

HLT-362V

Applied Statistics for Health Care Professionals Course Syllabus

Applied Statistics for Health Care Professionals

Course Code HLT-362V v:1 7.0	Type Credit Based	Duration 35 Days	Credit Hours 3.0
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Course Description

This is an introductory course on concepts of statistics, emphasizing applications to health care professions. The course is designed to prepare students to understand concepts of statistics and the appropriateness of statistical methods used in published research papers and a variety of settings. Areas of emphasis include an introduction to the statistical analysis concepts of variable/reliability factors; P values; experimental design; descriptive statistics, including mean, median, and mode; sampling methods; and power analysis.

Pre-Requisites

None

Co-Requisites

None

HLT-362V

Course Materials



Description:

Grand Canyon University. (Ed.). (2018). Applied statistics for health care.

Data Analysis With Excel

Description:

Review the "Microsoft Virtual Academy Data Analysis With Excel" tutorials, located on the Microsoft Virtual Academy website, and use them as resources for assigned work, as applicable.

The Visual Learner: Statistics

Description:

Use "The Visual Learner: Statistics" resource to learn more about the statistical calculations you will be using in this course.

Topic 1: What Is Statistics and Why It Is Important to Health Sciences?

Description

Objectives:

- 1. Describe an example of each type of measurement: nominal, ordinal, interval, ratio.
- 2. Define basic statistical terms.
- 3. Explain the historical application of statistics.
- 4. Describe the application of statistics in health care quality, safety, health promotion, and leadership.

Study Materials

Applied Statistics for Health Care

Description:

Read Chapter 1 in Applied Statistics for Health Care.

Introduction

Description:

Read "Introduction," and watch the associated videos by Lane, Hebl, Osherson, and Zeimer, from *Online Statistics Education: An Interactive Multimedia Course of Study.*

The Visual Learner: Statistics

Description:

Refer to the "Visual Learner: Statistics" to learn more about the statistical calculations presented in this topic.

Nominal, Ordinal, Interval Ratio: Examples

Description:

Read "Nominal, Ordinal, Interval Ratio: Examples," by Stephanie (2014), located on the Statistics How To website.

Fundamentals of Statistics 1: Basic Concepts :: Nominal, Ordinal, Interval and Ratio

Read "Fundamentals of Statistics 1: Basic Concepts :: Nominal, Ordinal, Interval and Ratio," located on the Usable Stats website.

Health Statistics

Description:

Explore the Health Statistics page of the MedlinePlus website.

Evidence-Based Practice for Nursing: Levels of Evidence

Description:

Read "Evidence-Based Practice for Nursing: Levels of Evidence," located on the Northern Virginia Community College website.

Chapter 3.1: Variables

Description:

Read "Chapter 3.1: Variables," by Wright and Lake, from Basics of Research for the Health Professions.

Measuring the Quality of Healthcare in the U.S.

Description:

Read "Measuring the Quality of Healthcare in the U.S.," by Claxton, Cox, Gonzales, Kamal, and Levitt (2015), located on the Peterson-Kaiser Health System Tracker website.

Quality Data Critical to Healthcare Decision-Making

Description:

Read "Quality Data Critical to Healthcare Decision-Making," by Nicholson and Penney (2004), located on the American Health Information Management Association (AHIMA) website.

Data and Statistics

Description:

Explore the Data and Statistics page of the Centers for Disease Control and Prevention (CDC) website.

👕 Health

Description:

Explore Health page of the United States Census Bureau website.

Health Topics: Health Statistics

Description:

Explore the Health Statistics page of the MedlinePluse website.



Topic 1 DQ 1

Description:

Discuss the historical application of statistics in the field of health care. Describe an example, other than Florence Nightingale's contributions, where statistical application has greatly influenced or changed health care operations or practice.

Topic 1 DQ 2

Description:

Discuss why it is important for a person working in health care to understand statistical concepts. Provide an example of how statistical data is used in your organization or specialty area today and what you are expected to do with this information as a practitioner.

