

# NEW COURSE FORM

## 1. General Information.

- a. Submitted by the College of: Engineering Today's Date: 08/23/2011
- b. Department/Division: Mining Engineering
- c. Contact person name: Tom Novak Email: tnovak@engr.uky.edu Phone: 7-3818  
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- d. Requested Effective Date:  Semester following approval OR  Specific Term/Year<sup>1</sup>: \_\_\_\_\_

## 2. Designation and Description of Proposed Course.

- a. Prefix and Number: MNG 435
- b. Full Title: Mine Systems Engineering and Economics
- c. Transcript Title (if full title is more than 40 characters): \_\_\_\_\_
- d. To be Cross-Listed<sup>2</sup> with (Prefix and Number): \_\_\_\_\_
- e. Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours<sup>3</sup> for each meeting pattern type.

4 Lecture \_\_\_\_\_ Laboratory<sup>1</sup> \_\_\_\_\_ Recitation \_\_\_\_\_ Discussion \_\_\_\_\_ Indep. Study \_\_\_\_\_  
\_\_\_\_\_ Clinical \_\_\_\_\_ Colloquium \_\_\_\_\_ Practicum \_\_\_\_\_ Research \_\_\_\_\_ Residency \_\_\_\_\_  
\_\_\_\_\_ Seminar \_\_\_\_\_ Studio \_\_\_\_\_ Other – Please explain: \_\_\_\_\_

- f. Identify a grading system:  Letter (A, B, C, etc.)  Pass/Fail
- g. Number of credits: 4
- h. Is this course repeatable for additional credit? YES  NO
- If YES: Maximum number of credit hours: \_\_\_\_\_
- If YES: Will this course allow multiple registrations during the same semester? YES  NO

i. Course Description for Bulletin: Optimization of mining systems and investment decisions based on the time value of money and the application of deterministic and stochastic models. Application of advanced features in spread-sheet programming for solving mine systems problems.

j. Prerequisites, if any: MNG 335 and Engineering Standing

k. Will this course also be offered through Distance Learning? YES<sup>4</sup>  NO

l. Supplementary teaching component, if any:  Community-Based Experience  Service Learning  Both

3. Will this course be taught off campus? YES  NO

## 4. Frequency of Course Offering.

<sup>1</sup> Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

<sup>2</sup> The chair of the cross-listing department must sign off on the Signature Routing Log.

<sup>3</sup> In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from SR 5.2.1)

<sup>4</sup> You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

## NEW COURSE FORM

- a. Course will be offered (check all that apply):  Fall  Spring  Summer
- b. Will the course be offered every year? YES  NO   
If NO, explain: \_\_\_\_\_
5. Are facilities and personnel necessary for the proposed new course available? YES  NO   
If NO, explain: \_\_\_\_\_
6. What enrollment (per section per semester) may reasonably be expected? 20-40
7. Anticipated Student Demand.
- a. Will this course serve students primarily within the degree program? YES  NO
- b. Will it be of interest to a significant number of students outside the degree pgm? YES  NO   
If YES, explain: \_\_\_\_\_
8. Check the category most applicable to this course:
- Traditional – Offered in Corresponding Departments at Universities Elsewhere
- Relatively New – Now Being Widely Established
- Not Yet Found in Many (or Any) Other Universities
9. Course Relationship to Program(s).
- a. Is this course part of a proposed new program? YES  NO   
If YES, name the proposed new program: \_\_\_\_\_
- b. Will this course be a new requirement<sup>5</sup> for ANY program? YES  NO   
If YES<sup>5</sup>, list affected programs: Mining Engineering
10. Information to be Placed on Syllabus.
- a. Is the course 400G or 500? YES  NO   
If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in **10.b**. You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR 3.1.4.)
- b.  The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from **10.a** above) are attached.

<sup>5</sup> In order to change a program, a program change form must also be submitted.



