MIN ENG 6936: Surface Mine Design (Lecture)

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Class Timings:  
**On campus:** Monday, Wednesday, Friday 12:00 PM to 12:50 PM  
Library G-14

**Distance Students:** Material (Lectures, Assignments, Homework) will be uploaded every Thursday with due date duly mentioned for assignments/homework/quizzes

Catalogue Data:  
This course will focus on the determinants of surface mine design, geomechanical and geometrical mine design for open pit and strip mining; mine layouts optimization; mine environmental systems; and research directions in surface mine design and optimization.

Course Objectives:  
The objectives of this course are to enhance the ability of students in integrating engineering concepts and design procedures so that they are able to appreciate and design a comprehensive mine plan based on the geologic, geotechnical, geometrical and demographic factors. Course will also discuss socio-economic and environmental impacts of a surface mine. Upon completion of this course, students will be able

- to understand the engineering principles relating to surface mining techniques, equipment and operations
- to design a simple mining system, component or process to meet a desired need
- to identify, formulate, and solve surface mine engineering problems
- to use the techniques, skills and modern engineering tools necessary to function effectively in a surface mining environment.

Prerequisites:  
Engineering standing, introductory courses of engineering design and working knowledge of CAD, statistics, spread sheets and word processing
Text Material:
1. *SME mining engineering handbook* by Hartman, Howard L (any edition available)
2. *Surface Mining* by Kennedy, Bruce A
3. Class Notes

Course Material: Course material (including lectures, assignments, homework, quiz, project, and exams) will be uploaded on blackboard site. I have combined all sections to **1A (on Campus) section**. All the material for quizzes, exams, and lectures will be available at 1A section under **Content Tab** (lecture material/solutions) and **Assignment Tab** (quizzes, homework, and exams). The material for **Distance class** (the recordings and other relevant information) will be uploaded inside the distance section of Blackboard i.e. **MIN ENG 6936-1DIS**. Only distance students will have access to the recordings and live information. The assignments and homework will be due on subsequent Monday i.e. approximately after 10 days unless mentioned otherwise. The due date for quiz, project, and exams will be posted with the exams.

Course Topics:

a. Introduction
b. An Overview Of Surface Mining Operations
c. Surface Mining Methods
d. Geomechanical and geometrical considerations
   i. Rock Mass classification
   ii. Geological factors
   iii. Surface Mapping
e. Surface mining unit operations
   i. Drilling and Blasting
   ii. Digging and Loading
   iii. Haulage
   iv. Dragline Operations
   v. Crushing
f. Surface Mine layouts
g. Surface Mining methods and various design considerations
   i. Quarry design
   ii. Open pit mining
   iii. Strip mining
iv. Auger mining
v. Solution mining

h. Main and auxiliary equipment
i. Environmental impact of surface mining operations
j. Health and safety considerations in surface mining

Term Paper: Students will continually work on a term paper throughout the semester. The paper must be capable of at least conference publication. Students will choose a specific related to surface mine planning, for which data is available. Detailed requirements for this part of course will be shared the first week of class.

Grading:

- Quizzes/Assignment 20%
- Homework 40%
- Final Project/exam 20%
- Term Paper 20%

Evaluation:

- Grade %
  - A 90% and above
  - B 80% - 89%
  - C 70% - 79%
  - D 60% - 69%
  - F < 60%

Communication: Prefer mode of communication is WebEx, emails or blackboard forum. Skype conference may also be scheduled, if needed. You are encouraged to email me without hesitation 24/7.

Honor Code and Academic Integrity:

Honor code is strictly followed. All assignments, homework, and exams are individual tasks unless clearly specified as group assignments, homework, or exams. The Honor Code can be found at this link: http://stuco.mst.edu/about/honor.shtml. Please read and reflect upon the Honor code and its emphasis on HONESTY and RESPECT.

Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010.
and offers descriptions of academic dishonesty including cheating, plagiarism or sabotage (http://registrar.mst.edu/academicregs/index.html)

Other informational resources for students regarding ethics and integrity can be found online at http://ugs.mst.edu/academicintegrity/studentresources-ai.

Video Communication Center (VCC): http://vcc.mst.edu

The VCC web site http://vcc.mst.edu has information to help distance students. There is a lot of information available at the VCC website for students regarding course access, participating in live classes, lectures, and recording download. There is additional information on the VCC Students page at http://vcc.mst.edu/stus/updatedstus/

S&Tconnect: https://blackboard.mst.edu/ (S&T connect tab)

S&Tconnect provides an enhanced system that allows students to request appointments with their instructors and advisors via the S&Tconnect calendar, which synchronizes with the faculty or staff member’s Outlook Exchange calendar. S&Tconnect also facilitates better communication overall to help build student academic success and increase student retention. S&Tconnect Early Alert has replaced the Academic Alert system used by Missouri S&T. If more information is needed, please contact Rachel Morris at rachelm@mst.edu or 341-7600.

LEAD Learning Assistance: http://lead.mst.edu

The Learning Enhancement across Disciplines Program (LEAD) sponsors free learning assistance in a wide range of courses for students who wish to increase their understanding, improve their skills, and validate their mastery of concepts and content in order to achieve their full potential. LEAD assistance starts no later than the third week of classes. Check out the online schedule at http://lead.mst.edu/assist, using zoom buttons to enlarge the view. Look to see what courses you are taking have collaborative LEAD learning centers (bottom half of schedule) and/or Individualized LEAD tutoring (top half of the schedule). For more information, contact the LEAD office at 341-7276 or email lead@mst.edu.

The Burns & McDonnell Student Success Center:

The Student Success Center is a centralized location designed for students to visit and feel comfortable about utilizing the campus resources available. The Student Success Center was
developed as a campus wide initiative to foster a sense of responsibility and self-directedness to all S&T students by providing peer mentors, caring staff, and approachable faculty and administrators who are student centered and supportive of student success. Visit the B&MSSC at 198 Toomey Hall; 573-341-7596; success@mst.edu; Facebook: www.facebook.com/mstssc; web: http://www.studentsuccess.com

Disability Support Services: http://dss.mst.edu

"If you have a documented disability and anticipate needing accommodations in this course, you are strongly encouraged to meet with me early in the semester. You will need to request that the Disability Services staff send a letter to me verifying your disability and specifying the accommodation you will need before I can arrange your accommodation."

Disability Support Services is located in 204 Norwood Hall. Their phone number is 341-4211 and their email is dss@mst.edu.

Title IX:

Missouri University of Science and Technology is committed to the safety and well-being of all members of its community. US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Furthermore, in accordance with Title IX guidelines from the US Office of Civil Rights, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Title IX Coordinator, any notice of sexual harassment, abuse, and/or violence (including personal relational abuse, relational/domestic violence, and stalking) disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises.

Missouri S&T’s Title IX Coordinator is Vice Chancellor Shenethia Manuel. Contact her directly (manuels@mst.edu; (573) 341-4920; 113 Centennial Hall) to report Title IX violations. To learn more about Title IX resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit http://titleix.mst.edu.