Application of Statistics in Health Care

Description:

Statistical application and the interpretation of data is important in health care. Review the statistical concepts covered in this topic. In a 750-1,000 word paper, discuss the significance of statistical application in health care. Include the following:

- 1. Describe the application of statistics in health care. Specifically discuss its significance to quality, safety, health promotion, and leadership.
- 2. Consider your organization or specialty area and how you utilize statistical knowledge. Discuss how you obtain statistical data, how statistical knowledge is used in day-to-day operations and how you apply it or use it in decision making.

Three peer-reviewed, scholarly or professional references are required.

Prepare this assignment according to the guidelines found in the APA Style Guide, located in the Student Success Center. An abstract is not required.

This assignment uses a rubric. Please review the rubric prior to beginning the assignment to become familiar with the expectations for successful completion.

You are required to submit this assignment to LopesWrite. Refer to the <u>LopesWrite Technical</u> <u>Support articles</u> for assistance.

📀 Quiz 1

Description:

This quiz tests your knowledge on the statistical concepts presented in this topic.



Topic 2: Population and Sampling Distributions

Objectives:

- 1. Identify examples of descriptive and inferential statistics.
- 2. Describe strategies for selecting a sample from a population.
- 3. Identify key questions you will ask/answer when reading a research study.

Study Materials

Applied Statistics for Health Care

Description:

Read Chapter 2 in Applied Statistics for Health Care.

Chapter 9: Sampling Distributions

Description:

Read "Chapter 9: Sampling Distributions," and watch the associated videos by Utens et al., from *Online Statistics Education: An Interactive Multimedia Course of Study.*

The Visual Learner: Statistics

Description:

Refer to the "Visual Learner: Statistics" to learn more about the statistical calculations presented in this topic.

Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial

Description:

Read "Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial," by Utens et al., from *International Journal of Nursing Students*(2013).

Review article in conjunction with the "Article Analysis Example 1" document to help prepare for the article analysis assignment due in this topic.

Eight Questions to Ask When Interpreting Academic Studies: A Primer for Media

Description:

Read "Eight Questions to Ask When Interpreting Academic Studies: A Primer for Media," by Feldman and Wihbey (2015), located on the Journalist's Resource website.

Ten Scientific Questions to Ask About Scientific Studies

Description:

Read "Ten Scientific Questions to Ask About Scientific Studies," by Smith, from Greater Good Magazine (2015).

Read "Research 101: Descriptive Statistics," by Conner and Johnson, from American Nurse Today (2017).

Sampling Methods in Clinical Research: an Educational Review

Description:

Read "Sampling Methods in Clinical Research: an Educational Review," by Elfil and Negida, from Emergency (2017).

Chapter 8: Strategies for Sampling

Description:

Read "Chapter 8: Strategies for Sampling," by Morse, from the online eBook, *Qualitative Nursing Research: A Contemporary Dialogue* (1991), available on the SAGE Research Methods website.



Description:

Review this document in conjunction with the "Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial" article to help prepare for the article analysis assignment due in this topic.

Article Analysis 1

Description:

Use the Article Analysis 1" template to complete the Article Analysis 1 assignment.



Tasks

Topic 2 DQ 1

Description:

Select a research article, other than the articles from your assignments, from the GCU library. Provide an overview of the study and describe the strategy that was used to select the sample from the population. Evaluate the effectiveness of the sampling method selected. Provide support for your answer. Include the article title and permalink in your post.

Topic 2 DQ 2

Description:

Using the research article selected for DQ 1, identify three key questions you will ask and answer when reading the research study and why these questions are important. When responding to peers, provide other questions and answers that could be considered in relation to the peers' studies.

The interpretation of research in health care is essential to decision making. By understanding research, health care providers can identify risk factors, trends, outcomes for treatment, health care costs and best practices. To be effective in evaluating and interpreting research, the reader must first understand how to interpret the findings. You will practice article analysis in Topics 2, 3, and 5.

For this assignment:

Search the GCU Library and find three different health care articles that use quantitative research. Do not use articles that appear in the Topic Materials or textbook. Complete an article analysis for each using the "Article Analysis 1" template.

