UNIVERSITY OF KENTUCKY

Current Course Report

4/27/2015 12:44:44 PM

Course Information

Date Submitted: 10/28/2014

Current Prefix and Number: MNG - Mining Engineering , MNG 335 INTRO TO MINE SYSTEMS ANALYSIS

Other Course:

Proposed Prefix and Number: MNG 335

What type of change is being proposed?

Major Change

Should this course be a UK Core Course? Yes

Statistical Inferential Reasoning

1. General Information

a. Submitted by the College of: ENGINEERING

b. Department/Division: Mining Engineering

c. Is there a change in 'ownership' of the course? No

If YES, what college/department will offer the course instead: Select...

e. Contact Person

Name: Joseph Sottile

Email: joseph.sottile@uky.edu

Phone: 859-257-4616

Responsible Faculty ID (if different from Contact)

Name:

Email:

Phone:

f. Requested Effective Date

Semester Following Approval: Yes OR Effective Semester:

2. Designation and Description of Proposed Course

a. Current Distance Learning (DL) Status: N/A

b. Full Title: INTRODUCTION TO MINE SYSTEMS ANALYSIS

Proposed Title: INTRODUCTION TO MINE SYSTEMS ANALYSIS

c. Current Transcript Title: INTRO TO MINE SYSTEMS ANALYSIS

Proposed Transcript Title:

d. Current Cross-listing: none

Proposed – ADD Cross-listing : NA

Proposed – REMOVE Cross-listing: NA

e. Current Meeting Patterns

LECTURE: 3

Proposed Meeting Patterns

LECTURE: 3

f. Current Grading System: ABC Letter Grade Scale

Proposed Grading System: *Letter (A, B, C, etc.)*

g. Current number of credit hours: 3

Proposed number of credit hours: 3

h. Currently, is this course repeatable for additional credit? No

Proposed to be repeatable for additional credit? No

If Yes: Maximum number of credit hours: NA

If Yes: Will this course allow multiple registrations during the same semester? No

2i. Current Course Description for Bulletin: Descriptive statistics; random variables &probability distributions; point estimation; hypothesis testing; linear regression; time and motion study; introduction to geostatistics.

Proposed Course Description for Bulletin: An introduction to probability, statistics, and statistical inferential reasoning. Probability distributions for discrete and continuous random variables; descriptive statistics and claims arising from them; construction and evaluation of claims arising from formal statistical inference conveyed in confidence intervals and hypothesis tests; analysis of variance; information literacy for statistical inferential reasoning;. The course emphasizes mining applications.

2j. Current Prerequisites, if any: Prereq: MA 114, MNG 264.

Proposed Prerequisites, if any: Prereq: MA 113, or equivalent quantitative foundations course, and MNG 201, or consent of instructor.

2k. Current Supplementary Teaching Component:

Proposed Supplementary Teaching Component:

3. Currently, is this course taught off campus? No

Proposed to be taught off campus? No

If YES, enter the off campus address: NA

4. Are significant changes in content/student learning outcomes of the course being proposed? Yes

If YES, explain and offer brief rational: One additional student learning outcome has been added: "Develop lifelong learning skills by independently identifying and utilizing appropriate information resources for statistical inferential reasoning" to conform with the requirements of UK Core statistical inferential reasoning and ABET (the accreditation agency for engineering). In addition, the previous four student learning outcomes have been modified slightly to place more emphasize on evaluating common claims that arise from various applications of statistics.

5a. Are there other depts. and/or pgms that could be affected by the proposed change? No

If YES, identify the depts. and/or pgms:

5b. Will modifying this course result in a new requirement of ANY program? No

If YES, list the program(s) here:

6. Check box if changed to 400G or 500: No

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1.How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2.How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3.How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4.Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5.How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6.How do course requirements ensure that students make appropriate use of learning resources?

7.Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8.How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (http://www.uky.edu/UKIT/)?

