or expulsion from the university. You are advised to complete and submit your own work. The exams are NOT group projects and must not be shared with other students in any way.

Online discussions and other course activities are confidential and should not be shared or discussed with others who are not enrolled in the class. The course provides an opportunity for each course participant to express his/her ideas and all are expected to do so. All ideas need to be respected in discussions and exercises. Any “group projects” (that are required) still require individual work as a minimal expectation, and individual work will be graded.

For further information you can access any of the following sites:

- International Studies and Programs
  [http://www.msu.edu/international/index.html](http://www.msu.edu/international/index.html)

Disruptive Behavior: Article 2.3.5 of the Academic Freedom Report (AFR) for students at Michigan State University states: "The student's behavior in the classroom shall be conducive to the teaching and learning process for all concerned." Article 2.3.10 of the AFR states that "The student has a right to scholarly relationships with faculty based on mutual trust and civility." General Student Regulation 5.02 states: "No student shall . . . interfere with the functions and services of the University (for example, but not limited to, classes . . .) such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action through the Student Faculty Judiciary process."
**Attendance:** Students whose names do not appear on the official class list for this course may not attend this class. Students who fail to attend the first four class sessions or class by the fifth day of the semester, whichever occurs first, may be dropped from the course. See the Ombudsman’s web site for a discussion of student observance of major religious holidays, student-athlete participation in athletic competition, student participation in university-approved field trips, medical excuses and a dean's drop for students who fail to attend class sessions at the beginning of the semester.

**College of Nursing Policies:** Professional Development Guidelines are found in the CON MSN Student Handbook at the CON website. Students are responsible for the information found in the CON MSN Student Handbook.
COURSE CALENDAR:

Week 1 (Wednesday, January 9, 2013):

Introduction:

(1) Why Statistics?
Role of Statistics in Health Care Research and Clinical Practice
Statistics in Research Design, Sampling, Measurement & Analysis

(2) Introduction to Clinical Data Sets:
Description of Data Sources
Codebooks: Variables, Variable and Value labels, Organization of Data Files, Missing Values

(3) Introduction to SPSS Statistical Software
Opening and Closing SPSS Data Sets, Pull-Down Windows for Program Commands, Output Windows
Creating New Data Sets
Importing Data
Labeling Variables and Values
Creating New Variables
Executing Statistical Commands

Week 2 (Wednesday, January 16, 2013):

Description of Uni-variate Sample Data:

Levels of Measurement
Frequency distribution, Cumulative Frequencies, Centiles
Histogram, Bar charts, Pie Charts, Box & Whisker Plots
Measures of Central Tendency: Mean, Median, Mode,
Measures of Dispersion: Range, Variance/Standard Deviation, Interquartile Range
Skewness and Kurtosis of Frequency Distributions
Outliers and Distributions with Multiple Modes

Week 3 (Wednesday, January 23, 2013):

Concepts of Probability
Sources of Randomness in Health Care Research: Sampling, Measurement & Random Assignment
Random and Non-random Missing Data Patterns
Theoretical Probability Distributions: Binomial, Normal & T-Distributions, Chi-Squared Distribution
The Sampling Distribution as the key concept in statistical inference

Week 4 (Wednesday, January 30, 2013):

Statistical Inference after Random Assignment:
Testing Hypotheses about mean differences: One-sample T-test, Independent Sample T-test, Paired/repeated measures T-test
Statistical Inference after Random Sampling:
Estimation of Point Estimates and Confidence Intervals for Means
Oneway Analysis of Variance: Decomposition of Variance and F-test
Multiple Comparisons

SELF-TEST QUIZ 1
Week 5 (Wednesday, February 6, 2013):

Factorial Analysis of Variance: Two-factor Models
Statistical Interactions
Repeated Measures Analysis of Variance
Time by Factor Interactions

Week 6 (Wednesday, February 13, 2013):

Correlation
Simple Linear Regression
Regression with categorical predictor variables
Comparison of Oneway ANOVA and Simple Regression

SELF-TEST QUIZ 2

Week 7 (Wednesday, February 20, 2013):

Multiple Linear Regression
Un-standardized and Standardized Regression Coefficients

Interaction Terms in Linear Regression

Week 8 (Wednesday, February 27, 2013):

MID-TERM EXAM

Spring Break (Monday, March 3, 2013 – Friday, March 8, 2013)

Week 9 (Wednesday, March 13, 2013):

