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 weeks)
• 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.
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<tr>
<td>A</td>
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6.0 Resource Material

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

6.2 Other suggested reading materials, if any.

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.