9.Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10.Does the syllabus contain all the required components? NO

11.I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|HONAKER|Rick Honaker|MNG 335 CHANGE Dept Review|20141028

SIGNATURE|BJSTOK0|Barbara J Brandenburg|MNG 335 CHANGE College Review|20141111

SIGNATURE|MQFLET00|Melissa Q Pittard|MNG 335 CHANGE UKCEC Expert Review|20150417

SIGNATURE|JMETT2|Joanie Ett-Mims|MNG 335 CHANGE UKCEC Review|20150422

SIGNATURE|JMETT2|Joanie Ett-Mims|MNG 335 CHANGE Undergrad Council Review|20150427

Course Change Form

https://myuk.uky.edu/sap/bc/soap/rfc?services=

Open in full window to print or save

Generate R

Attachments:

Browse... Upload File

	ID	Attachment
Delete	3801	Statistical Inferential Reasoning Review Form-rev(
Delete	3803	MNG 335-Schedule.docx
Delete	3804	MNG 335-Syllabus-SIR.docx

First 1 Last

NOTE: Start form entry by choosing the Current Prefix and Number
(*denotes required fields)

	Current Prefix and Number:	MNG - Mining Engineering / MNG 335 INTRO TO MINE SYSTEMS ANALYSIS	*Proposed Prefix & Number:* (example: PHY 401G) ☑ Check if same as current	MNG 335
*	What type of change is being proposed?	☑ Major Change ☐ Major – Add Distance Learning ☐ Minor - change in number within the same hundred series, excep 799 is the same "hundred series" ☐ Minor - editorial change in course title or description which does change in content or emphasis ☐ Minor - a change in prerequisite(s) which does not imply a chang course content or emphasis, or which is made necessary by the elim or significant alteration of the prerequisite(s) ☐ Minor - a cross listing of a course as described above		

Should this course be a UK Core Course? ◉ Yes ○ No

If YES, check the areas that apply:

☐ Inquiry - Arts & Creativity	☐ Composition & Communications - II
☐ Inquiry - Humanities	☐ Quantitative Foundations
☐ Inquiry - Nat/Math/Phys Sci	☑ Statistical Inferential Reasoning
☐ Inquiry - Social Sciences	☐ U.S. Citizenship, Community, Diversity
☐ Composition & Communications - I	☐ Global Dynamics

1. General Information

a. Submitted by the College of: ENGINEERING Submission Date: 10/28/2014

b. Department/Division: Mining Engineering

c.* Is there a change in "ownership" of the course?

○ Yes ◉ No If YES, what college/department will offer the course instead? Select...

e.* * Contact Person Name: Joseph Sottile Email: joseph.sottile@uky.edu Phone: 859-257-4616

* Responsible Faculty ID (if different from Contact) Email: Phone:

f.* Requested Effective Date: ☑ Semester Following Approval OR Specific Term: 2

2. Designation and Description of Proposed Course.

a. Current Distance Learning(DL) Status:
◉ N/A
○ Already approved for DL*
○ Please Add
○ Please Drop

*If already approved for DL, the Distance Learning Form must also be submitted unless the department affirms (by checking this box) that the proposed chang affect DL delivery.

b. **Full Title:** INTRODUCTION TO MINE SYSTEMS ANALYSIS — *Proposed Title:* * INTRODUCTION TO MINE SYSTEM ANALYSIS

c. **Current Transcript Title** (if full title is more than 40 characters): INTRO TO MINE SYSTEMS ANALYSIS

c. *Proposed Transcript Title (if full title is more than 40 characters):*

d.	**Current Cross-listing:**	☑ N/A	OR	Currently[3] Cross-listed with (Prefix & Number):	none
	Proposed – ADD[3] Cross-listing (Prefix & Number):				NA
	Proposed – REMOVE [3,4] Cross-listing (Prefix & Number):				NA

e. **Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours [5] for each meeting patterr**

Current:	Lecture 3	Laboratory[5]	Recitation	Discussion	Indep. Study
	Clinical	Colloquium	Practicum	Research	Residency
	Seminar	Studio	Other	Please explain:	
*Proposed: **	Lecture 3	Laboratory[5]	Recitation	Discussion	Indep. Study
	Clinical	Colloquium	Practicum	Research	Residency
	Seminar	Studio	Other	Please explain:	

f.	**Current Grading System:**	ABC Letter Grade Scale		
	*Proposed Grading System:**	◉ *Letter (A, B, C, etc.)* ○ *Pass/Fail* ○ *Medicine Numeric Grade (Non-medical students will receive a letter grade)* ○ *Graduate School Grade Scale*		
g.	**Current number of credit hours:**	3	*Proposed number of credit hours:**	3
h.*	**Currently, is this course repeatable for additional credit?**			○ Yes ◉ No
*	*Proposed to be repeatable for additional credit?*			○ Yes ◉ No
	If YES:	*Maximum number of credit hours:*		NA
	If YES:	*Will this course allow multiple registrations during the same semester?*		○ Yes ◉ No

i. **Current Course Description for Bulletin:**

Descriptive statistics; random variables & probability distributions; point estimation; hypothesis testing; linear regression; time and motion study; introduction to geostatistics.