Refer to the "Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial," in conjunction with the "Article Analysis Example 1," for an example of an article analysis.

While APA style is not required for the body of this assignment, solid academic writing is expected, and documentation of sources should be presented using APA formatting guidelines, which can be found in the APA Style Guide, located in the Student Success Center.

This assignment uses a rubric. Please review the rubric prior to beginning the assignment to become familiar with the expectations for successful completion.

You are required to submit this assignment to LopesWrite. Refer to the <u>LopesWrite Technical</u> <u>Support articles</u> for assistance.



Description

Objectives:

- 1. Evaluate hypothesis testing approaches and their application to health care.
- 2. Define dependent and independent variables and their role in hypothesis testing.
- 3. Describe evidence used to "reject "or "do not reject" the null hypothesis.
- 4. Evaluate the relationship between hypothesis testing and confidence intervals.

Study Materials

Applied Statistics for Health Care

Description:

Read Chapter 3 in Applied Statistics for Health Care.

The Visual Learner: Statistics

Description:

Refer to the "Visual Learner: Statistics" to learn more about the statistical calculations presented in this topic.

Chapter 6: Research Design

Description:

Read "Chapter 6: Research Design" and watch the associated videos, by Lane, from Online Statistics Education: An Interactive Multimedia Course of Study.



Description:

Read "Chapter 10: Estimation" and watch the associated videos, by Lane, from Online Statistics Education: An Interactive Multimedia Course of Study.

Chapter 11: Logic of Hypothesis Testing

Description:

Read "Chapter 11: Logic of Hypothesis Testing," and watch the associated videos by Lane, from *Online Statistics Education: An Interactive Multimedia Course of Study.*

Chapter 12: Test of Means

Description:

Read "Chapter 12: Test of Means" and watch the associated videos, by Lane, from *Online Statistics Education: An Interactive Multimedia Course of Study.*

Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial

Description:

Review "Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial," by Utens et al., from *International Journal of Nursing Students*(2013).

Review this article in conjunction with the "Article Analysis Example 2" document to help prepare for the article analysis assignment due in this topic.

Hypothesis Testing, Type I and Type II Errors

Description:

Read "Hypothesis Testing, Type I and Type II Errors," by Banerjee, Chitnis, Jadhay, Bhawalkar, and Chaudhury, from *Industrial Psychiatry Journal* (2009).

Probability, Clinical Decision Making and Hypothesis Testing

Description:

Read "Probability, Clinical Decision Making and Hypothesis Testing," by Banerjee, Jadhave, and Bhawalker, from *Industrial Psychiatry Journal* (2009).

Understanding Null Hypothesis Testing

Read "Understanding Null Hypothesis Testing," by Jhangiani and Chiang, from the online eBook, *Research Methods in Psychology*(2013), available on the BC Campus Open Ed website.

The Difference Between Quality Improvement, Evidence-Based Practice, and Research

Description:

Read "The Difference Between Quality Improvement, Evidence-Based Practice, and Research," by Ginex, from *ONS Voice*(2017), located on the Oncology Nursing Society (ONS) website.

Identifying the Differences Between Quality Improvement, Evidence-Based Practice, and Original Research

Description:

Read "Identifying the Differences Between Quality Improvement, Evidence-Based Practice, and Original Research," by Baker et al., from *Journal of Emergency Nursing* (2014).

Probability, Proof, and Clinical Significance

Description:

Read "Probability, Proof, and Clinical Significance," by Skelly, from Evidence-Based Spine-Care Journal (2011).

Statistical Versus Clinical Significance in Nursing Research

Description:

Read "Statistical Versus Clinical Significance in Nursing Research," by El-Masri, from *Canadian Journal of Nursing Research* (2016).

👕 Article Analysis Example 2

Description:

Review this document in conjunction with the "Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial" article to help prepare for the article analysis assignment due in this topic.

Article Analysis 2

Description:

Use the "Article Analysis 2" template to complete the Article Analysis 2 assignment.



