



**The Hashemite University- School of Nursing
Master's Degree in Nursing
Fall Semester**

Course Title:	Statistical Methods
Course Number:	0703702
Course Pre-requisite:	None
Credit Hours:	3 credit hours
Day, Time, Room #:	Section (Oncology): Sunday 9-12, Room #3119 Section (Psychiatry): Tuesday 9-12, Room # 3119
Faculty:	Dr. Hanan Al-Modallal, PhD, RN
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Office Location:	College of Nursing Building, Room # 2099
Office Hours:	Sunday (12-1); Tuesday (3-4)

Course Description:

This course focuses on assisting students understand the concepts of statistical and analytical methods used in nursing research and their applications. The course will enable the development of students' ability to evaluate statistical information and interpret statistical outcomes in practice and research fields in nursing. This course provides students with foundations of knowledge and skills to critically support "Nursing Research Methods" course. Statistical methods course emphasizes on statistical concepts, and statistical and analytical methods used in health-related sciences such as nursing. Topics include the basic concepts of descriptive and inferential statistics, probability distribution, hypothesis testing, univariate and bivariate analyses which include correlation and regression models. Parametric and nonparametric tests are major milestones in this course.

Course Intended Learning Outcomes (ILOs):

Upon completion of this course, the students will be able to:

1. Leadership:

- Use statistical data and calculated results to evaluate nursing practice.
- Use statistical outcomes in improving current nursing practice.
- Identify methods of disseminating research findings through participation in national and international conferences.

2. Critical Thinking:

- Understand the purpose of descriptive statistics in summarizing data to describe the sample or population attributes.
- Understand the purpose of inferential statistics and their applications.
- Apply statistical results and knowledge to critique and interpret research studies.
- Incorporate statistical analysis procedures to facilitate the conduct of scientific research.
- Critically evaluate results of statistical analysis.
- Present analytical data in summary forms.
- Decide on the appropriate statistical procedures for hypotheses testing.
- Provide examples for different analysis procedures from the health science fields.
- Utilize known statistical software, such as SPSS, to enter and analyze data.
- Apply appropriate statistical analysis plans throughout exams and class discussions.

3. Caring:

- Be active consumer of research and related statistical results.
- Utilize data-based results to evaluate nursing practice and intervention.
- Develop an understanding that sample data can be generalized to populations.

4. Communication:

- Utilize research findings in improving the quality of care in clinical settings.
- Interpret and disseminate calculated data in narrative terms.

5. Therapeutic Nursing Intervention

- Use statistical methodology in evaluating the effectiveness of certain nursing interventions.
- Relate statistics to the biological and health sciences.

6. Employers' Satisfaction

- Evaluate research findings to enhance the quality of nursing practice.
- Improve current nursing practice based on reliable research findings.

Required Textbooks:

Daniel, W. (2010). *Biostatistics: Basic concepts and methodology for the health sciences* (9th Ed.). New Jersey: John Wiley & Sons, Inc.

Daniel, W. (2005). *Biostatistics: A foundation for analysis in the health sciences* (8th Ed). New Jersey: John Wiley & Sons, Inc.

Munro, B. H. (2001). *Statistical methods for health care research* (4th Ed.). Lippincott Williams & Wilkins.

Pagano, M., Gauvreau, K. (2000). *Principles of biostatistics* (2nd Ed). California: Thomas Learning Academic Resource Center.

Recommended Textbooks:

Verna, B. L., Shukla, G. D., & Strivasta, R. N.(1994). *Biostatistics: Perspectives in health care research and practice* (1st Ed). Delhi: Satish Kumar Jain for CBS publishers & Distibutors.

Sanders, D. H. (1995). *Statistics: A first course* (5th Ed). New York: McGraw-Hill Inc.

Note: Books are available in the library. Critical thinking and application exercises package, or uploaded material on the Blackboard, will be given for the students periodically and as planned.

Related Websites:

<http://ocw.jhsph.edu/courses/MethodsInBiostatisticsI/lectureNotes.cfm>
<http://www.stat.ubc.ca/~rollin/teach/643.f02/notes/index.html>

Teaching Methods:

- 1 Interactive lectures.
- 2 Assignments
- 3 Blackboard

Instructional resources

1. Handouts
2. Computer lab meetings

Course's Guidelines:

- Fifty to seventy percent of each topic is allocated for interactive lecturing using audio-visual aids.
- Short critical thinking exercises and applications/ case studies exercises will be given periodically in class.