* *Proposed Course Description for Bulletin:*

An introduction to probability, statistics, and statistical inferential reasoning. Probability distributions for discrete and continuous random variables; descriptive statistics and claims arising from them; construction and evaluation of claims arising from formal statistical inference conveyed in confidence intervals and hypothesis tests; analysis of variance; information literacy for statistical inferential reasoning;. The course emphasizes mining applications.

j. **Current Prerequisites, if any:**

Prereq: MA 114, MNG 264.

* *Proposed Prerequisites, if any:*

Prereq: MA 113, or equivalent quantitative foundations course, and MNG 201, or consent of instructor.

*

k.	**Current Supplementary Teaching Component, if any:**	○ Community-Based Experience

		○ Service Learning ○ Both
	Proposed Supplementary Teaching Component:	○ Community-Based Experience ○ Service Learning ○ Both ○ No Change
3.	**Currently, is this course taught off campus?**	○ Yes ◉ No
*	*Proposed to be taught off campus?*	○ Yes ◉ No
	If YES, enter the off campus address: NA	
4.*	**Are significant changes in content/student learning outcomes of the course being proposed?**	◉ Yes ○ No
	If YES, explain and offer brief rationale:	
	One additional student learning outcome has been added: "Develop lifelong learning skills by independently identifying and utilizing appropriate information resources for statistical inferential reasoning" to conform with the requirements of UK Core statistical inferential reasoning and ABET (the accreditation agency for engineering). In addition, the previous four student learning outcomes have been modified slightly to place more emphasize on evaluating common claims that arise from various applications of statistics.	
5.	**Course Relationship to Program(s).**	
a.*	**Are there other depts and/or pgms that could be affected by the proposed change?**	○ Yes ◉ No
	If YES, identify the depts. and/or pgms:	
b.*	**Will modifying this course result in a new requirement[Z] for ANY program?**	○ Yes ◉ No
	If YES[Z], list the program(s) here:	
6.	**Information to be Placed on Syllabus.**	
a.	☐ Check box if changed to 400G or 500.	If changed to 400G- or 500-level course you must send in a syllabus and *you must include the differentiation* between under and graduate students by: (i) requiring additional assignments by the graduate students; and/or (ii) establishing different gra in the course for graduate students. (See *SR 3.1.4.*)

[U]See comment description regarding minor course change. *Minor changes are sent directly from dean's office to Senate Council Chair.* If Chair deems the change as "not minor," the form will b appropriate academic Council for normal processing and contact person is informed.
[Y]Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.
[S] Signature of the chair of the cross-listing department is required on the Signature Routing Log.
[G] Removing a cross-listing does not drop the other course -- it merely unlinks the two courses.
[H] Generally, undergrad courses are developed such that one semester hr of credit represents 1 hr of classroom meeting per wk for a semester, exclusive of any lab meeting. Lab meeting gene least two hrs per wk for a semester for 1 credit hour. (See *SR 5.2.1.*)
[D] You must *also* submit the Distance Learning Form in order for the course to be considered for DL delivery.
[Z]In order to change a program, a program change form must also be submitted.

Course Review Form
Statistical Inferential Reasoning

Reviewer Recommendation
Accept ☐ Revisions Needed ☐

Course: MNG 335 - Introduction to Mine Systems Analysis

Using the course syllabus as a reference, identify when and how the following learning outcomes are addressed in the course. Since learning outcomes will likely be addressed multiple ways within the same syllabus, please identify a representative example (or examples) for each outcome.

☐ Evidence of course activities that will enable students to evaluate common claims arising from the formal statistical inference conveyed through margins of error and confidence intervals; and to articulate the sense in which margins of error and confidence intervals address and quantify risks that are of practical interest.

Date(s)/location(s) on syllabus or assignment:
A. Location: classes 12, 17, 18, 25, 26, 27, 28, 29, 36, 37, 38

Brief Description:

A. Portions of Topics 3, 4, 7, and 8 in classes 12, 17, 18, 25, 26, 27, 28, 29, 36, 37, 38. Evaluating claims regarding discrete random variables, evaluationg claims regarding continuous random variables. Statistical inference on a single sample: introduction and terminology, interpreting confidence intervals and confidence bounds, evaluating claims regarding confidence intervals and confidence bounds. Statistical inference on two samples: interpreting confidence intervals and confidence bounds, evaluating claims regarding confidence intervals and confidence bounds.