Topic 3 DQ 1

Provide two different examples of how research uses hypothesis testing, and describe the criteria for rejecting the null hypothesis. Discuss why this is important in your practice and with patient interactions.

Topic 3 DQ 2

Description:

Evaluate and provide examples of how hypothesis testing and confidence intervals are used together in health care research. Provide a workplace example that illustrates your ideas.

Article Analysis 2

Description:

Search the GCU Library and find two new health care articles that use quantitative research. Do not use articles from a previous assignment, or articles that appear in the Topic Materials or textbook.

Complete an article analysis for each using the "Article Analysis: Part 2" template.

Refer to the "Patient Preference and Satisfaction in Hospital-at-Home and Usual Hospital Care for COPD Exacerbations: Results of a Randomised Controlled Trial," in conjunction with the "Article Analysis Example 2," for an example of an article analysis.

While APA style is not required for the body of this assignment, solid academic writing is expected, and documentation of sources should be presented using APA formatting guidelines, which can be found in the APA Style Guide, located in the Student Success Center.

This assignment uses a rubric. Please review the rubric prior to beginning the assignment to become familiar with the expectations for successful completion.

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📀 Quiz 2

Description:

This cumulative quiz tests your understanding of concepts, terminology and statistical application presented in Topics 1–3.

Topic 4: Statistical Analysis

Description

Objectives:

- 1. Differentiate among experimental research, quasi-experimental, and nonexperimental research.
- 2. Identify key differences between qualitative and quantitative research.
- 3. Differentiate between research and quality improvement.
- Study Materials

Applied Statistics for Health Care

Read Chapter 4 in Applied Statistics for Health Care.

The Visual Learner: Statistics

Description:

Refer to the "Visual Learner: Statistics" to learn more about the statistical calculations presented in this topic.

Chapter 14: Regression

Description:

Review "Chapter 14: Regression," and watch the associated videos by Lane, from *Online Statistics Education: An Interactive Multimedia Course of Study.*

Is This Quality Improvement or Research?

Description:

Read "Is This Quality Improvement or Research?" by Merrill, from American Nurse Today (2015).

Differentiating Between Research and Quality Improvement

Description:

Read "Differentiating Between Research and Quality Improvement," by Gregory, from *Journal of Perinatal and Neonatal Nursing* (2015).

Chapter 44: Tools and Strategies for Quality Improvement and Patient Safety

Description:

Read "Chapter 44: Tools and Strategies for Quality Improvement and Patient Safety," by Hughes, from the online eBook, *Patient Safety and Quality: An Evidence-Based Handbook for Nurses* (2008), available on the National Center for Biotechnology Information (NCBI) website.

Focusing on the Fundamentals: A Simplistic Differentiation Between Qualitative and Quantitative Research

Description:

Read "Focusing on the Fundamentals: A Simplistic Differentiation Between Qualitative and Quantitative Research," by Rutberg and Bouikidis, from *Nephrology Nursing Journal* (2018).



Tasks



Provide an example of experimental, quasi-experimental, and nonexperimental research from the GCU Library and explain how each research type differs from the others. When replying to peers, evaluate the effectiveness of the research design of the study for two of the examples provided.

Topic 4 DQ 2

Description:

Describe the difference between research and quality improvement. Provide a workplace example where qualitative and quantitative research is applied and how it was used within your organization. When replying to peers, discuss how these research findings might be incorporated into another health care setting.

Quality Improvement Proposal

Description:

Identify a quality improvement opportunity in your organization or practice. In a 1,250-1,500 word paper, describe the problem or issue and propose a quality improvement initiative based on evidence-based practice. Apply "The Road to Evidence-Based Practice" process, illustrated in Chapter 4 of your textbook, to create your proposal.