- Submitted assignments need to be turned in (in class) on the due date. **Late submissions are not acceptable.**
- It is students' responsibility to answer assignments on their own. Matched answers between students will result in "fail" grade for the corresponding students.
- Active participation is expected and will be initiated.
- It is the student responsibility to bridge the gap that will happen in the courses in case of absence; attending lectures is a necessity.
- All required books will be on the reservation shelf in the library at the beginning of the course.
- All students need to have their scientific calculators during classes and exams.
- It is students' responsibility to download statistical software on their own computers for completing their assignments.

Evaluation Methods:

The grading system of the School of Nursing is based on the rules and policies of the Hashemite University. **The final grades will be issued in accordance to the A,B,C system followed at the Hashemite University.**

Midterm Exam:	25 %
Application on statistical analysis:	20 %
Planned statistical analysis for the proposal:	15 %
<u>Final Exam:</u>	<u>40 %</u>
Total	100 %

Course's Policy:

1. The general rule in graduate studies is to be a full time student and to possess regular attendance for all lectures.
2. It is not allowed for any student to be absent for more than 20% of course's credit hours.
3. The student whose absence exceeds the 20% of course's credit hours without an acceptable excuse will not be allowed to take the final exam and his/her record in the course will be marked by "failed".
4. When students get absent for more than 20% of course's credit hours with an acceptable excuse, their record will be marked by "withdrawn" for the course.
5. Students who represent the Kingdom and the university in curricular or extracurricular activities are allowed to be absent up to 20% of course's credit hours.
6. Any sick leave is to be issued or considered by the university's doctors and should be submitted to the course instructor within a week to be able to take a make-up exam. Failure to do so results in a fail grade.
7. If a student is absent from a final exam he/she should show an acceptable excuse as soon as the cause of absence is eliminated to avoid "failed" in the course. Such excuse should be directed and approved by the Dean. Only, the university's doctors can approve medical excuses. The make up final exam should be taken during the second week of the next semester, in maximum.
8. According to HU's rules, the **minimum** grade in any regular course is C+, and the **minimum GPA is 3/4.**

9. Students enrolled in this course need to respect others in the class and accept their points of view even when they contradict with their own.
10. Mobile phones need to be turned off during classes and exams.
11. Read the graduate book before enrollment in graduate classes in order to be familiar with the overall program requirements and expectations.
12. If students with special needs are enrolled in the courses, special arrangement will be done to facilitate the learning process.

Course Outline

Weeks	Unit and Topic	References
1 Week	1. Overview of the course	
	2. Introduction to Biostatistics <ul style="list-style-type: none"> • Basic concepts • Measurement and measurement scales • Samples and population • The simple random sample 	Daniel (2005) Ch. 1; Gauvreau (2000) Ch.1
1 Week	3. Descriptive Statistics <ul style="list-style-type: none"> • The ordered array • Grouped data: frequency distribution, relative frequency, stem and leaf display, graphs. • Measures of central tendency (Mean, Median, Mode) • Measures of dispersion (Range, Interquartile range, Variance and Standard Deviation, Coefficient of variation). 	Daniel (2005) Ch. 2 ; Gauvreau (2000) Ch.2 & 3
	4. Probability <ul style="list-style-type: none"> • Basic concepts • Elementary properties of probability • Probability rules (multiplication rule, Addition rule) • Bayes's Theorem • Screening tests • Sensitivity • Specificity • Positive and negative predictive values • Probability distributions 	Daniel (2005) Ch. 3, Gauvreau (2000) Ch.6 (p.131-140)