- Note that prior to covering this material, students will have developed an understanding of random variables, independence, sampling, and bias. Students will also have been introduced to important distributions, e.g., the normal distribution, and the probability associated with specific events.

☐ Evidence of course activities that will enable students to evaluate common claims arising from the formal statistical inference conveyed through null hypothesis testing within statistically designed experiments, and to articulate the sense in which null hypothesis testing addresses and quantifies risks that are of practical interest.

Date(s)/location(s) on syllabus or assignment:
B. Location: classes 7, 8, 30, 31, 32, 33, 34, 39, 40, 41.

Brief Description:
B. Portions of Topics 2, 7, and 8. The goals of this outcome are very similar to those of the previous outcome, except that this outcome is focused on hypothesis testing while the previous outcome is focused on confidence intervals (and bounds). Topics include evaluating claims regarding concepts of probability, e.g., the false positive paradox; hypothesis testing on a single sample: introduction, Type I and Type II errors, conducting hypothesis tests, evaluating claims regarding hypothesis tests on one sample; hypothesis testing on two samples: conducting hypothesis tests, evaluating claims regarding hypothesis tests on two samples. Inference on two samples will help students evaluate claims when the performance of one product is compared to another product.

☐ Evidence of course activities that will enable students to evaluate common claims that arise from statistical constructs, like charts and graphs, tables and numerical summaries, through the informal act of human inference; and to articulate some of the associated challenges (e.g. with conditional reasoning, hidden variables, confounding, association versus correlation, not having the right information, misinterpreting randomness).

Date(s)/location(s) on syllabus or assignment:
C. Location: classes 2, 3, 4, 5, 6, 9, 10, 11, 19, 20, 21.

Brief Description:
C. Topic 2. Probability (7 classes) – Sample spaces and events, axioms of probability, independence, conditional probability, random variables. In this unit, students will be introduced to terminology related to probability, random experiments, sample space, and tree diagrams for visualizing sample spaces. Students will also be introduced to conditional probability, including Bayes' Theorem. Students will also be introduced to independence. Students will be given assignments in which they evaluate claims; students will also be given assignments in which they determine the probability of certain events.

C. Topic 5. Descriptive Statistics (3 classes) – In this unit, students will be introduced to descriptive statistics, such as the mean, median, mode, range, variance, and so forth. Graphical summaries such as histograms, box plots, stem and leaf diagrams, and so forth will be introduced (or reviewed). Students will be given assignments in which they evaluate claims based on descriptive statistics, and they will be given assignments in which they generate descriptive statistics.

☐ Topic distribution includes estimation (at least 25%), statistical testing (at least 25%), describing data (at least 20%), and information literacy (at least 5%).

Date(s)/location(s) on syllabus or assignment:
A. Estimation comprises 25% of course in classes 12, 17, 18, 25, 26, 27, 28, 29, 36, 37, 38 and approximately 25% of the homework assignments and exam questions.
B. Statistical testing comprises 25% of course in classes 7, 8, 30, 31, 32, 33, 34, 39, 40, 41 and approximately 25% of the homework assignments and exam questions..
C. Describing data comprises 25% of the course in classes 2, 3, 4, 5, 6, 9, 10, 11, 19, 20, 21 and approximately 20% of the homework assignments and exam questions.
D. Topic (10) will be approximately 5% of the class, and is conducted through homework assignments.

Brief Description:
See description for each topic on this form or syllabus.

☐ Assessable artifact(s) are identified and focused on demonstrating that the use and worth of statistical inference is for making everyday decisions. The artifact(s) should be conceptually focused and not primarily focused on computations and derivations.

Date(s)/location(s) on syllabus or assignment:
2. Probability , 6. Central Limit Theorem

Brief Description:
2. Probability - the false positive paradox - In this exercise, students will be given a situation similar to the one described below:

Screening people for early signs of a serious disease can be potentially very beneficial. However, there are often problems with false positives, e.g., unnecessary treatments, emotional stress, etc (like the woman who squanders her life savings because she thinks she has six months to live).
With this in mind, suppose that 0.50% of the population suffers from a particular serious disease. Further, consider that the probability of a false positive is only 0.50% and the probability of a false negative is only 0.50%.

a. Immediately after reading this description, give an estimate of what you think the probability of of having the disease would be if the test is positive. b. Sketch a tree diagram of this situation and illustrate how the probability that a person has the disease, given that the test is positive, can be determined. c. Discuss your results. Are they close to what you expected? d. Discuss the advantages and disadvantages of this type of screening. e. Find another situation that is similar to this one and describe its advantages and disadvantages.

