

**King Abdulaziz University
Faculty of Engineering
Mining Engineering Department
Undergraduate Program**

**ABET EC-2000
COURSE BINDER**

**MINE 301
PRINCIPLES of MINING ENGINEERING**

PREPARED BY

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Fall 2006/2007

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DIVIDER 1: Course Design Data

Course Syllabus (ABET -2000 Format):

**MinE 301: Principles of Mining Engineering (3: 3, 0) - Fall 2006/ 2007
(Required Core Course)**

Course Description	Basic Definition, Mining History, Mining Contribution to Civilization, Common Minerals and their uses, Mineral Resources in Saudi Arabia, Stages of Mine Cycle, Prospecting, Exploration, Ore Reserve Estimation, Types of Mining, Important terms of Surface Mining & some Examples, Important Terms of Underground Mining & some Examples, Drilling, Blasting, Supporting, Development, Exploitation, Mine Ventilation& Safety, Mineral Processing, Smelting Operations.
Prerequisite	Completion of the 2 nd level of engineering courses, EMR 101, Gen Geol
Textbook	Thomas, L. J., "An Introduction to Mining", 1978 Hartman, H.L. , " Introductory Mining Engineering, 1987 SME Mining Engineering Handbook
Reference	Thomas, L. J., "An Introduction to Mining", 1978 Hartman, H.L. , " Introductory Mining Engineering, 1987 SME Mining Engineering Handbook
Course Learning Objectives (C.L.O.)	1- introduce to minerals needs and mineral resources in Saudi Arabia 2- Analyze principle stages of mine cycle (prospecting, exploration, <i>development& production</i>) 3- Estimate ore reserves 4- Define mining terms and Describe types of mining 5- Analyze mining operations (development, blasting, supporting) 6- Illustrate mine ventilation and safety 7- State in brief outlines of principles of mineral processing and smelting processing
Topics covered by (weeks)	<ul style="list-style-type: none">• Mineral Resources in Saudi Arabia and Their Uses (2).• Stages of Mine Cycle- Prospecting& Exploration (2).• Ore Reserve Estimation (3).• Mining Terms and Types of Mining (2).• Mining Operations- Development, Blasting& Supporting (2).• Principles of Mine Ventilation and Safety (1).• Principles of Mineral Processing and Smelting Processing (1).

Course Relationship to Program Outcomes	Program Outcomes											
	Highest attainable level of Learning	a	b	c	d	e	f	g	h	i	j	k
		3	-	-	-	3	-	2	2	-	2	2
Class/ Lab Schedule	The class meets twice a week, 110 minutes per class. The class is equipped with a complete multimedia and Pc for each student to facilitate active cooperative learning											
Instructional Methods	Lectures, Tutorials, Homework, Quizzes, Computer applications, Reporting, Presentations											
Course Contribution to Professional Component	Engineering Science : 3 credits or 100%											
Instructor	Prof. Dr. Mahmoud Aboushook - <i>E-mail:</i> prof_dr_aboushook@yahoo.com <i>Mob:</i> 0568265313											

Course Learning Objectives– Program Outcomes Matrix

MinE 301: Principles of Mining Engineering

Course Learning Objectives (C.L.O.)	Program Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
1- introduce to minerals needs and mineral resources in Saudi Arabia							M	M		L	
2- Analyze principle stages of mine cycle (prospecting, exploration, <i>development & production</i>)	M						-			-	
3- Estimate ore reserves	H				H		-			L	
4- Define mining terms and Describe types of mining							M			-	
5- Analyze mining operations (development, blasting, supporting)	M						-			-	M
6- Illustrate mine ventilation and safety							-	M			M
7- State in brief outlines of principles of mineral processing and smelting processing							-				M
Average	H	-	-	-	H	-	M	M	-	M	M

3= High = Synthesis & Evaluation levels ,

2= Medium = Application & Analysis Levels ,

1= Low = knowledge & Comprehension Levels

Program Outcomes

- a. an ability to apply knowledge of mathematics, science, and engineering fundamentals.
- b. an ability to design and conduct experiments, and to critically analyze and interpret data.
- c. an ability to design a system, component or process to meet desired needs.
- d. an ability to function in multi-disciplinary teams.
- e. an ability to identify, formulate and solve engineering problems.
- f. an understanding of professional and ethical responsibility.
- g. an ability for effective oral and written communication.
- h. the broad education necessary to understand the impact of engineering solutions in a global and societal context.
- i. a recognition of the need for, and an ability to engage in life-long learning.
- j. a knowledge of contemporary issues.
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Calendar

