Special Topic: Statistics for the Health Professional
NUR 804
Sections 731, 732, 733, 735
3 Credits
Fall 2015

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. 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 of variance (one-way, factorial ANOVA), linear regression, logistic regression, introduction to survival analysis.

Course Objectives: Students will:

1) Examine basic statistical concepts for descriptive versus inferential statistics.
2) Examine statistical models for continuous, categorical and censored outcome variables relevant to nursing and health related disciplines.
3) Learn basic principles of data management and analysis.
4) Survey available data sets relevant to nursing, medical and health care problems.

Prerequisites: Introductory undergraduate statistics course

Co-requisites: None

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

Faculty Contact Information:

Manfred Stommel, PhD, Professor, Health Services Research, College of Nursing, C-350 Life Sciences (Bott Building), 1355 Bogue St., Michigan State University, East Lansing, MI 48824
Phone: 517-355-5123; E-mail: Manfred.Stommel@hc.msu.edu (preferred mode of contact)
Office Hours: Wednesday – 12:00 to 2:00 p.m. Others 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 manner.

Instruction:


b. Required Texts:


c. Required Resources, References, and Supplies:

D2L Help Line
1.800.500.1554 (24 hrs, 7 days/week in North American and Hawaii)
517.355.2345 (24 hrs, 7 days/week Local Campus Number)
Always check with the D2L 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** (90 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, October 21, 2015**.

- **Proctored cumulative final exam** (90 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, December 10, 2015**.

- **Course paper.** The paper counts 30% of the course grade. Additional details about the paper will be posted in the Week #11 (available starting on **Wednesday, November 11, 2015**). 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, December 11, 2015** (Note the date).

- **Four On-line Quizzes.** Each counts for 4% of the course grade (a total of 16% of the grade). In format, the on-line quizzes are shorter versions of the proctored exams.

- **Application Exercises.** Participation in the Content Discussion Board to respond to weekly Application Exercises counts for 4% of the overall course grade. 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.
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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<th>%</th>
<th>GRADE</th>
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<td>94 – 100</td>
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<td>93 – 87</td>
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<td>86 – 80</td>
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<tr>
<td>79 – 75</td>
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<td>74 – 70</td>
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<td>64 – 60</td>
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<td>Below 60</td>
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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 D2L online course system. To access the course web site, go to the MSU D2L 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 D2L, please contact Jennifer Kallos, Enrollment Manager & Administrative Staff Assistant for Academic Affairs, at 517.432.1172. Technical problems with use of D2L should be referred to the D2L Help Desk. The toll free D2L Help Line number is 1.800.500.1554 (North American and Hawai'i), and the local campus area number is 517.355.2345.

When you click on the 'Course' tab within the NUR 804 D2L web site, you will see a section entitled 'Announcements' at the right side of the page. It is very important to check for any new announcements each time you go into the course web site or at least once a week.
Each week’s course content is placed in a separate folder under the 'Lessons' tab, labeled by the week number and dates. **The starting day for each week is Wednesday.**

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 book and the weekly summaries generated by the instructor in Power Point. 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 D2L Help Desk for any difficulties with accessing assigned readings or other materials posted in the D2L web site.**)

The 'Application Exercise' folder contains the weekly exercise/task assignments. The exercises involve specific questions about statistical tables either generated by the instructor or part of the book or a nursing research article, which would be posted in the ‘Readings Assignment’ folder. Answers to these questions must be posted in the 'Content Discussion Forum' under the heading for each question.

The 'Content Discussion Forum' will also contain a section labeled ‘General Questions’ that allows 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.

A 'Contact Forum' 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 instructors will supervise and participate in the student discussions to provide individual feedback; model solutions to the weekly exercise questions will be posted for the whole class at the end of each week (Tuesdays).

**When to Look for Course Materials**

Wednesday is considered the “beginning” day of each week of the course (refer to the Course Calendar below). However, the materials for Weeks 1 and 2 will be accessible to you starting on Wednesday, August 27. Then on Wednesday, September 3 (start of Week 2), you'll be able to “look ahead” to the Week 3 materials as desired. 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.