Include the following:

- 1. Provide an overview of the problem and the setting in which the problem or issue occurs.
- 2. Explain why a quality improvement initiative is needed in this area and the expected outcome.
- Discuss how the results of previous research demonstrate support for the quality improvement initiative and its projected outcomes. Include a minimum of three peer-reviewed sources published within the last 5 years, not included in the course materials or textbook, that establish evidence in support of the quality improvement proposed.
- 4. Discuss steps necessary to implement the quality improvement initiative. Provide evidence and rationale to support your answer.
- 5. Explain how the quality improvement initiative will be evaluated to determine whether there was improvement.
- 6. Support your explanation by identifying the variables, hypothesis test, and statistical test that you would need to prove that the quality improvement initiative succeeded.

While APA style is not required for the body of this assignment, solid academic writing is expected, and documentation of sources should be presented using APA formatting guidelines, which can be found in the APA Style Guide, located in the Student Success Center.

This assignment uses a rubric. Please review the rubric prior to beginning the assignment to become familiar with the expectations for successful completion.

You are required to submit this assignment to LopesWrite. Refer to the <u>LopesWrite Technical Support</u> <u>articles</u> for assistance.

Topic 5: Discovering Relationships and Building Models

Description

Objectives:

- 1. Analyze a specified data set.
- 2. Describe how data influences epidemiological practices.
- 3. Evaluate data analyzed from research articles using different types of variables.



Study Materials

Applied Statistics for Health Care

Description:

Read Chapter 5 in Applied Statistics for Health Care.

Excel for Windows Training

Description:

Review the "Excel for Windows Training" modules, located on the Microsoft Office website, and use them as resources for the Summary and Descriptive Data assignment, as needed.

The Visual Learner: Statistics

Description:

Refer to the "Visual Learner: Statistics" to learn more about the statistical calculations presented in this topic.

Ethics in Medical Research and Publication

Description:

Read "Ethics in Medical Research and Publication," by Masic, Hodzic, and Mulic, from *International Journal of Preventative Medicine*(2014).

Chapter 2. Health Databases and Health Database Organizations: Uses, Benefits, and Concerns

Description:

Read "Chapter 2. Health Databases and Health Database Organizations: Uses, Benefits, and Concerns," by Donaldson and Lohr, from the online eBook, *Health Data in the Information Age: Use, Discloser, and Privacy* (1994), available on the National Center for Biotechnology Information (NCBI) website.

Using Epidemiological Data to Guide Clinical Practice: Review of Studies on Cardiovascular Disease and Use of Combined Oral Contraceptives

Description:

Read "Using Epidemiological Data to Guide Clinical Practice: Review of Studies on Cardiovascular Disease and Use of Combined Oral Contraceptives," by Hannaford and Owen-Smith, from *BMJ* (1998).

Secondary Data Analysis: Ethical Issues and Challenges

Description:

Read "Secondary Data Analysis: Ethical Issues and Challenges," by Tripathy, from *Iranian Journal of Public Health* (2013).

What Are the Major Ethical Issues in Conducting Research? Is There a Conflict Between the Research Ethics and the Nature of Nursing?

Read "What Are the Major Ethical Issues in Conducting Research? Is There a Conflict Between the Research Ethics and the Nature of Nursing?" by Fouka and Mantzorou, from *Health Scinece Journal* (2011).

Ethical Challenges of Researchers in Qualitative Studies: The Necessity to Develop a Specific Suideline

Guideline

Description:

Read "Ethical Challenges of Researchers in Qualitative Studies: The Necessity to Develop a Specific Guideline," by Sanjari, Bahramnezhad, Fomani, Shoghi, and Cheraghi, from *Journal of Medical Ethics and History of Medicine* (2014).

Challenges in Conducting Qualitative Research in Health: A Conceptual Paper

Description:

Read "Challenges in Conducting Qualitative Research in Health: A Conceptual Paper," by Khankeh, Ranjbar, Khorasani-Zavareh, Zargham-Boroujeni, and Johansson, from *Iranian Journal of Nursing and Midwifery Research* (2015).

Article Analysis and Evaluation of Research Ethics

Description:

Use the "Article Analysis and Evaluation of Research Ethics" template to complete the Article Analysis and Evaluation of Research Ethics assignment.