6. Central Limit Theorem – In this exercise, students will be introduced to the Central Limit Theorem (CLT) by means of an in-class experiment using dice. Students will determine the mean and standard deviation of the roll of a six-sided die for sample sizes of 1, 3, 5, and 10 and graph the histogram of each, using a spreadsheet program. (The experiment will be replicated approximated 60 times to obtain a sufficient number of trials.) Students will also compute the mean and standard deviation for each of the four sample sizes (using a spreadsheet program) and note their observations. Once completed, the CLT will be introduced and the experimental results will be compared with those predicted by the CLT. Subsequently, illustrations of other distributions will be shown to the class and discussed.

☐ Sufficient evidence to suggest that the course is not confined to, or even largely focused on computation, but rather is designed to provide a conceptual understanding of statistical inferential reasoning (increasing student skill with computations is a perfectly acceptable by-product of the course). **This box must be checked by the reviewer for the submission to move forward**.

Date(s)/location(s) on syllabus or assignment:
All topics on syllabus except for topic (9).

Brief Description:
Throughout this course, students will be given a 50/50 mix of computation and non-computational evaluation. Emphasis will be on developing critical thinking skills in statistical inferential reasoning with for situations in daily life and mining engineering. The most important item in all of the course materials is a clear explanation of the premise/problem, solution/result, in the context of the problem.

Reviewer Comments:

COURSE SYLLABUS
Fall Semester 20XX

MNG 335 – Introduction to Mine Systems Analysis
Department of Mining Engineering
University of Kentucky

3 Credit Hours
MWF 9:00 – 9:50
207 RGAN

Instructor: J. Sottile
Office: 234A MMRB
Phone: 257-4616
Email: joseph.sottile@uky.edu

Course Description: An introduction to probability, statistics, and statistical inferential reasoning. Probability distributions for discrete and continuous random variables; descriptive statistics and claims arising from them; construction and evaluation of claims arising from formal statistical inference conveyed in confidence intervals and hypothesis tests; analysis of variance; information literacy for statistical inferential reasoning;. The course emphasizes mining applications.

Prerequisites: MA 113 or equivalent quantitative foundations course and MNG 201, or consent of instructor.

Course Goals: Upon completion of this course, students will have an understanding of the role of probability and statistics in engineering and everyday living. Students will have a basic knowledge of probability, including conditional probability, and its role in statistical inferential reasoning. Students will be able to develop and interpret common descriptive statistics (graphical and numerical) and evaluate claims that arise from statistical constructs. Students will be able to construct and evaluate common claims arising from confidence intervals and hypothesis testing. Students will demonstrate information literacy for statistical inferential reasoning. Applications will include daily experiences, engineering, and mining engineering and emphasis will be placed on developing critical thinking skills in probability and statistics.

Textbooks: *Applied Statistics and Probability for Engineers*, 5th edition; Montgomery and Runger; Wiley, 2011

Stat Spotting: A field Guide to Identifying Dubious Data, Joel Best, University of California Press, 2008

References: To be provided

Software: MS Excel (or functionally equivalent spreadsheet program) with data analysis tools

Course and Student Outcomes (Required by ABET, Inc.)
The following items will be used to assess the achievement of specific program outcomes:

Course Outcome	Program Outcome	Assessment Method
Apply knowledge of math, science, and engineering by demonstrating a basic knowledge of probability, including conditional probability, and its role in statistical inferential reasoning	a	Exam 1
Identify, formulate, and solve engineering problems by developing and interpreting common descriptive statistics (graphical and numerical) and evaluating claims that arise from statistical constructs	e, a	Exam 2
Identify, formulate, and solve engineering problems by constructing and evaluating common claims arising from confidence intervals and hypothesis testing	e, a	Exam 3
Identify, formulate, and solve engineering problems by conducting analysis of variance (ANOVA)	e, a	Final Exam
Develop lifelong learning skills by independently identifying and utilizing appropriate information resources for statistical inferential reasoning	i	Homework

