

WINONA STATE UNIVERSITY
GENERAL EDUCATION PROGRAM APPROVAL FORM

Routing form for General Education Program Course approval.

Course STAT 301

Department Approval

[Signature]
Department Chair

10/17/13
Date

bdeppa@winona.edu
e-mail address

Dean's Recommendation Yes No*

Charles Smitsch
Dean of College

10/22/13
Date

*If the dean does not approve the proposal, a written rationale should be provided to the General Education Program Subcommittee.

GEPS Recommendation Approved Disapproved

[Signature]
Chair, General Education Program Subcommittee

10/30/13
Date

A2C2 Recommendation Approved Disapproved

[Signature]
Chair of A2C2

11/6/13
Date

Faculty Senate Recommendation Approved Disapproved

President of Faculty Senate

Date

Academic Vice President Recommendation Approved Disapproved

Academic Vice President

Date

Decision of President Approved Disapproved

President

Date

Please forward to Registrar.

Registrar _____
Date entered

Please notify department chair via e-mail that curricular change has been recorded.

**WINONA STATE UNIVERSITY
PROPOSAL FOR GENERAL EDUCATION PROGRAM COURSES**

Department Mathematics & Statistics

Date 10/17/13

STAT 301
Course No.

Statistical Thinking for Healthcare
Course Name

3
Credits

Prerequisites Qualification by math placement exam or associate degree in nursing

GEP Goal Area(s):*

CORE GOAL AREAS

- Goal 1: Communication
- Goal 3: Natural Science
- Goal 4: Mathematics/Logical Reasoning
- Goal 5: History and the Social and Behavioral Sciences
- Goal 6: The Humanities and Fine Arts

THEME GOAL AREAS

- Goal 7: Human Diversity
- Goal 8: Global Perspective
- Goal 9: Ethical and Civic Responsibility
- Goal 10: People and the Environment

* Courses may be submitted for up to two Goal Areas.

Additional Requirement Categories (list number of credits desired in appropriate category):

Intensive:

- 1. Writing
- 2. Oral Communication
- 3a. Mathematics/Statistics
- 3b. Critical Analysis

Physical Development and Wellness

Provide information as specified in the previous directions.

Attach a *General Education Program Approval Form*.

Department Contact Person for this Proposal:

Daniel Rand or Tisha Hooks
Name (please print)

457-5655
Phone

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e-mail address

STAT 301- Statistical Thinking for Healthcare - 3 Credits

Course Description: An introductory course of statistical applications to the health sciences. Descriptive statistics, sampling, techniques of estimation, and hypothesis testing are included. The understanding of statistical applications as presented in health science research will be emphasized. Prerequisite: qualification by math placement exam or associate degree in nursing.

Mathematics/Statistics Intensive Objectives: Students will be able to

- a. Practice the correct application of mathematical or statistical models that are appropriate to their prerequisite knowledge of those areas
- b. Make proper use of modern mathematical or statistical methods appropriate to their level of prerequisite knowledge, to include, if statistics is used in a substantive way, the use of a statistical package with graphics capability when appropriate.

In the course outline below, the mathematics/statistics intensive objectives in this list are referred to by a-b. The outline indicates when each objective is addressed in the course.

Course Outline:

I. Introductory terms and methods of data collection (a)

- a. Data types
- b. Surveys
- c. Experiments
- d. Observational studies

II. Descriptive statistics (b)

- a. Numerical and graphical summaries for categorical data
- b. Numerical and graphical summaries for numeric data

III. Introduction to probability (a,b)

- a. Role of probability in decision making
- b. Conditional probability
- c. Relative risk and odds ratios

- IV. Sampling distributions (a)
 - a. Central limit theorem
 - b. Standard error

- V. Confidence interval estimation (a,b)
 - a. Means
 - b. Proportions
 - c. Relative risk and odds ratios

- VI. The logic and applications of hypothesis testing (a,b)
 - a. Means
 - b. Proportions
 - c. Nonparametric tests

- VII. Contingency table analysis (a, b)
 - a. 2x2 tables
 - b. R X C tables

- VIII. Regression analysis (a, b)
 - a. Correlation
 - b. Linear regression
 - c. Logistic regression

- IX. Introduction to Analysis of Variance (a, b)
 - a. Completely randomized design
 - b. Blocking and repeated measures
 - c. Multiple comparison procedures

- X. Review of journal papers to reinforce statistical concepts (b)

Textbook:

- The Practice of Statistics in the Life Sciences, Baldi and Moore, 2012, or
- Biostatistics for the Biological and Health Sciences, Triola & Triola, 2007

Rationale for Mathematics/Statistics Intensive Course: The purpose of this course is to develop students' understanding of how statistics is used in the health sciences. The course focuses on appropriate methods for data collection, data analysis, and the clear communication of results based on this analysis.

General Discussion of Each Objective as it Relates to Learning Activities in STAT 301

Mathematics/Statistics Intensive Student Competencies: Students will be able to...	Learning Opportunity	Assessment and Evaluation
<p>Practice the correct application of mathematical or statistical models that are appropriate to their prerequisite knowledge of those areas</p>	<p>In this course, students are introduced to various methods for describing and analyzing data. The calculation of descriptive statistics (such as means, proportions, and ratios) and quantities used in hypothesis testing and confidence interval estimation make use of computational skills acquired in a students' basic math course.</p> <p>In addition to learning about a variety of statistical methods that are used in the health sciences, students will also be taught how to choose the <i>correct</i> statistical model for addressing a given research question. Moreover, they will encounter several examples throughout the course that require them to choose and carry out the correct analysis.</p> <p>Finally, to derive appropriate conclusions from data, students must understand how the data were collected. In this course, students learn about the difference between observational studies and designed experiments, mostly in the form of clinical trials, and the impact the study design has on what conclusions can be drawn.</p> <p>Throughout the semester, students will be asked to draw appropriate conclusions based on both how the data were collected and their analysis, and students will be required to communicate the results of their analysis in a clear and concise way.</p>	<p>The examinations and homework include many scenarios where students are required to choose and carry out the correct analysis to address a given research question. Students must also consider the data collection process and what impact this has on conclusions that can be drawn.</p>

<p>Make proper use of modern mathematical or statistical methods appropriate to their level of prerequisite knowledge, to include, if statistics is used in a substantive way, the use of a statistical package with graphics capability when appropriate.</p>	<p>In addition to practicing the correct application of statistical models as described above through carrying out their own analyses, students will also spend a great deal of time reviewing journal articles. Students will identify the proper use of statistical methods by evaluating the study design, data collection process, appropriateness of statistical methods, and inferred conclusions in the reported work of others.</p> <p>Furthermore, a statistical software package will be used extensively in this course. Once an understanding of the theory behind the computations has been established, students will use the software to create graphical summaries, calculate descriptive statistics, and carry out analyses. The course will continue to focus on choosing the correct descriptive statistics, graphical summary, and analysis for addressing a given research question.</p>	<p>On both exam questions and journal/paper evaluations, students will be asked to assess the validity of data and studies reported in news and journals.</p> <p>The homework assignments will also include many problems that require students to make proper use of a statistical software package for analysis, and exams may include questions requiring students to interpret this output correctly.</p>
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