Week	Lesson	Lecture Topic	Activities
1 st	1	Mineral Resources in Saudi Arabia and Their Uses	
	2	Continue	
2 nd	1		Reporting 1
	2		Computer Work 1
3 rd	1	Stages of Mine Cycle- Prospecting& Exploration	
	2	Continue	
4 th	1		Homework 1
	2		Quizzes 1
5 th	1	Ore Reserve Estimation	
	2	Continue	
6 th	1	Continue	
	2		Quizzes 2
7 th	1		Computer& Statistics Works 2
	2		Mid Term Exam
8 th	1	Mining Terms and Types of Mining	
	2	Continue	
9 th	1		Homework 2 , Reporting 2
	2		Computer Works 3
10 th	1	Mining Operations- Development, Blasting& Supporting	
	2	Continue	
11 th	1		Homework 3
	2		Quizzes 3
12 th	1	Principles of Mine Ventilation and Safety	
	2		Homework 4& Preesntation 1
13 th	1	Principles of Mineral Processing and Smelting Processing	
	2		Homework 5 & Presentation 2
14 th	1		Revision
	2		Final Exam.

Course Articulation Matrix:

MinE 301: Principles of Mining Engineering

Course Learning Objectives (C.L.O.)	Program Outcomes											Assessment Tools& Activities						
	a	b	c	d	e	f	g	h	i	j	k	T1	T2	T3	T4	T5	T6	T7
1- introduce to minerals needs and mineral resources in Saudi Arabia	.						2	2		2				X (2)	X (2)		X (5)	
2- Analyze principle stages of mine cycle (prospecting, exploration, <i>development & production</i>)	2											X (2)	X (3)				X (5)	X (10)
3- Estimate ore reserves	3			3						1			X (4)	X (5)			X (10)	X (10)
4- Define mining terms and Describe types of mining						2	2			2		X (2)		X (3)	X (3)			X (10)
5- Analyze mining operations (development, blasting, supporting)	2										2	X (2)	X (3)					X (10)
6- Illustrate mine ventilation and safety										2		X (2)				X (3)		
7- State in brief outlines of principles of mineral processing and smelting processing										2		X (2)				X (2)		
Average	3	-	-	-	3	-	2	2	-	2	2							

3= High = Synthesis & Evaluation levels,
2= Medium = Application & Analysis Levels
1= Low = knowledge & Comprehension Levels.

T1 = Home Works (10) , T2 = Quizzes (10) , T3 = Computer& Statistic Works (10) ,
T4= Reports (5) , T5= Presentations (5) , T6= Exams (20) , T7= Final Exam (40).

Performance Targets (Passing Criteria):

60% of the class student's score over 60% in each course learning objective and each program outcome.

DIVIDER 2: Course Assessment Data

Indirect Assessment Tool

Surveys of Course Learning Objectives& Instructional Tools

**Course: MinE301 - Principles of Mining Engineering
2006/2007**

Fall

<i>Upon the completion of this course how do you rank your ability to do the following:</i>		Poor	Adequate	Good
		1	2	3
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia			
C.L.O.2	Analyze principle stages of mine cycle (prospecting, exploration)			
C.L.O.3	Estimate ore reserves			
C.L.O.4	Define mining terms and Describe types of mining			
C.L.O.5	Analyze mining operations (development, blasting, supporting)			
C.L.O.6	Illustrate mine ventilation and safety			
C.L.O.7	State in brief outlines of principles of mineral processing and smelting processing			
<i>There were 7 Instructional tools used in this course. Please indicate how important each of these tools was in helping you to attain the course learning objectives.</i>		No Value	Some Value	Important
		1	2	3
1	Lectures			
2	Tutorials			
3	Homework			
4	Quizzes			
5	Computer Application			
6	Reporting			
7	Presentations			

