

COURSE SYLLABUS/DESCRIPTION

Department &

Course Number: ISQA 9120
Course Title: Applied Experimental Design and Analysis
Course Coordinator: Deepak Khazanchi
Total Credits: 3
Date last revised: August 21, 2009

1.0 Course Description:

- 1.1 Overview of content and purpose of the course (Catalog description).
Constructing and analyzing designs for experimental investigations; completely randomized, randomized complete block and Latin-square designs, split-plot designs, incomplete block designs, confounded factorial designs, nested designs, and treatment of missing data, comparison of designs. The course will use computer-assisted analysis and graphic techniques included in software such as SAS or SPSS.
- 1.2 For whom course is intended.
This course is primarily intended for graduate students pursuing a research thesis or doctoral dissertation in Information Technology related areas.
- 1.3 Prerequisites of the course (Courses).
ISQA 8156 or consent of instructor.
- 1.4 Prerequisites of the course (Topics).
Survey of advanced statistical methods.
- 1.5 Unusual circumstances of the course.
None.

2.0 Objectives:

- 2.1 List of performance objectives stated in terms of the student educational outcomes.
On completion of this course students will be able:
 - To learn how to plan, design and conduct experiments efficiently and effectively, and analyze the resulting data to obtain objective conclusions in the IT research domain.
 - To understand how to build a well-designed experiment that result in reliable and valid conclusions.
 - To understand the characteristics of poor-experimental design.

3.0 Content and Organization:

- 3.1 List of major topics to be covered in chronological sequence (specify number of weeks on each).
 - Introduction (1 week)
 - Experiments with a Single Factor: The Analysis of Variance (1 week)
 - Randomized Blocks, Latin Squares, and Related Designs (1 week)

- Introduction to Factorial Designs (1 week)
- The 2^k Factorial Design (1 week)
- Blocking and Confounding in the 2^k Factorial Design (1 week)
- Two-Level Fractional Factorial Design (1 week)
- Three-Level and Mixed-Level Factorial and Fractional Factorial Designs (2 week)
- Fitting Regression Models (1 week)
- Response Surface Methods and Other Approaches to Process Optimization (1 week)
- Experiments with Random Facts (1 weeks)
- Nested and Split-Plot Designs (1 week)
- Other Designs and Analysis Techniques (1 week)

4.0 Teaching Methodology:

4.1 Methods to be used.

The course will use a combination of pedagogical approaches including lectures, problem solving, case studies, and assignments/projects using statistical packages such as SAS or SPSS.

4.2 Student role in the course.

The students will be encouraged to actively engage in class through lectures, participation and discussion, and individual and group assignments/projects.

4.2 Contact hours.

Three credit hours.

5.0 Evaluation:

5.1 Type of student projects that will be the basis for evaluating student performance, specifying distinction between undergraduate and graduate, if applicable. For Laboratory projects, specify the number of weeks spent on each project).

- ❖ Homework/In-class Projects (5)
- ❖ Mid-Term Examinations (2) – Open book/notes examinations.
- ❖ Final Examination - Open book/notes examination.
- ❖ Integrated Final Project Case (Experimental Design, Report and Analysis)

5.2 Basis for determining the final grade (Course requirements and grading standards) specifying distinction between undergraduate and graduate, if applicable.

- Assignments/Projects – 20%
- Mid-Term (two midterms) – 15% each = 30%
- Final Examination – 25%
- Integrated Final Project Case (Statistical Design, Report and Analysis) – 25%

5.3 Grading scale and criteria.

GRADE	POINT VALUE
A+	96% ≤ x % ≤ 100%
A	92% ≤ x % < 96%
A-	89% ≤ x < 92%
B+	86% ≤ x < 89%
B	82% ≤ x < 86%
B-	79% ≤ x < 82%
C+	76% ≤ x < 79%
C	72% ≤ x < 76%
C-	69% ≤ x < 72%
D+	66% ≤ x < 69%
D	62% ≤ x < 66%
D-	59% ≤ x < 62%
F	Less than 59%

6.0 Resource Material

6.1 Textbooks and/or other required readings used in course.

- Main Text: Montgomery D.C (2009). Design and Analysis of Experiments, 5th edition, John Wiley & Sons, New York.
- Reference: Sproull, N. (1998). Handbook of Research Methods: Guide for Practitioners in the Social Sciences (Paperback). Scarecrow Press.

