Washington State University
MAJOR CURRICULAR CHANGE FORM - - COURSE
(Submit original signed form and ten copies to the Registrar's Office, zip 1035.)

Future Effective Date: 08/19/2013
(effective date cannot be retroactive)

☐ New course  ☐ Temporary course  ☐ Drop service course
☐ There is a course fee associated with this course (see instructions)

☐ Variable credit ______________________
☐ Repeat credit (cumulative maximum ________ hours)
☐ Increase credit (former credit ________)
☐ Lecture-lab ratio (former ratio ________)
☐ Number (former number ________)
☐ Prefix (former ________)
☐ Crosslisting (between WSU departments) (Must have both departmental signatures)
☐ Cooperative listing (UI prefix and number ________)
☐ Conjoint listing (400/500)
☐ S, F grading
☐ Request to meet Writing in the Major [M] requirement (Must have All-University Writing Committee Approval)
☐ Request to meet GER in ________ (Must have GenEd Committee Approval)
☐ Professional course (Pharmacy & Vet Med only)  ☐ Graduate credit (professional programs only)
☐ Other (please list request) ______________________

E M

course prefix  503

Managing Variability Using Statistics
course no.
title

3

credit 3 lecture hrs lab hrs studio hrs prerequisite
per week per week per week

Description (20 words or less) Managing variability and uncertainty using statistics for engineering decision making involving risk.

Instructor: Luna Magpili
Contact: Patti Elshafei
Campus Zip Code: 2785

Phone number: (757) 232-6824
Email: luna.magpili@wsu.edu
Phone number: (509) 335-0125
Email: pelshafei@wsu.edu

- Please attach rationale for your request, a current and complete syllabus, and explain how this impacts other units in Pullman and other branches (if applicable).
- Secure all required signatures and provide 10 copies to the Registrar’s Office.

Chair/DATE 3/4/13
Dean/DATE 3/4/13

General Education Com/DATE 8/22

Chair (if crosslisted/interdisciplinary)*
Dean (if crosslisted/interdisciplinary) *
Graduate Studies Com/DATE

All-University Writing Com/DATE
Academic Affairs Com/DATE
Senate/DATE

*If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.
Justification for new course in the Engineering and Technology Management curriculum

E M 503 Managing Variability Using Statistics

At the last few faculty meetings, concern was expressed that incoming students were weak in the area of managing variability. This course was designed as an outcome of the program assessment to strengthen the core selectives of the program. This course focuses on analyzing and using data so the engineering and technical managers that are our student clientele will be able to make decisions when confronted with problems in which uncertainty and/or risk play a significant role. This course will be one of the core selectives in the Managing Variability area which also includes E M 580 and 585. It replaces Stat 430 as part of the curriculum. Stat 430 deals with random variables, sampling, hypothesis testing; linear, multilinear, and nonlinear regression; analysis of variance for designed experiments; statistical computing. It does not address the needs of the managers of large corporations and industry that must make decisions and actually apply the knowledge of uncertainty. E M 503 will become a required prerequisite for many of our more quantitative courses.
EM 503 (3 credits): Managing Variability Using Statistics

COURSE SYLLABUS

Instructor: Luna Magpili, PhD
Contact: PH 757.232.6824; luna.magpili@wsu.edu
Course location: On-line
Course dates: TBA
Office hours: By appointment (contact me to arrange day and time), email anytime

Course description: Engineering and technical managers are often confronted with problems dealing with variability and uncertainty. This course focuses on analyzing and using data to understand situations and processes so decisions can be made under terms of variability and uncertainty. Students learn to read and interpret statistical literature; apply statistical methods in evaluating data; make decisions based on the data collected; and identify and manage variability and uncertainty in engineering and management systems. This course prepares students with diverse technical backgrounds and objectives with fundamental probabilistic and statistical concepts, methods, and techniques for use in engineering management through a balance of theory and application involving engineering decision-making, including situations in which uncertainty and risk are important. Emphasis is placed on problem definition, solution, and interpretation of results.

Textbook: Applied Statistics and Probability for Engineers

Software: Statistical software such as Minitab

Consultation: Prefer post and use of discussion forum in Angel for questions and clarifications for maximum benefit of the whole class. Extended consultations are by appointment. Emails and phone calls will be entertained during business hours, Eastern Standard time (EST).

Course webpage: Course materials (announcements, instructions, lectures, homework, exams, solutions, and readings) will be posted on Angel. All submission of course work will be through Angel or by email.

Learning outcomes:

- Students will get a refresher and review of probability and statistics, specifically methods and techniques for handling randomness, variability, uncertainty, and error.
- Students will learn to apply these tools in engineering problems, particularly dealing with variability and uncertainty of systems and processes. The emphasis is not on the mechanics of the calculations, but on the basic concepts, the core mathematical ideas, and knowing which kind of techniques to use in the context of engineering management decisions.
- Students will prepare a project to experience how engineering managers can deal with variability and uncertainty.
Grade Requirements and Evaluation:

<table>
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<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm</td>
<td>25%</td>
</tr>
<tr>
<td>Final exam</td>
<td>25%</td>
</tr>
<tr>
<td>Project</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Homework:**
There will be three (3) homework sets assigned and will be posted on Angel. Please submit your homework to me through Angel or via Email. Homework should be submitted on or prior to the due date. Points will be deducted for late submission. The average of the three homework set will count for 25 percent of the course grade.