1 Week	5. The Normal Distribution <ul style="list-style-type: none"> • Characteristics of the normal distribution • The standard normal distribution • Normal distribution applications (with examples) 	Daniel (2005) Ch. 4, Gauvreau (2000) Ch.7
1 Week	6. Sampling Distribution <ul style="list-style-type: none"> • Sampling distribution from a population • Sampling distribution of the mean (mean and variance) • Sampling distribution of the proportion (mean and variance) • Sampling from a normally distributed population • Sampling from a non normally distributed population • The Central limit theorem 	Daniel (2005) Ch. 5, Gauvreau (2000) Ch.8
1 Week	7. Estimation <ul style="list-style-type: none"> • Introduction • Confidence interval • Confidence interval for a population mean • The t distribution • Confidence interval for the difference between two population means • Confidence interval for a population proportion • Confidence interval for the difference between two population proportions • Determination of sample size for estimating sample means • Determination of sample size for estimating sample proportions 	Daniel (2005) Ch. 6, Gauvreau (2000) Ch.9 (p.214-220)
Midterm Exam		
2 Weeks	8. Hypothesis Testing <ul style="list-style-type: none"> • Introduction • Hypothesis testing steps • Types of error • Hypothesis testing: one-sample test • Hypothesis testing: Two-samples test (Independent samples) • Hypothesis testing: Paired comparisons • Hypothesis testing: A single population proportion • Hypothesis testing: The difference between two population proportions 	Daniel (2005) Ch. 7

	<ul style="list-style-type: none"> • Hypothesis testing: Population variances • Estimation of the power of a test • Estimation of sample size 	
2 Week	9. Analysis of Variance <ul style="list-style-type: none"> • Introduction • The One-Way ANOVA • The Two-Way ANOVA 	Daniel (2005) Ch. 8
2 Week	10. Simple Linear Regression	Daniel (2005) Ch. 9, Gauvreau (2000) Ch.18
1 Week	11. Multiple Linear Regression	Daniel (2005) Ch. 10
1 Week	12. Correlation	Daniel (2005) Ch. 9
	13. Relative Risk and Odds Ratio	Daniel (2005) Ch. 12
1 Week	14. Chi Square	Daniel (2005) Ch. 15
1 Week	15. Non parametric Statistics <ul style="list-style-type: none"> • Introduction • The Sign Test • The Wilcoxon Signed-Rank Test • Spearman Rank Correlation Coefficient 	Daniel (2005) Ch. 13; Gauvreau (2000) Ch.17
1 Week	Situations for data analysis using research articles	
	<i>Final exam date and time will be announced by the registration department</i>	

Application on Statistical Analysis (20 points)

Students have to use a dataset to perform statistical analysis tests. Use the following points to complete the assignment.

- a. Get familiar with the dataset. Identify the variables available in the dataset.
- b. State your hypotheses/research questions. **(4 points)**.
- c. Identify variables you are going to use (Variables' types), and provide descriptive analysis output for the chosen variables) **(5 points)**.
- d. Choose the appropriate statistical analysis test and discuss why it was chosen. **(2 points)**
- e. Perform statistical analysis test, and get the output. **(2 points)**
- f. Write the output results in a paragraph that does not exceed 8 lines **(ONLY)**. **(4 points)**
- g. Combine analysis output with your assignment. **(1 point)**
- h. Use APA writing style, grammar, and language. **(2 points)**

Due date for turning this part in will be for All groups. Late submissions will not be accepted.

Planned Statistical Analysis for Research Proposal (15 points)

Students are expected to submit a written statistical analysis plan for their proposal required for the course of “Nursing Research Methods”.

The written part should include the following:

- a. **Hypothesis/research question:** Research problem statement, hypothesis/question **(2 points)**.
- b. **Variables:** State the variables in the study and identify dependent and independent variables and their types **(2 points)**.
- c. **Instruments:** Explain how the instrument will be statistically evaluated for its internal consistency (reliability) **(1 point)**.
- d. **Demographic variables:** State how demographic variables will be analyzed to describe the study sample **(1 point)**.
- e. **Analysis:** Identify statistical tests that should be appropriate for the level of the data collected. Identify the appropriate test to each hypothesis you stated, and why **(5 points)**.
- f. **Presentation of data:** State how the data will be presented **(2 point)**.
- g. Use of APA style, grammar, and language **(2 points)**.

This assignment should not be more than 2-3 double spaced pages long, ONLY.

Due date for turning this part in will be for All groups. Late submissions will not be accepted.