

Syllabus for HIMT 350

Statistics for Healthcare

Course Description

This is an introductory course in statistical methods used in applied research for the biological sciences. The course will emphasize the principles of statistical reasoning, underlying assumptions, hypothesis testing, and careful interpretation of results. Some topics covered: descriptive statistics, graphical displays of data, probability, confidence intervals and tests for means, differences of means, sample size and power, differences of proportions, chi-square tests for categorical variables, regression, multiple regression, and non-parametric statistics.

Prerequisites: None

Course Learning Objectives

This course will emphasize much more than just number crunching. You will develop a new set of reasoning skills that will provide a foundation for designing, analyzing and interpreting research in the biological sciences. This knowledge and these skills are essential in today's healthcare environment, which emphasizes evidenced-based healthcare and health outcome evaluation.

At the conclusion of this course, you will be able to:

1. Articulate the basic concepts and techniques of statistics for healthcare.
2. Appreciate the vital role of statistics in determining study designs.
3. Apply statistical analyses to conduct and interpret healthcare data
4. Appreciate the scope of statistics and its essential role in promoting evidenced-based healthcare and health outcome evaluation.

HIM Curriculum Competencies

This course presents the content, knowledge, and skills required for the following 2014 AHIMA bachelor's degree competencies:

- I.D.5 - Evaluate data from varying sources to create meaningful presentations.
- III.D.1 - Interpret inferential statistics.
- III.D.2 - Analyze statistical data for decision making.
- III.E.1 - Apply principles of research and clinical literature evaluation to improve outcomes.
- III.E.2 - Plan adherence to Institutional Review Board (IRB) processes and policies.

Course Materials

Required Textbook

Required Software

For our statistical analysis work in this course, we will be using Minitab 17 or Minitab Express. To purchase a copy, click the following link: <http://www.onthehub.com/minitab/#>.

Grading

Grades will be based on your performance of the following items:

Activities	Percent of Final Grade
Lesson Quizzes	15%
Activities	15%
Exam 1	20%
Exam 2	20%
Final Exam (comprehensive)	30%
Total	100%

Grading Scale

90–100 %	A
80–89%	B
70–79%	C
60–69%	D
0–59%	F

Grading Criteria

“A” reflects exceptional work (going beyond the basics, integrating material well, displaying professionalism in individual and group work, application and demonstration of knowledge and skills, showing initiative, using creativity, writing is reflective of multiple drafts).

“B” reflects good work (valuable teamwork skills, active in class, ability to grasp basic concepts and apply to new situations, some participation in class, completes all assignments with a degree of proficiency but may not demonstrate initiative, creativity or reflection consistently, writing contains errors or lacks conciseness and completeness).

“C” reflects average work (assignments are completed at the minimum, basic concepts are grasped but cannot be applied, some difficulty in group work, spelling and grammar mistakes are common, writing is conversational in tone with little attention paid to detail, word choices, organization (rough draft quality), little participation in class.

Course Outline

- Lesson 1a: Introduction to Statistics for Healthcare
- Lesson 1b: Introduction to Chance and Probability
- Lesson 2: Measurement
- Lesson 3: Major Study Designs
- Lesson 4: Sampling
- Lesson 5: Frequency Distributions
- Lesson 6: Summary Statistics
- Lesson 7: Probability Concepts
- Lesson 8: Binomial Probability Distributions
- Lesson 9: Normal Probability Distributions
- Lesson 10: Introduction to Statistical Inference
- Lesson 11: Basics of Hypothesis Testing
- Lesson 12: Confidence Intervals
- Lesson 13: Inferences about a Mean
- Lesson 14: Comparing Independent Means
- Lesson 15: Comparing Several Means
- Lesson 16: Correlation and Regression
- Lesson 17: Multiple Linear Regression
- Lesson 18: Proportions and Vital Statistics
- Lesson 19: Chi-sq test
- Lesson 20: Introduction to Nonparametric Statistics
- Lesson 21: A Brief Introduction to Advanced Statistics
- Lesson 22: Data Report and Presentation

Course Policies

Please note that you are responsible for anything I send you via email.

The News tool in D2L will be used as a means of communication. Please check it on a regular basis to keep current. The syllabus, schedule and assignments are all subject to change. Any changes or need for additional information affecting the course as a whole will be communicated here.

All assignments will have a specified due date. You must submit one copy of your homework in the dropbox of D2L by this due date. Late assignments may be accepted but these will receive a lower grade. *If you have any concern about meeting the requirements of this course, please contact me.*

Assignment and quiz grades will be available to you in the Grades tool of D2L.

