

Course Proposal
The University of Dubuque

New Course

Revised Course

Cross-listed Course, check this line & appropriate line above and add comment in Section B3

School: Liberal Arts

Department: EVS and NRS

Course:

EVS/NRS 230: Introduction to Statistics and Experimental Design

A. Course Information

1. **Majors in which this course will be employed:** EVS, Nursing, Other Sciences and Majors requiring an introduction to statistics courses.
2. **Departmental Prefix:** EVS/NRS
3. **Number:** 230
4. **Course Title:** Introduction to Statistics and Experimental Design
5. **Abbreviated Title:** Intro to Statistics
6. **Number of Credits:** 3
7. **Description:** This course will provide students an introduction to elementary statistical methods and experimental design pre-requisite to their consumption and utilization of research. Emphasis is on the comprehension, interpretation, and utilization of inferential statistical concepts. Concepts include: experimental design, descriptive statistics; random sampling and statistical inference; estimation and testing hypotheses of means and variances; analysis of variance; parametric and non-parametric tests: correlation and regression analysis; and Chi-square. This course is a required pre-requisite to the nursing program and is a required course for environmental science majors.
Pre-requisites: CIS 101, UDMA 112 Algebra, and a College-level Science with Lab course
Pre-requisite or Co-requisite: RES 104 Research Writing.
8. **Format:** A 15-week course lecture course.

B. Relationship of Course to Missions and Departments

1. The course's relation to the Mission of the University:

Scholarship	Spiritual Growth	Social Development	Professional Preparation	Aesthetics	Global Awareness	Stewardship
X			X			X

Explanation: EVS 230/NRS 230 will prepare nursing students to fulfill the University's Mission as they:

- a. Undergo the academic rigors of the class.
- b. Develop expertise in statistics, a tool of scholarship necessary for their profession..
- c. Become aware of stewardship of the environment and its impact on health gained from statistical analyses of environmental data.

2 and 3. Environmental Science Degree Program: The course's relation to the Mission and Learning Outcomes of the Environmental Science Program.

a. Department of Natural and Applied Sciences' Environmental Science Degree Program

Mission of the Environmental Science Program

The goal of the Environmental Science program is to provide students with a broad-based contemporary program of study, which will provide them with the necessary technical and intellectual skill sets needed to work as an environmental professional in the 21st century."

Environmental Science Degree Program Goals/Learning Outcomes:

Students should be able to do the following:

1. Identify and analyze significant environmental issues of local and global concern.
2. Appreciate ecological diversity.
3. Contribute significantly to multidisciplinary teams researching environmental problems.
4. Gather and perform quantitative analyses of environmental data using current technology.
5. Communicate results according to professional standards in the form of reports, maps, graphics, and presentations.
6. Evaluate the ethics of behavior and decisions likely to be encountered in one's professional career.
7. Embrace lifelong learning.

EVS 230/NRS 230 Relationship to Department of Natural and Applied Sciences Mission and Outcomes (9 elements):

Requirement	Elective	Knowledge Foundations	Academic/ Professional Preparation	Environmental Stewardship	Zeal for Lifelong Learning	Critical Thinking/ Analysis	Personal/ Professional growth	Ethics
X		x	x	X	x	x	x	X

Explanation: EVS 230 will prepare students in alignment with the mission of the Environmental Science Program by providing students:

1. An opportunity for students to apply statistics in the analyses of significant environmental issues.
2. With both technical skills for data analysis and an intellectual framework for understanding variability in data necessary to contribute to multidisciplinary teams researching environmental problems.
3. Practice in gathering and performing quantitative analyses of environmental data.
4. Exposure to the communication of published environmental research.
5. The building blocks necessary to understanding environmental research necessary to lifelong learning in environmental science.
5. Exposure to ethical dilemmas in the conduct of environmental research.

2 and 3. Department of Nursing: The course's relation to the Mission and Learning Outcomes of the Department of Nursing

Mission of the Department of Nursing

To educate nurses to provide the highest quality of care within the context of the diverse, dynamic, and challenging health care environments of the 21st century.

Department of Nursing Goals/Learning Outcomes:

1. Deliver patient-centered care that is ethical, safe, effective, efficient, timely, and equitable using systematic assessment and critical analysis of the care situation and application of the best evidence, best practices, available technology, cultural considerations and ethical tenets.
2. Promote health care teamwork to affect the highest quality patient-centered care through the use of communication, relationship –building, quality improvement, management, and leadership skills.
3. Optimize patient, family, and population health and self-care ability in a variety of health care settings by constantly seeking to identify, develop, implement, and maintain best health care practices with other health care team members.
4. Identify, analyze, and maximize personal and professional opportunities for growth.
5. Participate in political, regulatory, and health care organizational processes to promote improvements in health care delivery systems and practices.