Program outcomes are available at the mining engineering website:
http://www.engr.uky.edu/mng/students/undergraduate/outcomes/

Course Topics:

1. Introduction (1 class)
2. Probability (7 classes) – Sample spaces and events, axioms of probability, independence, conditional probability, random variables. In this unit, students will be introduced to terminology, random experiments, sample space, and tree diagrams for visualizing sample spaces. Students will also be introduced to conditional probability, including Bayes' Theorem and will develop an understanding of the false positive paradox. Students will also be introduced to independence.
3. Discrete Random Variables and Probability Distributions (4 classes) – Probability distributions, mean and variance of a discrete random variable, and important discrete distribution. In this unit, students will be introduced to discrete random variables, learn the mean, variance (and standard deviation) of a discrete random variable. Students will also be introduced to some important discrete distributions, such as the binomial distribution.
4. Continuous Random Variables and Probability Distributions (5 classes) – Probability distributions, mean and variance of a continuous random variable, important continuous distributions. In this unit, students will be introduced to continuous random variables. Students will be introduced to the probability density function (graphically, rather than computationally) and the concept that probability is the area under the curve. Students will also be introduced to important continuous distributions, such as the normal and exponential distributions.
5. Descriptive Statistics (3 classes) – In this unit, students will be introduced to descriptive statistics, such as the mean, median, mode, range, variance, and so forth. Graphical summaries such as histograms, box plots, stem and leaf diagrams, and so forth will be introduced (or reviewed). Students will be given assignments in which they evaluate claims based on descriptive

statistics, and they will be given assignments in which they generate descriptive statistics.

6. Central Limit Theorem (2 classes) – In this unit, students will be introduced to the Central Limit Theorem (CLT) by means of an in-class experiment using dice. Students will calculate the mean and standard deviation (of the roll of a six-sided die) for sample sizes of 1, 3, 5, and 10 and graph the histogram of each. (The experiment will be replicated approximated 60 times to obtain a sufficient number of trials.) Students will also compute the mean and standard deviation for each of the four sample sizes and note their observations. Once completed, the CLT will be introduced and the experimental results will be compared with those predicted by the CLT. Subsequently, illustrations of other distributions will be shown to the class and discussed.
7. Statistical Inference on a single sample (10 classes) – Type I and type II errors, confidence intervals and hypothesis tests on the mean, variance, and proportion. Units 2, 3, and 4 will have provided students with sufficient background to develop an understanding of confidence intervals and confidence bounds for mean and variance (or standard deviation) and their applications. Hypothesis tests will be introduced, and compared with confidence intervals (graphically). Students will be introduced to type I and type II errors and formal hypothesis testing. Students will also be introduced to confidence levels and p-value. Students will evaluate common claims arising from formal statistical inference conveyed in hypothesis testing and confidence intervals (on one sample) associated with statistically designed experiments. Students will also conduct hypothesis tests (on one sample) and properly interpret the results of the tests.
8. Statistical Inference on Two Samples (6 classes) – confidence intervals and hypothesis tests on the difference in mean values, variances and proportions, paired t-test. This unit will be similar to (7) except that emphasis will be on two samples instead of one. Students will evaluate common claims arising from formal statistical inference conveyed in hypothesis testing and confidence intervals (on two samples) associated with statistically designed experiments. Students will also conduct hypothesis tests (on two samples) and properly interpret the results of the tests.
9. Introduction to Analysis of Variance – (3 classes) Students will be introduced to ANOVA, the ANOVA table, and applications of ANOVA.
10. Students will develop lifelong learning skills by independently identifying and utilizing appropriate information resources for statistical inferential reasoning.

Course Projects: None

Course Grading

Item	**Weight**
First Exam	20%
Second Exam	20%
Third Exam	20%
Final Exam	20%
Homework (approximately 10 assignments)	20%

Grade Scale

A:	90 - 100%
B:	80 - 89.9%
C:	70 - 79.9%
D:	60 - 69.9%
E:	< 60%

Final Exam and Holidays:

Academic Calendar: http://www.uky.edu/Registrar/AcademicCalendar.htm
Final Exam Schedule: http://www.uky.edu/Registrar/finals.htm

Course Policies

Homework:

Homework must be neat and legible. Hand-written homework must be submitted on stapled, engineering paper. Answers must be boxed. If solutions require diagrams or graphs, straight edges or computer-generated graphics should be used. Problems are to be solved individually. Critical thinking and the method of analysis are as important as the final answer. Homework must be turned in at the beginning of class on the due date. Late homework will not be accepted.

