

## APPLICATION FOR NEW COURSE

1. Submitted by the College of Engineering Date: 2-February-2009

Department/Division proposing course: Mining Engineering

2. Proposed designation and Bulletin description of this course:

a. Prefix and Number MNG 541

b. Title Computer Design of Mine Ventilation Systems

If title is longer than 24 characters, offer a sensible title of 24 characters or less: Comp Des Mine Vent Sys

c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week.

( ) CLINICAL ( ) COLLOQUIUM ( ) DISCUSSION ( ) LABORATORY ( 3 ) LECTURE  
( ) INDEPEND. STUDY ( ) PRACTICUM ( ) RECITATION ( ) RESEARCH ( ) RESIDENCY  
( ) SEMINAR ( ) STUDIO ( ) OTHER - Please explain: \_\_\_\_\_

d. Please choose a grading system:  Letter (A, B, C, etc.)  Pass/Fail

e. Number of credit hours: 3

f. Is this course repeatable? YES  NO  If YES, maximum number of credit hours: \_\_\_\_\_

g. Course description:

Computer methods applied to the design and analysis of mine ventilation networks; flow distribution, location and size of regulators and fans; evaluation of existing ventilation systems and application of correction methods to improve effectiveness of ventilation system.

h. Prerequisite(s), if any:

MNG 341 with a C or higher

i. Will this course also be offered through Distance Learning? YES  NO

If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

Internet/Web-based

Interactive video

Extended campus

3. Supplementary teaching component:  N/A  Community-Based Experience  Service Learning  Both

4. To be cross-listed as: \_\_\_\_\_ / \_\_\_\_\_  
Prefix and Number Cross-listing Department Chair

5. Requested effective date (term/year): Fall / 2010

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6. Course to be offered (please check all that apply):  Fall  Spring  Summer
7. Will the course be offered every year?  YES  NO  
If NO, please explain: \_\_\_\_\_
8. Why is this course needed?  
Material in proposed course is relevant for practicing mining engineers involved with ventilation systems.  
This course can be used to satisfy one of the two technical electives required for B.S. degree in mining engineering.
9. a. By whom will the course be taught? Dr. Andrzej M. Wala
- b. Are facilities for teaching the course now available?  YES  NO  
If NO, what plans have been made for providing them?  
\_\_\_\_\_
10. What yearly enrollment may be reasonably anticipated?  
10-15
11. a. Will this course serve students primarily within the department?  Yes  No
- b. Will it be of interest to a significant number of students outside the department?  YES  NO  
If YES, please explain.  
\_\_\_\_\_  
\_\_\_\_\_
12. Will the course serve as a University Studies Program course<sup>1</sup>?  YES  NO  
If YES, under what Area? \_\_\_\_\_  
<sup>1</sup>AS OF SPRING 2007, THERE IS A MORATORIUM ON APPROVAL OF NEW COURSES FOR USP.
13. Check the category most applicable to this course:
- traditional - offered in corresponding departments at universities elsewhere
  - relatively new - now being widely established
  - not yet to be found in many (or any) other universities
14. Is this course applicable to the requirements for at least one degree or certificate at UK?  Yes  No
15. Is this course part of a proposed new program?  YES  NO  
If YES, please name: \_\_\_\_\_
16. Will adding this course change the degree requirements for ANY program on campus?  YES  NO  
If YES<sup>2</sup>, list below the programs that will require this course:  
\_\_\_\_\_  
\_\_\_\_\_

<sup>2</sup>In order to change the program(s), a program change form(s) must also be submitted.

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17.  The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18.  Check box if course is 400G or 500. If the course is 400G- or 500-level, you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)
19. Within the department, who should be contacted for further information about the proposed new course?

Name: Dr. Andrzej M. Wala Phone: 257-2959 Email: awala@engr.uky.edu

20. Signatures to report approvals:

<p><u>11-11-08</u> DATE of Approval by Department Faculty</p>	<p><u>Rick Horaker</u> / <u>Rick Horner</u> Reported by Department Chair</p>
<p><u>11-20-09</u> DATE of Approval by College Faculty</p>	<p><u>RICHARD J. SWEIGARD</u> / <u>Richard Sweigard</u> Reported by College Dean</p>
<p><u>1-19-2010</u> * DATE of Approval by Undergraduate Council</p>	<p><u>S. Gill</u> / <u>Sharon O'Neil</u> Reported by Undergraduate Council Chair</p>
<p>_____ * DATE of Approval by Graduate Council</p>	<p>_____ Reported by Graduate Council Chair</p>
<p>_____ * DATE of Approval by Health Care Colleges Council (HCCC)</p>	<p>_____ Reported by Health Care Colleges Council Chair</p>
<p>_____ * DATE of Approval by Senate Council</p>	<p>_____ Reported by Office of the Senate Council</p>
<p>_____ * DATE of Approval by University Senate</p>	<p>_____ Reported by Office of the Senate Council</p>