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## Signature Routing Log

**General Information:**

Course Prefix and Number: MNG 435

Proposal Contact Person Name: Tom Novak      Phone: 7-3818      Email: tnovak#engr.uky.edu

**INSTRUCTIONS:**

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

**Internal College Approvals and Course Cross-listing Approvals:**

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Mining Engineering	10/7/2011	Rick Honaker /7-1108/ rhonaker@engr.uky.edu	<i>Rick Honaker</i>
Engineering Faculty	11/28/11	Richard Sweigard 7-8827 rsweigard@engr.uky.edu	
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		/ /	
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**External-to-College Approvals:**

Council	Date Approved	Signature	Approval of Revision <sup>6</sup>
Undergraduate Council	2/14/2012	Sharon Gill	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

<sup>6</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

## COURSE SYLLABUS

### MNG 435: Mine Systems Engineering and Economics

Department of Mining Engineering

University of Kentucky

4 Credit Hours  
Meeting Days and Times:  
Meeting Location:

Instructor: Dr. T. Novak  
Office: Room 234B MMRB  
Phone: 257-3818  
E-mail: [tnovak@engr.uky.edu](mailto:tnovak@engr.uky.edu)

**Course Description:** Optimization of mining systems and investment decisions based on the time value of money and the application of deterministic and stochastic models. Application of advanced features in spread-sheet programming for solving mine systems problems.

**Prerequisites:** MNG 335 and engineering standing.

**Course Goals:** Upon completion of the course, students will possess the skills needed to analyze projects and investments from an economics perspective using the time value of money, and to schedule projects and analyze systems for the purpose of optimization.

**Textbooks:** Stermole and Stermole, Economic Evaluation and Investment Decision Making, 12<sup>th</sup> ed., 2009, Investment Evaluations Corporation, Golden CO.

Detailed course notes – Provided in advance of class.

**References:** R.M. Stark and R.L. Nicholls, Mathematical Foundations for Design: Civil Engineering Systems, Dover Books, 2005.  
B. Jelen, Excel 2010 In Depth, Que, June, 2010.  
F.S. Hillier and G.J. Lieberman, Introduction to Operations Research, Holden-Day, 1995.

**Learning Outcomes:** Students will be able to:

Outcomes	Program Outcome	Implementation Strategy
1. Perform economic calculations associated with the time-value of money.	(a)	Homework and Exams
2. Perform economics analysis on mineral properties.	(e)	Homework and Exams
3. Use CPM and PERT for project scheduling and cost minimization.	(e)	Homework, Small Projects, and Exams
4. Perform Monte Carlo simulations for optimizing mine operating procedures.	(a) (b)	Homework, Small Projects, and Exams
5. Use linear programming techniques to optimize mine systems and demonstrate proficiency in using advanced features in spread-sheet programming.	(e) (k)	Homework, Small Projects, and Exams
6. Demonstrate the ability to function on multi-disciplinary teams by completing a project in a team format.	(d) (g)	Project

**Course Topics:**

1. Compound interest formulas and equivalence
2. Break-even analyses
  - a. Rate of Return (ROR)
  - b. Net Present Value (NPV)
  - c. Present Value Ratio (PVR)
3. Inflation and escalation in economic analyses
4. Sensitivity analysis to address uncertainty
5. Depreciation, depletion, amortization, and after-tax cash flow
6. Project scheduling and cost minimization
  - a. Critical Path Method (CPM)
  - b. Project Evaluation and Review Technique (PERT)
7. Time/motion studies
8. Monte Carlo simulation
9. Linear programming
  - a. Graphical method
  - b. Simplex method

**Course Project:**

The project will be directed toward the economic analysis and optimization of a mining project.

**Course Grading:**

Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	25% (Comprehensive)
Homework Assignments	15%
Project	15%

**Grading Scale:**

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
< 60	E

**HW and Projects:**

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. Often, there may not be a single solution. Critical thinking and the method of analysis are as important as the final answer.

Projects must be submitted as a typed, engineering report package, including a title page, executive summary, statement of the problem, approach and methodology, and summarized solutions.

**Office Hours:**

Students may stop by my office, or call me, anytime on Tuesdays, Wednesdays, and Thursdays. If I am busy, we will schedule a meeting time.



**Attendance:**

Per departmental policy, class attendance is required. A student must arrive within 5 minutes of the scheduled start of the class period and must stay for the remainder of the period to be credited for attendance. Your grade will be reduced by 5 percentage points for each week-equivalent of class that is missed because of unexcused absences. For example, since MNG 435 meets 4 times per week, the following grade reductions would be incurred:

<u>Number of unexcused absences</u>	<u>Grade Reduction</u>
1-4	0%
5-8	5%
9-12	10% etc.

Excused absences are not counted in this total. Tests can only be made up for excused absences or by pre-arrangement with the course instructor. The instructor has complete authority regarding the issue of allowing test make-up and scheduling of such test.

**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).

**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](mailto:jkarnes@email.uky.edu)) for coordination of campus disability services available to students with disabilities.