6.2 Other suggested reading materials, if any.

- Charles R. Hicks and Kenneth V. Turner, Jr. (1999). Fundamental Concepts in the Design of Experiments. 5th edition, Oxford.

6.3 Other sources of information.

None.

6.4 Current bibliography of resource for student's information.

The following IT related research articles demonstrate the application of some of the experimental designs studied in this course.

- Benbasat, I. and A. S. Dexter "An Experimental Evaluation of Graphical and Color-Enhanced Information Presentation." Management Science **31**(11): 1348.
- Bodart, F., A. Patel, et al. "Should optional properties be used in conceptual modelling? A theory and three empirical tests." Information Systems Research **12**(4): 384.
- Browne, G. J. and M. B. Rogich "An empirical investigation of user requirements elicitation: Comparing the effectiveness of prompting techniques." Journal of Management Information Systems **17**(4): 223.
- Cappel, J. J. and J. C. Windsor "Ethical decision making: A comparison of computer-supported and face-to-face group." Journal of Business Ethics **28**(2): 95.

- Gefen, D. and C. M. Ridings "Implementation team responsiveness and user evaluation of customer relationship management: A quasi-experimental design study of social exchange theory." Journal of Management Information Systems **19**(1): 47.
- Glass, R. L. "Software requirements success predictors - Behavioral factors beat technical ones." The Journal of Systems and Software **51**(2): 85.
- Goodhue, D. L., B. D. Klein, et al. "User evaluations of IS as surrogates for objective performance." Information & Management **38**(2): 87.
- Hender, J. M., D. L. Dean, et al. "An examination of the impact of stimuli type and GSS structure on creativity: Brainstorming versus non-brainstorming techniques in a GSS environment." Journal of Management Information Systems **18**(4): 59.
- Hung, S.-Y. "Expert versus novice use of the executive support systems: An empirical study." Information & Management **40**(3): 177.
- Kahai, S. S. and R. B. Cooper "The effect of computer-mediated communication on agreement and acceptance." Journal of Management Information Systems **16**(1): 165.
- Kahai, S. S. and R. B. Cooper "Exploring the core concepts of media richness theory: The impact of cue multiplicity and feedback immediacy on decision quality." Journal of Management Information Systems **20**(1): 263.
- Kiang, M. Y. "A comparative assessment of classification methods." Decision Support Systems **35**(4): 441.
- Kwok, R. C.-W., J. Ma, et al. "Effects of group support systems and content facilitation on knowledge acquisition." Journal of Management Information Systems **19**(3): 185.
- Lim, K. H. and I. Benbasat "The effect of multimedia on perceived equivocality and perceived usefulness of information systems." MIS Quarterly **24**(3): 449.
- Marcolin, B. L., D. R. Compeau, et al. "Assessing User Competence: Conceptualization and Measurement." Information Systems Research **11**(1): 37.
- Massey, A. P., M. M. Montoya-Weiss, et al. "Because time matters: Temporal coordination in global virtual project teams." Journal of Management Information Systems **19**(4): 129.
- Muhlenbach, F., S. Lallich, et al. "Identifying and Handling Mislabeled Instances." Journal of Intelligent Information Systems **22**(1): 89.
- Reinig, B. A. and B. Shin "The dynamic effects of group support systems on group meetings." Journal of Management Information Systems **19**(2): 303.
- Sabherwal, R., M. K. Sein, et al. "Escalating commitment to information system projects: Findings from two simulated experiments." Information & Management **40**(8): 781.
- Sia, C.-L., B. C. Y. Tan, et al. "Group polarization and computer-mediated communication: Effects of communication cues, social presence, and anonymity." Information Systems Research **13**(1): 70.
- Smith, H. J., M. Keil, et al. "Keeping mum as the project goes under: Toward an explanatory model." Journal of Management Information Systems **18**(2): 189.
- Sussman, S. W. and L. Sproull "Straight talk: Delivering bad news through electronic communication." Information Systems Research **10**(2): 150.