\*If applicable, as provided by the University Senate Rules. (<http://www.uky.edu/USC/New/RulesandRegulationsMain.htm>)

Syllabus

**MNG 541: COMPUTER DESIGN OF MINE VENTILATION  
SYSTEMS (MVS)**  
Fall 2009

Instructor: Dr. Andrzej M. Wala

Time: TBD

Description: Computer methods applied to the design and analysis of mine ventilation networks; flow distribution, location and size of regulators and fans; evaluation of existing ventilation systems and application of correction methods to improve effectiveness of ventilation system.

Goals: Extend student skills in the theory and practice of mine ventilation and environmental engineering. Apply computer for mine ventilation system planning, design and for every-day ventilation problem solving.

Prerequisites:  
MNG 341 with a C or higher

Textbook: Mine Ventilation and Air Conditioning, Howard L. Hartman, Jan M. Mutmansky, R.V. Ramani, Y.J. Wang, John Wiley & Sons, New York 1997

Reference: Handout materials

Learning outcomes – upon completion of course, students shall be able to: (program learning outcome) Program learning outcomes are listed on the mining engineering website: <http://www.engr.uky.edu/mng/undergraduate/outcomes.html>.

1. Design a ventilation system for a given new mine (providing the required flow distribution, location and size for regulators and fan(s), minimize the power being used for ventilation. **(c), (k)**
2. Evaluate the existing ventilation system based on data provided by the instructor or, if available, based on data collected during the ventilation survey performed by students in a coal mine. After evaluation process make suggestions for correction needed to improve the effectiveness of the system. **(c), (k)**

3. (Graduate Students) will be able to communicate advanced technical information effectively (Graduate students will be required to write an additional technical paper on an advanced topic of their choice (as it relates to this course)).

**Weeks 1-5. Project #1**

Design a ventilation system for a new room and pillar underground coal mine in Appalachian Region. The electronic map as an AutoCAD file will be given.

(Lecture + recitation and computer lab work)

**Objective:** Develop a numerical model of the mine ventilation system, distribute the air according to the mine regulations and select a proper fan(s). These goals could be accomplish by following the procedure listed below:

1. Design temporary, auxiliary (tubing) ventilation, needed during the start-up stage of the mine. This part of the project will required the work schedule (timing) before installation of the main fan at the top of the return shaft and finishing the rest of the main portals.
2. Develop layout of the ventilation system for the projected mine,
3. Make line schematics of the ventilation system,
4. Using the ventilation system simulation package, named VnetPc 2007, create the numerical model of the ventilation system,
5. Analyze the ventilation system using developed model and implement proper control devices (regulators and fans) to achieve an effective and efficient ventilation system.

**Weeks 6 - 12. Project #2**

Modify and redesign the existing MVS from Project #1.

(Lecture + recitation and computer lab work)

**Objective:** The ventilation system designed during the first project was in operation for the last three years. From the first ventilation study it was known that the additional shaft, to reduce the resistance of the system because of the long mains being used, will be needed.

The engineering staff of the mine, trying to avoid the new shaft, orders the ventilation survey to evaluate the existing conditions. The results of the ventilation survey performed by the mining engineering students, as the part of class MNG 641/2007, will be provided. Based on these data student need to evaluate the existing ventilation system, find the problems and make a plan for corrective action to eliminate or minimize these problems and improve ventilation at the mine.

**Weeks 13 - 18. Project #3**

**Objective:** Perform the ventilation survey (hands on equipment) in one of the active, relatively small coal mine, designated by Massey Energy Company.

The results of the ventilation survey performed by the mining engineering students will be used to evaluate the existing ventilation system, find the problems, develop numerical model of the ventilation system being surveyed and make a plan for corrective action to eliminate or minimize these problems and improve ventilation at the mine.

(Lecture + recitation and computer lab work)

**Evaluation of Course:**

<b>Undergraduate Students</b>		<b>Graduate Students</b>	
Project #1	40%	Project #1	35%
Project #2	30%	Project #2	25%
Project#3	30%	Project#3	25%
		Technical Paper	15%

<u><b>Grading:</b></u>	<u><b>Undergraduate Students</b></u>	<u><b>Graduate Students</b></u>
	( 90-100% ) <b>A</b>	<b>A</b>
	( 80-89.9% ) <b>B</b>	<b>B</b>
	( 70-79.9% ) <b>C</b>	<b>C</b>
	( 60-69.9% ) <b>D</b>	<b>E</b>
	< 60% ) <b>E</b>	<b>E</b>