Attendance Policy:

Class attendance is required. A student must arrive within 5 minutes of the scheduled start of class and must stay for the remainder of the period to be credited for attendance. Your grade will be reduced by 5% for each week-equivalent of class missed beyond one week. For example, since Mining 335 meets three times per week, the following grade reductions would be incurred:

Number of Unexcused Absences	Grade Reduction
1-3	0%
4-6	5%
7-9	10%
etc.	

Excused absences, as defined in the University Bulletin, are not counted in this total.

Excused Absences:

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences:

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity:

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of *Student Rights and Responsibilities* (available online http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Office Hours:

I am generally available anytime except one hour before a class.
My weekly class schedule is provided below.

Time	Mon.	Tues.	Wed.	Thur.	Fri.
8:00					
9:00	MNG 335		MNG 335		MNG 335
10:00					
11:00		MNG 511		MNG 511	
12:00					
1:00					
2:00					
3:00					
4:00					
5:00					

Blackboard:

We will be using Blackboard course management system to provide access to assignments and grades and to provide a location for posting any information that is important for the class. However, it will not be used as a substitute for providing paper copies of course materials. Although all assignments will be posted on Blackboard (for convenience) they will also be provided in class.

If you are having trouble with Blackboard, send email to helpdesk@uky.edu, or phone 218-4357 for a quicker response.

Cell Phones and Other Electronics:

Cell phone (and other electronics) use is not permitted in class. Please keep your phone on vibrate and out of sight during class.

MNG 335 – Introduction to Mine Systems Analysis - Class Schedule

Topic	Classes	Topics/Activities
1	1	Introduction – Introduce concepts and provide motivating examples in engineering and everyday life that demonstrate the need for probability and statistics and statistical inferential reasoning
2	2-4	Introduce probability – terminology and concepts, axioms of probability and methods for determining probability (relative frequency, tree diagrams, combinations, permutations, etc)
	5-6	Conditional probability, Bayes' theorem, and independence
	7-8	Evaluating claims regarding concepts of probability, e.g., false positive paradox
3	9	Introduce discrete random variables and probability distributions
	10	Mean and variance of discrete random variables
	11	Important discrete distributions, e.g., uniform and binomial
	12	Evaluating claims regarding discrete random variables
	13	Exam 1
4	14	Introduce continuous random variables and concept of probability density function, mean and variance
	15-16	Important continuous distributions, e.g., normal, exponential, etc.
	17-18	Evaluating claims regarding continuous random variables
5	19	Descriptive statistics – Introduction (terminology, statistical inference)
	20-21	Descriptive statistics – Measures of central tendency (mean, median, etc), measure of variability (variance, histograms, etc.) (Note that mean and variance were previously introduced. They are reinforced here in addition to the new measures being introduced.)
6	22	Central Limit Theorem – In class exercise
	23	Central Limit Theorem – review in-class exercise and define Central Limit Theorem
	24	Exam 2
7	25	Statistical Inference (single sample) – Introduction and terminology
	26-27	Statistical inference (single sample) – Confidence intervals: interpreting confidence intervals and confidence bounds
	28-29	Statistical inference (single sample) – Evaluating claims regarding confidence intervals and confidence bounds
	30	Statistical Inference (single sample) – Hypothesis testing: introduction
	31	Statistical Inference (single sample) – Hypothesis testing: Type I and Type II Errors
	32	Statistical Inference (single sample) – Hypothesis testing: conducting hypothesis tests
	33-34	Statistical Inference (single sample) – Evaluating claims regarding hypothesis tests
	35	Exam 3
8	36	Statistical inference (two samples) – Confidence intervals: interpreting confidence intervals and confidence bounds
	37-38	Statistical inference (two samples) – Evaluating claims regarding confidence intervals and confidence bounds
	39	Statistical Inference (two samples) – Hypothesis testing: conducting hypothesis tests

Topic	Classes	Topics/Activities
	40-41	Statistical Inference (two samples) – Evaluating claims regarding hypothesis tests
9	42	Analysis of variance (ANOVA) – Introduction
	43-44	Analysis of variance – Illustration of ANOVA through example, ANOVA table
10	out of class	Information literacy
	45	Final Exam during Finals Week