EVS 230/NRS 230 Relationship to Nursing Mission and Outcomes (15 elements):

Requirement	Elective	Knowledge Foundations	Communication / Relationship /Team work Skills (2,3)	Nursing Interventions (1)	Critical Thinking /Critical Analysis (1)	Ethics (1)	Quality of Care/ Quality Improvement (1,2,3)
X		X			X	X	

Population / Patient-Centered Health (1,2,3)	Evidence-Based Practice/Best Practices (1,3)	Leadership / Management (2)	Informatics/ Available Technology (1)	Life Long Learning (4)	Personal and Professional Growth (4)	Political/ Regulatory/ Organizational Systems and Processes (5)
	X			X	x	

Number in () indicates program outcome that matrix term corresponds to.

Explanation: EVS/NRS 230 will prepare nursing students in alignment with the Nursing Department's Mission by:

- a. Providing foundations of knowledge for students in concepts of experimental design and data analysis necessary to evaluate health care research that is the basis of evidence-based health care.
- b. Contributing to the development of essential health professional core competencies of critical thinking as it applies to health care research and evidence-based practice.
- c. Initiating the use of statistical analyses and experimental design that is integral to systematic critical thinking processes that can then be applied in future personal and professional situations in the reading and utilization of research studies/evidence.
- d. Introducing students to the use of statistics integral to lifelong learning as a professional in the health care field. Health is often more affected by the environment than by actual medical care.
- e. Identifying ethical issues in the design and presentation of research.

2. Relationship of the course to other departments and programs (if applicable):

Course may provide support for other Department of Natural and Applied Science majors who choose to take this statistics course rather than the other statistics courses offered at the University.

C. Relationship of the Course to Learner-Centered Teaching

1. Course Outline

Percentage

- | | |
|------------------------|-----|
| I. Experimental Design | 20% |
| -Variables | |
| -Confounding Effects | |

- Overcoming Confounding Effects (Controls, Blinding, Randomization)
- Observational Studies
- Consequences of Design Flaws

II. Descriptive Statistics	20%
<ul style="list-style-type: none"> -Measures of Central Tendency -Measures of Variability -Frequency Distributions -Histograms -Symmetry and Skewness 	
III Inferential Statistics	20%
<ul style="list-style-type: none"> -Probability -Random Variables and Distributions -Population -Sampling -Matching -Estimation 	
IV. Inferential Statistics Methods: Analyzing Differences Between Groups	20%
<ul style="list-style-type: none"> -Hypothesis Testing -Type I and II Errors - Parametric and Nonparametric Data Sets -T-Test -Matched Pairs T-Test -One-Way Analysis of Variance (ANOVA) 	
V. Analyzing Relationships Among Variables	10%
<ul style="list-style-type: none"> -Correlation -Regression 	
VI. Goodness of Fit	10%
<ul style="list-style-type: none"> - Chi-Square 	

1 Week = 3 contact hours

2. Educational Competencies:

Think critically, analytically, & synergistically	Communicate effectively in writing & speaking	Appreciate Diverse perspectives	Articulate Mature viewpoints	Respond Ethically	Apply Technology effectively	Develop Science Literacy	Conduct Appropriate Research
X		X				X	X

Explanation:

- a. Students ability to think **critically, analytically, and synergistically** is demonstrated by completing **course assignments and exams** during the lesson plans.
- b. Students' ability to **develop science literacy** is demonstrated throughout **course assignments, exams, and the class discussions**, pertinent to the lesson plans.
- c. Students' ability to **conduct appropriate research** is demonstrated by completing **course assignments**, relevant to the course content.
- d. Nursing and EVS students will grow to appreciate the diverse perspectives of students in these and other majors.

3. Learning Outcomes and Assessment/Evaluation Methods:

Learning Outcomes Upon completion of this course, the student will be prepared to:	Assessment Method

1. Identify necessary components of experimental designs.	Course exam, Discussion, Individual Assignments
2. Perform basic calculations for descriptive statistical parameters, such as mean and variance.	Course exam, Discussion, Individual Assignments
3. Identify and discuss basic concepts of inferential statistics.	Course exam, Discussion, Individual Assignments
4. Quantify differences between groups using appropriate inferential statistical methods.	Course exam, Discussion, Individual Assignments
5. Analyze relationships among variables.	Course exam, Discussion, Individual Assignments
6. Evaluate differences between observed and expected distributions of data.	Course exam, Discussion, Individual Assignments
7. Critically analyze and evaluate the use of experimental design and statistical analyses in environmental science, health, and other scientific literature.	Course exam, Individual Assignments, Group Project
8. Conduct an evaluation of data from a simple experiment.	Course exam, Group Project
9. Identify ethical issues in the design and analyses of research studies.	Discussion

D. Operational Requirements

1. **Special Facilities**: A classroom with computer projection capabilities.
2. **Technology Needs**: A classroom with computer projection capabilities
3. **Library Needs**: No special library requirements were identified.
4. **Budget Implications**: None.
5. **Frequency of Offering and Projected Enrollment**: This course will be taught yearly in the *spring semester*. Projected enrollment is between 15 and 40 students.
6. **Effective Date**: Spring, 2006

E. Author(s) of this Document.

Dan Call, Professor of Environmental Science
Dale Easley, Associate Professor of Environmental Science
Kathryn J. Dolter, Associate Professor/Chair, Nursing Department

F. Approval Signatures

Chair COA

Date

VPAA

Date