**Completing and Submitting Course Assignments**

Weekly Application Exercise discussion comments should be posted in the Content Discussion Board and are due no later than 5:00 p.m. on Tuesday (last day of a weekly session 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, September 2. The assignments listed for Week 2 are due no later than the end of the day (5 pm) on Tuesday, September 9, and so forth. **While you may work ahead on the material of the following week, do not post your exercises or ask questions about them until the beginning of that week (Wednesday) in the Content Discussion Board for that week.**
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 Grading; 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

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

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.
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<th>Week</th>
<th>Topic</th>
<th>Exams, Quizzes, Paper</th>
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| **Week 1**  
(Wednesday  
*September 27, 2014*) | Introduction:  
(1) Why Statistics?  
Role of Statistics in Health Care Research and Clinical Practice  
Statistics in Research Design, Sampling, Measurement & Analysis  
(2) Conceptual Underpinning:  
Populations, samples, variables |  |
| **Week 2**  
(Wednesday  
*September 30, 2014*) | Description of Univariate Sample Data:  
Levels of Measurement  
Frequency distribution, Cumulative Frequencies, Centiles  
Histogram, Bar charts, Box & Whisker Plots  
Measures of Central Tendency: Mean, Median, Mode,  
Measures of Dispersion: Range, Variance/Standard Deviation, Interquartile Range,  
Skewness and Kurtosis, Outliers and Distributions with Multiple Modes |  |
| **Week 3**  
(Wednesday  
*September 10, 2014*) | Concepts of Probability:  
Sources of Randomness in Health Care Research: Sampling, Measurement & Random Assignment  
Random and Non-random Missing Data Patterns  
The Sampling Distribution as the key concept in statistical inference  
Theoretical Probability Distributions: Normal & T-Distributions |  |
| **Week 4**  
(Wednesday  
*September 17, 2014*) | 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  
One-way Analysis of Variance: Decomposition of Variance and F-test | **ON-LINE QUIZ #1** |
| **Week 5**  
(Wednesday  
*October 24, 2014*) | Correlation  
Simple Linear Regression  
Regression with categorical predictor variables  
Comparison of One-way ANOVA and Simple Regression |  |
| **Week 6**  
(Wednesday  
*October 47, 2014*) | Factorial Analysis of Variance: Two-factor Models  
Statistical Interactions  
Repeated Measures Analysis of Variance  
Time by Factor Interactions | **ON-LINE QUIZ #2** |
| **Week 7**  
(Wednesday  
*October 148, 2014*) | Multiple Linear Regression  
Un-standardized and Standardized Regression Coefficients  
Interaction Terms in Linear Regression  
Comparison of Linear Regression and ANOVA Models |  |
| **Week 8**  
(Wednesday  
*October 2145, 2014*) | MID-TERM EXAM | **Mid-Term Exam**  
*Wednesday October 2148, 2014* |
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<th>Week</th>
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<th>Exams, Quizzes, Paper</th>
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<tr>
<td>Week 9</td>
<td>Non-Parametric Analysis: Wilcoxon test, Kruskal-Wallis test, Mann-Whitney U test</td>
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<td>October 22, 20145</td>
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<td>Week 10</td>
<td>Categorical Data Analysis: Contingency Table Analysis: 2x2 tables &amp; m x n tables</td>
<td>ON-LINE QUIZ #3</td>
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<td>November 429, 20145</td>
<td>Measures of Association: Phi-Correlation, Odds-ratios, Relative Risk ratios</td>
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<td>Pearson Chi-Square test, Fisher's Exact Test, Tests of Proportions (hypothesis tests, confidence intervals, continuity corrections)</td>
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<td>Week 11</td>
<td>Regression Models for Binary Outcomes: The Logit, Logistic Regression coefficients, Odds-ratios Analysis of 2 x 2 tables using the logistic regression model</td>
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<td>November 115, 20145</td>
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<td>Week 12</td>
<td>Multiple Logistic Regression models Confounding and Interactions</td>
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<td>November 182, 20145</td>
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<td>Week 13</td>
<td>Analysis of Time-to-Event/Survival time Censored Data Construction of Life Tables Survival probabilities and Kaplan-Meier Statistic Calculation of incidence rates &amp; Relative Risk/Hazard Ratios</td>
<td>ON-LINE QUIZ #4</td>
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<td>November 2549, 20145</td>
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<tr>
<td>Week 14</td>
<td>The Log-rank test Mantel-Haenszel test Introduction to Cox Regression Models</td>
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<td>December 21, 20145</td>
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<tr>
<td>Week 15</td>
<td>Overview of Public Use Data Sets for Health Care Researchers Federal/State Data Systems Data Management and Confidentiality</td>
<td>Course Paper DUE Friday, December 511, 20145</td>
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<td>December 39, 20146</td>
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<td>Week 16</td>
<td>FINAL EXAM</td>
<td>Final Exam Wednesday December 106, 20154</td>
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<td>December 146, 20145</td>
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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

- Check student photo ID to ensure the examinee is actually the right person before providing the exam packet or password for on-line 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