Any necessary communication regarding assignments placed in the dropbox will be posted through dropbox feedback.

Legitimate emergencies do occur and may prevent the completion of course work by the designated time. Please inform me as soon as possible when emergency situations occur and indicate your plans for completing the work. Extension of the completion time will be considered on an individual basis.

Course Calendar

Week Starting	Reading & Presentations	Activities
Week 1 Sept 6	Lesson 1a – Introduction to Statistics for Healthcare Lesson 1b – Intro to Chance and Probability Deming videos Hans Rosling – The Joy of Stats video (1 hour)	Lesson 1a Quiz Lesson 1b Quiz
Week 2 September 12	Chapter 1 in textbook Lesson 2 – Measurement Chapter 2 in textbook Lesson 3 – Major Study Designs	Lesson 2 Quiz Lesson 3 Quiz
Week 3 September 19	Lesson 4 – Sampling Chalk talk – Sampling Chapter 3 in textbook Lesson 5 – Frequency Distributions	Lesson 4 Quiz Lesson 5 Quiz
Week 4 September 26	Chapter 4 in textbook Lesson 6 – Summary Statistics Chapter 5 in textbook Chalk talk – Variance part 1 Chalk talk – Variance part 2 Lesson 7 – Probability Concepts	Lesson 6 Quiz Start Minitab Activity 1 – Frequency and Descriptive Statistics Lesson 7 Quiz

Week 5 October 3	Chapter 6 in textbook Lesson 8 – Binomial Probability Distributions Chapter 7 in textbook Lesson 9 – Normal Probability Distributions	Lesson 8 Quiz Minitab Activity 1 answers due Lesson 9 Quiz
Week 6 October 10	Chapter 8 in textbook Lesson 10 – Introduction to Statistical Inference Chalk talk – Central Limit Theorem part 1 Chalk talk – Central Limit Theorem part 2 Chapter 9 in textbook Lesson 11 – The Basics of Hypothesis Testing Chalk talk – Hypothesis Testing WISE applets Chapter 10 in textbook Lesson 12 – Confidence Intervals	Lesson 10 Quiz Lesson 11 Quiz Lesson 12 Quiz
Week 7 October 17	Study guide for Exam 1 Exam 1	Exam 1 – Chapters 1-10 (available Oct 17, 12:01 a.m., thru Oct 23, 11:59 p.m.)
Week 8 October 24	Chapter 11 in textbook Lesson 13 – Inferences about a Mean	Lesson 13 Quiz
Week 9 October 31	Chapter 12 in textbook Lesson 14 – Comparing Independent Means Chalk talk – T-Tests	Lesson 14 Quiz Start Minitab Activity 2 – t-tests
Week 10 November 7	Chapter 13 in textbook Lesson 15 – Comparing Several Means Chalk talk – ANOVA	Lesson 15 Quiz Start Minitab Activity 3 – ANOVA
Week 11 November 14	Chapter 14 in textbook Lesson 16 – Correlation and Regression Chalk talk – Correlation Chalk talk – Regression Chapter 15 in textbook Lesson 17 – Multiple Linear Regression	Minitab Activity 2 answers due Lesson 16 Quiz Lesson 17 Quiz Start Minitab Activity 4 – Correlation and Regression

Week 12 November 21	Exam 2 study guide Review for Exam 2 Exam 2	Minitab Activity 3 answers due Minitab Activity 4 answers due Exam 2 – Intro concepts plus Chapters 10-15 (available Nov. 21, 12:01 a.m., until Nov 27, 11:59 p.m.)
Week 13 November 28	Chapter 16 in textbook Lesson 18 – Proportions and vital statistics Chapters 18 and 19 in textbook Lesson 19 – Chi-sq test Chalk talk – Chi-sq	Lesson 18 Quiz Start Minitab Activity 5 – Chi-sq analysis Lesson 19 Quiz
Week 14 December 5	Lesson 20 – Introduction to Nonparametric Statistics Chalk talk – Non-Parametric Statistics Lesson 21 – A Brief Introduction to Advanced Statistics Chalk talk – Some Advanced Statistics	Minitab Activity 5 answers due Lesson 20 Quiz Lesson 21 Quiz
Week 15 December 12	Lesson 22 - Data Reporting and Presentation Review for Final Exam	Lesson 22 Quiz
Week 16 December 19	Final Exam Study Guide Review for Final Exam	Comprehensive Final Exam (available Dec. 19, 12:01 a.m., thru Dec 23, 11:59 p.m. Please note it must be completed by 11:59 p.m., Dec 23. NO EXCEPTIONS!!!!)