Non-Parametric Analysis:
Wilcoxon test, Kruskal-Wallis test, Mann-Whitney U test

Week 10 (Wednesday, March 20, 2013):

Categorical Data Analysis:
Contingency Table Analysis: 2x2 tables & m x n tables
Measures of Association: Phi-Correlation, Cramer's V, Odds-ratios, Relative Risk ratios
Pearson Chi-Square test, Fisher's Exact Test,
Tests of Proportions (hypothesis tests, confidence intervals, continuity corrections)

SELF-TEST QUIZ 3

Week 11 (Wednesday, March 27, 2013):

Regression Models for Binary Outcomes:
The Logit, Logistic Regression coefficients, Odds-ratios
Analysis of 2 x 2 tables using the logistic regression model

Week 12 (Wednesday, April 3, 2013):

Multiple Logistic Regression models
Week 13 (Wednesday, April 10, 2013):

- Analysis of Time-to-Event/Survival time
- Censored Data
- Construction of Life Tables
- Survival probabilities and Kaplan-Meier Statistic
- Calculation of incidence rates & Relative Risk/Hazard Ratios

Self-Test Quiz 4

Week 14 (Wednesday, April 17, 2013):

- The Log-rank test
- Mantel-Haenszel test
- Short introduction to Cox Regression Models

Self-Test Quiz 5

Week 15 (Wednesday, April 24, 2013 to Friday, April 26, 2013):

- Overview of Public Use Data Sets available at the National Center for Health Statistics
- Michigan State Data Sources

Final Week (Wednesday, May 1, 2013):

Final Exam
Students may take examinations off campus as long as security measures for administering the test are strictly maintained before, during and after testing. Off campus examinees should be tested under the same circumstances as their peers on campus to ensure the academic integrity of the examination. The student is responsible for selecting a qualified proctor and an appropriate testing site. The proctor may not be a relative or social acquaintance. It is preferred that the proctor be associated with a testing center or a library.

The examination should be administered in a quiet, well-lighted office or classroom setting conducive to concentration. Exam administration in private homes is not appropriate. A list of some testing centers available for proctored exams can be found at this website: http://testingoffice.msu.edu/distance.htm

Proctor Responsibilities

- If a hard copy of the exam is mailed ahead of the exam date, store the exam in a secure location where it cannot be accessed by others.
- Check student photo ID to ensure the examinee is actually the right person before providing the exam packet or password for online exam.
- Ensure that no electronic or hard copies of exam questions or answers are made other than those necessary to submit electronic or hard copies to MSU.
- Ensure that the student does not access notes, books, or articles during the exam unless the test specifies otherwise.
- Time the test and alert the examinee 15 minutes prior to the conclusion of the specified time allotment to allow for submission of completed electronic documents if required.
- Delete or destroy any electronic copies of the exam questions or answers after the student has printed one hard copy and submitted one electronic copy as directed. This requires deleting all electronic files created and saved by the student on the hard drive and then from emptying same from Trash or recycle bin.
- Note any testing irregularities on a separate sheet.
- Secure the exam until mailing.
- Ship completed test to designated address as directed.
- If a fee is charged for exam supervision, request payment from the student at the time of testing. MSU will not pay proctor fees.

MSU reserves the right to verify proctor qualifications, require additional evidence of eligibility or select a different proctor. The Proctor Agreement may be terminated for any cause by the proctor, student or MSU upon written notification to all parties.
Thank you for your willingness to proctor an examination for an MSU student. Please review the Examination Proctor Guidelines attached. If you meet the qualifications and are willing to assume the responsibilities, please sign and submit this agreement form. Should you have questions before, during or after the examination, please call the Office of Clinical Placements at 517 353 8633.

As an authorized test proctor, I agree to use the specified guidelines to administer an examination to:

Student Name: ____________________________  Student PID #: ____________________________  Course: ____________________________

Proctor name: ____________________________  ____________________________

Signature: ____________________________  Date: ____________________________

Title: ____________________________

Employer: ____________________________  ____________________________

Business Address: ____________________________

City, State, Zip Code: ____________________________

Phone: ____________________________  Fax: ____________________________  E-mail: ____________________________

Testing Location: ____________________________

Testing Date and Time: ____________________________ (if determined)

Please return Examination Proctor Agreement Form to:

Patricia Phillips, Department Secretary
Academic Instructional Support Services
Michigan State University
College of Nursing
A116 Life Sciences Building
East Lansing, Michigan 48824-1317
Phone: 1-517-353-8633
Fax: 1-517-432-5933