National Cancer Institute Data

Description:

Use the "National Cancer Institute Data" Excel spreadsheet to complete the Summary and Descriptive Statistics assignment.



Tasks

Topic 5 DQ 1

Description:

Describe how epidemiological data influences changes in health practices. Provide an example and explain what data would be necessary to make a change in practice.

Topic 5 DQ 2

Description:

Discuss ways your organization uses technology to gather patient and health care information, and how this information and data are used to direct patient care and outcomes.

Article Analysis and Evaluation of Research Ethics

Search the GCU Library and find one new health care article that uses quantitative research. Do not use an article from a previous assignment, or that appears in the Topic Materials or textbook.

Complete an article analysis and ethics evaluation of the research using the "Article Analysis and Evaluation of Research Ethics" template. See Chapter 5 of your textbook as needed, for assistance.

While APA style is not required for the body of this assignment, solid academic writing is expected, and documentation of sources should be presented using APA formatting guidelines, which can be found in the APA Style Guide, located in the Student Success Center.

This assignment uses a rubric. Please review the rubric prior to beginning the assignment to become familiar with the expectations for successful completion.

You are required to submit this assignment to LopesWrite. Refer to the <u>LopesWrite Technical Support</u> <u>articles</u> for assistance.

Summary and Descriptive Statistics

Description:

There is often the requirement to evaluate descriptive statistics for data within the organization or for health care information. Every year the National Cancer Institute collects and publishes data based on patient demographics. Understanding differences between the groups based upon the collected data often informs health care professionals towards research, treatment options, or patient education.

Using the data on the "National Cancer Institute Data" Excel spreadsheet, calculate the descriptive statistics indicated below for each of the Race/Ethnicity groups. Refer to your textbook and the Topic Materials, as needed, for assistance in with creating Excel formulas.

Provide the following descriptive statistics:

- 1. Measures of Central Tendency: Mean, Median, and Mode
- 2. Measures of Variation: Variance, Standard Deviation, and Range (a formula is not needed for Range).
- 3. Once the data is calculated, provide a 150-250 word analysis of the descriptive statistics on the spreadsheet. This should include differences and health outcomes between groups.

APA style is not required, but solid academic writing is expected.

This assignment uses a rubric. Please review the rubric prior to beginning the assignment to become familiar with the expectations for successful completion.

You are not required to submit this assignment to LopesWrite.

Grade Scale

Final Grade Column

Letter Grade	GPA Value	Minimum (%)	Maximum (%)
А	4.0	93.0	100.0
A-	3.7	90.0	92.99

B+	3.3	87.0	89.99
В	3.0	83.0	86.99
B-	2.7	80.0	82.99
C+	2.3	77.0	79.99
С	2.0	70.0	76.99
D	1.0	60.0	69.99
F	0.0	0.02	59.99
1	0.0	0.0	0.01

Grade Categories

Assignments (%)	Points	Percentile
Quality Improvement Proposal	150.0	
Application of Statistics in Health Care	100.0	
Summary and Descriptive Statistics	100.0	
Article Analysis 1	120.0	
Article Analysis 2	130.0	
Article Analysis and Evaluation of Research Ethics	140.0	

Discussion Question (%)	Points	Percentile
Topic 4 DQ 1	8.0	
Topic 1 DQ 2	8.0	
Topic 5 DQ 1	8.0	
Topic 5 DQ 2	8.0	
Topic 1 DQ 1	8.0	
Topic 3 DQ 2	8.0	
Topic 3 DQ 1	8.0	
Topic 2 DQ 2	8.0	
Topic 2 DQ 1	8.0	
Topic 4 DQ 2	8.0	

Participation (%)	Points	Percentile
	32.0	

Participation (%)	Points	Percentile
	32.0	

Participation (%)	Points	Percentile
	32.0	
Participation (%)	Points	Percentile
	32.0	
Participation (%)	Points	Percentile
	32.0	
Quizzes (%)	Points	Percentile
Quiz 2	10.0	
Quiz 1	10.0	

Class Effective Start: Dec 09, 2019