**Midterm:**
The midterm is given at the end of session 8. It will be open notes and open books. You have one week to complete the exam. The exam should be submitted through Angel. Late submission will not be accepted. Midterm exam is an individual effort. No consultations among students are allowed. If you have questions or clarifications, consult with the instructor.

**Final exam:**
The final exam is given on the last day of class. It will be open notes and open books. The final exam should be submitted through Angel. Final exam is an individual effort. Again, no consultations among students are allowed. Late submission will not be accepted.

**Application Project:**
The student will select one of the major topics in the course and apply statistical strategies or techniques to an appropriate problem in his or her own work environment (or personal situation). The application project is due on the last day of the class and will be presented and discussed. As documentation, a project report will also be submitted through Angel. Students may work individually or in groups, depending on the scope of the project (maximum 3 individuals in a group).

**Grading Scale:**

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<tr>
<th>Grade</th>
<th>Score Range</th>
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<tbody>
<tr>
<td>A</td>
<td>[94-100]</td>
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<tr>
<td>A-</td>
<td>[90-94]</td>
</tr>
<tr>
<td>B+</td>
<td>[88-90]</td>
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<tr>
<td>B</td>
<td>[83-88]</td>
</tr>
<tr>
<td>B-</td>
<td>[80-83]</td>
</tr>
<tr>
<td>C+</td>
<td>[77-80]</td>
</tr>
<tr>
<td>C</td>
<td>[73-77]</td>
</tr>
<tr>
<td>C-</td>
<td>[70-73]</td>
</tr>
<tr>
<td>D</td>
<td>[65-70]</td>
</tr>
<tr>
<td>F</td>
<td>[0-65]</td>
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## Course Outline:

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<td>Test of Hypothesis</td>
<td>HW2 due; MIDTERM given</td>
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<td>Spring Break: NO CLASS</td>
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<td>Project report due</td>
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<td></td>
<td></td>
<td>FINAL EXAM given</td>
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<tr>
<td>16</td>
<td></td>
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Student Notices

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Academic Integrity: Academic integrity is the foundation of the academic community. WSU aims to foster and preserve the scholarly values of inquiry, experimentation, critical appraisal and integrity, and to foster these values in its students. ‘Academic Integrity’ is a term used at WSU to describe honest behavior as it relates to all academic work (for example, papers written by staff, student assignments, conduct in exams, etc.) and is the foundation of university life. One of the main principles is respecting other people’s ideas and not claiming them as your own. Anyone found to have used another person’s ideas without proper acknowledgement is guilty of academic misconduct and the University considers this to be a serious matter. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3).

http://conduct.wsu.edu/default.asp?PageID=338

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We also recognize the importance of courtesy and decorum during all discussions – in class, in chat rooms, email, and other conversations.

Treatment of Sensitive Material: We recognized that many students come from industry and as such are bound to their company’s policies for sharing information. If you have sensitive proprietary material that should not be shared publicly, please do not discuss it in class or other class communications channels. However, if you desire to use this material in submitted work to the instructor, you can indicate you have sensitive material in your submission. I will not share that information with any other individual. Some firms desire a non-disclosure agreement in these cases. Such agreements are easily possible for sensitive work. However, most of the time, a simple "sensitive material" statement is all you need.

Incomplete Policy: Students who desire an Incomplete (I) grade must notify the professor in writing, complete an Incomplete Grade Agreement form and provide sufficient reason for the Incomplete request. Incompletes will only be considered if at least 50%
of point assignments required in the course are totally completed and submitted by the end of the course. Incompletes must be cleared by the tenth week of the following semester. Spring and summer incompletes must be cleared by the tenth week of the fall semester. Fall Incompletes must be cleared by the tenth week of the spring semester. If Incompletes are not completed by the deadline, the student must retake the class to have a grade change submitted. Students must have permission to register for future semesters if they have two or more Incompletes on their transcripts. Students will not be allowed to graduate with an Incomplete on their transcript. Incompletes will automatically change to a Failing (F) grade if not cleared within one year.

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- WSU Spokane: [http://spokane.safetyplan.wsu.edu/](http://spokane.safetyplan.wsu.edu/)
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- Final exam: 25%
- Project: 25%

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Application Project: The student will select one of the major topics in the course and apply statistical strategies or techniques to an appropriate problem in his or her own work environment (or personal situation). The application project is due on the last day of the class and will be presented and discussed. Each presentation will be allocated 15 minutes. In the case where there are more presentations than the session time allows, randomly chosen projects will be selected for presentation in class. As documentation, a project report will also be submitted through Angel. Students may work individually or in groups, depending on the scope of the project (maximum 3 individuals in a group).

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- A  94-100
- A-  90-93
- B+  88-89
- B   83-87
- B-  80-82
- C+  77-79
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- D   65-69
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