TO: The Engineering Faculty

FROM: The Faculty of the School of Engineering Education

RE: New undergraduate course in engineering statistics, IDE 33000, Multidisciplinary Engineering Statistics.

The Faculty of the School of Engineering Education has approved the new undergraduate course IDE 33000, Multidisciplinary Engineering Statistics. This action is now submitted to the Engineering Faculty with a recommendation for approval.

NEW COURSE: A new undergraduate course IDE 33000, Multidisciplinary Engineering Statistics will be the preferred probability/statistics selective in the Interdisciplinary Engineering Studies and Multidisciplinary Engineering programs: See attachments.

REASONS: IDE 33000, Multidisciplinary Engineering Statistics, is added as the preferred method to fulfill the Probability or Statistics selective in the plans of study in the Interdisciplinary Engineering Studies and Multidisciplinary Engineering programs. Existing statistics courses either require additional prerequisites (e.g., ChE 32000) or cover material in depth requiring two courses (e.g., IE 23000 and IE 33000). Three additional factors that led to the development of this ENE taught course were: 1. To ensure that computers were used to help satisfy ABET criterion 3k. 2. The ABET PEV recommended that more courses in the program be taught by ENE faculty. 3. The desire to increase the *esprit de corps* of the students in the program by having them take an additional course together. This course has been successfully taught twice. The other statistics options are retained for CODO students who have already taken probability or statistics.

_____

David Radcliffe, Professor and Kamyar Haghighi Head
School of Engineering Education

Attachment 1.
New Undergraduate Level Course:
IDE 33000 – Multidisciplinary Engineering Statistics

IDE 33000 Multidisciplinary Engineering Statistics
Semester 1 or 2, Cr.3

Prerequisites: MATH 162 or equivalent, Declared major in IDE/MUEN or permission of instructor

Description:

Students will be able to design and conduct experiments as well as analyze and interpret data and use probability models to solve problems in engineering systems. An emphasis is placed on performing statistical analyses using computer software and appropriately interpreting the software results. Topics covered include inferences on underlying means, variance, and proportions to solve multidiscipline engineering problems. Students formulate a research question, to plan how to address that question using data, collect and analyze the data, to write a report and to make a public presentation of the findings. Finally, students are able to transfer statistical understanding to their own multidisciplinary major.

This course is being taught for the third time in Spring 2012 by Prof. Teri Reed-Rhoads as IDE 49500.

IDE 49500 – Multidisciplinary Engineering Statistics
Spring 2012, Stanley Colter 283
Tuesday, Thursday 12:00 to 1:15 pm

Instructor: Dr. Teri Reed-Rhoads
ARMS 1300
494-4966, Email: trhoads@purdue.edu
Office Hours: Wednesdays 9:30 a.m. – 11:30 a.m. or by appointment.

Pre-requisite: MATH 162 or equivalent, Declared major in IDE/MDE or permission of instructor

Reasonable Accommodation Policy: Any student in this course who has a disability that may prevent him/her from fully demonstrating his/her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

Text: Montgomery, D. C., G. C. Runger, and Norma F. Hubele (2010). Engineering Statistics, Fifth Edition, John Wiley & Sons Inc., New York, NY.

Overall Course Outcome: Upon successful completion of this course, students will be able to design and conduct experiments as well as analyze and interpret data and use probability models to solve engineering problems.

The Overall Course Outcome is a consequence of achieving the following outcomes. Students will demonstrate their ability:

- To perform statistical analyses using computer software and to appropriately interpret the software results.
- To perform simple graphics and compute summary statistics and interpret their meaning for solving diverse engineering problems that are multidiscipline in nature.
- To use some probability models to describe uncertainty and to make decisions.

- To use sample summary statistics to make inferences about the underlying means, variances, and proportions to solve multidiscipline engineering problems.
- To build simple empirical models from data.
- To design simple controlled experiments and analyze results.
- Describe how statistical methods are used in an engineering system.
- To formulate a research question, to plan how to address that question using data, collect and analyze the data, to write a report and to make a public presentation of the findings.
- Be able to transfer statistical understanding to own multidisciplinary major.

Grading:

Midterm Project	20%
Final Project	20%
Homework	10%
Exam 1 – February 24	15%
Exam 2 – April 7	15%
Comprehensive Final Exam	20%

Guaranteed Grading Scale: There is a Grade Guarantee of 90% = A, 80% = B, 70% = C, 60% = D. Grades may be curved at the end of the semester, but grade boundaries will never be more severe than the Grade Guarantee. Approximately half of your grade comes from learning the material in the textbook and half comes from applying that material to solve problems.

Re-grading Policy: Re-grading is always permitted following an exam or homework assignment. You will have *one week* to submit a request for re-grade *in writing* to me along with your exam or assignment. However, it should be noted that resubmission allows for a re-grade of all your work and there is a potential of points lost as well as gained.

Laptop/Computer Policy: There will be periodic exercises conducted using the computer both in and out of class. Minitab is available through Remote Access, in the classroom, and in iTAP labs and can be used to solve homework exercises, unless otherwise specified.

Course Website: This course will use its website extensively. It will be the main mode of communication in that all assignments, announcements, grades, class lecture notes and some learning mechanisms will be found on the website. Emails will be used as a means of communication as well. It is your responsibility to make sure that your Purdue email address is operational and that you are checking it periodically. We will be using Blackboard as our course website software. The course website can be reached directly from http://blackboard.purdue.edu.

In-class Participation: It is my belief that student contributions to classroom discussions are critical to the learning environment. Information about your in-class participation will be used in the final grade determinations. Active participation will become particularly important when a student is on the borderline between letter grades.

Project Assignments: The objective of each of the projects will be to complete an engineering statistical study for an open-ended problem. All projects will be teamed-based and your participation in those teams will be assessed and factored into your overall project grade for the midterm project only. There will be a poster presentation of this project with a date to be announced. Attendance is mandatory for the poster presentation in order to receive a grade on the midterm project.

Homework: Homework can either be submitted in class or dropped off in the ENE Office in ARMS 1300 by 5:00 pm of the due date, unless otherwise announced in class. You will be allowed to drop one homework grade. Therefore, **no** late assignments will be accepted.

Exams: The exam dates are scheduled and are firm. You must notify the instructor in advance of any absence. If you miss an exam, a zero grade will be averaged into your final grade.

Nondiscrimination Policy Statement: Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Academic Integrity Expectations:

What does "academic integrity" mean?

Academic integrity means honesty and responsibility in scholarship. Professors have to obey rules of honest scholarship, and so do students. Here are the basic assumptions about academic work at Purdue University:

(1) Students attend Purdue University in order to learn and grow.
(2) Academic assignments exist for the sake of this goal.
(3) Grades exist to show how fully the goal is attained.
(4) Thus, all work and all grades should result from the student's own effort to learn and grow. Academic work completed any other way is pointless, and grades obtained any other way are fraudulent.

Academic integrity means understanding these basic rules, without which no university can exist. Academic misconduct (cheating) is not just "against the rules." It destroys the mutual trust and respect that should exist between student and professor, and it is unfair to students who earn their grades honestly.

Cheating, plagiarism, or any act of dishonesty will not be tolerated. This policy applies to all parties involved in the incident. Plagiarism is defined as "the taking of ideas, writings, etc. from another and offering them as one's own" (Webster's New World Dictionary, 1973). Never take credit for anyone else's intellectual property, be it on an exam, homework assignment or a project. This course has a zero-tolerance policy toward dishonest behavior. In addition to upholding the Purdue Code of Honor, Engineers are expected to uphold the Engineering code of ethics (if you are unfamiliar with the code, look it up at www.nspe.org) which includes "Being Honest" and "Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession." In other words, be honest and act civil. Now is the time to start to practice acting in an ethical and professional fashion.

Campus Emergency: In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Consult the course Blackboard site for further information should a situation warrant such actions.

Students are responsible to inform themselves about any changes/additions to this syllabus announced in class. **We are working together in this course. If you have any contacts, materials, events, or suggestions that may be used by all of us, please offer them.**

Schedule for IDE 33000:

Weeks	Content
2	**Introduction and Applications of Probability and Statistics** 1. Role of Statistics in Engineering 2. Data Summary and Presentation
4	**Random Variables and Probability Distributions** 1. Continuous Random Variable o Normal o Lognormal o Exponential o Gamma, Weibull, and Beta 2. Discrete Random Variables o Uniform o Binomial o Poisson 3. More than One Random Variable 4. Functions of Random Variables 5. Central Limit Theorem
5	**Decision Making for Single and Two Samples** 1. Statistical Inference 2. Point Estimate 3. Hypothesis Testing and Confidence Intervals 4. Goodness of Fit Testing o P-values o One and two-sided tests o Type I and Type II Errors o Choice of Sample Size
2	**Building Empirical Models** 1. Limitations of Regression 2. Simple Linear Regression 3. Multiple Regression 4. Confidence Intervals and Prediction Intervals
2	**Analysis of Variance for more than two samples** 1. Factorial Designs 2. Fractional Factorial Designs