Results of Surveys of Course Learning Objectives& Instructional Tools

Course: MinE301 - Principles of Mining Engineering

Fall 2006/2007

<i>Upon the completion of this course how do you rank your ability to do the following:</i>		Poor	Adequate	Good
		%	%	%
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia	0	0	100
C.L.O.2	Analyze principle stages of mine cycle (prospecting, exploration)	0	0	100
C.L.O.3	Estimate ore reserves	0	0	100
C.L.O.4	Define mining terms and Describe types of mining	0	0	100
C.L.O.5	Analyze mining operations (development, blasting, supporting)	0	0	100
C.L.O.6	Illustrate mine ventilation and safety	0	0	100
Average		0	0	100
<i>There were 7 Instructional tools used in this course. Please indicate how important each of these tools was in helping you to attain the course learning objectives.</i>		No Value	Some Value	Important
		%	%	%
1	Lectures	0	0	100
2	Tutorials	0	100	0
3	Homework	0	0	100
4	Quizzes	0	0	100
5	Computer Application	0	0	100
6	Reporting	0	0	100
Average		0	16	84

Comment:

- The ability of student to achieve course learning objectives is in a good rank by an average percentage of 100%.
- The instructional tools used in helping the students to attain the course learning objectives are in important rank by average percentage of 84% and in some value rank by percentage of only 16%.

Direct Assessment Tools

(Copies Question Papers of HW, Exams, etc....)

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Mining Engineering Department
Undergraduate Program

MinE 301 – Principles of Mining Engineering - Fall 2006/2007
Prof. Dr. Mahmoud Aboushok

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Homework 1

- 1- Summarize prospecting steps of mineral deposits.
- 2- Outline geophysical methods.
- 3- Using your personal skill to outline stages of mine cycle.

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MinE 301 – Principles of Mining Engineering - Fall 2006/2007
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Homework 2

- Illustrate the important terms using in mining engineering

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**MinE 301 – Principles of Mining Engineering - Fall 2006/2007
Prof. Dr. Mahmoud Aboushok**

Homework 3

Sketch out the following items:

- Different access to the ore body.
- Different blasting rounds on the mine heading.
- Different types of mine supports.

Homework 4

- Give us some notes about the principles of mine ventilation and safety.

Homework 5

- Summarize the principles points of mineral and smelting processing.

Undergraduate Program

**MinE 301 – Principles of Mining Engineering - Fall 2006/2007
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Quizzes 1

- 1- What are the sampling types?**
- 2- Give an example for the channel sampling.**
- 3- Compare between different types of exploration drilling by tables and illustrations?**
- 4- What are different types of drill holes patterns?**
- 5- Identify the geological, metallurgical and pilot testing as well as feasibility studies.**

Undergraduate Program

**MinE 301 – Principles of Mining Engineering - Fall 2006/2007
Prof. Dr. Mahmoud Aboushook**

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Quizzes 2

- 1- Reproduce dilution calculations given in lecture example.**
- 2- The operating costs for a gold mine are 60 \$/ton. The recovery at the mill is 95%. At what price of \$350/oz, what is the cutoff grade in oz AU/ton?**
- 3- The operating costs for a gold mine are 50 \$/ton. The recovery at the mill is 80% and the mining dilution is 10%. At a gold price of \$500/oz, what is the cutoff grade in oz AU/ton?**
- 4- The operating costs for a gold mine are 70 \$/ton. The recovery at the mill is 85%. The smelting and refining costs are \$20/ozAu. At a gold price of \$600/oz, what is the cutoff grade in oz AU/ton?**

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MinE 301 – Principles of Mining Engineering - Fall 2006/2007
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Quizzes 3

- 1- What are different types of mine supporting materials?
- 2- What are different types of round blasting in underground mining?
- 3- How can you trace successively blasting round on a D shape mine heading?

Computer Works 1

- 1- Using word processing, arrange in a table the important mining terms.
- 2- Using your skill in computer to summarize mineral resources and their uses in Saudi Arabia.

Computer Works 2

- 1- Using your skill in computer to transfer the calculation reserve estimation by polygons areas to the triangles areas and compare between values obtained by the two methods?
- 2- Using Excel spreadsheet to analyze cutoff grade given in the given lecture example.

Computer Works 3

- Using your skill in computer to draw the important access to the ore body.

Report 1

- Make a scientific report about the mineral resources and industries in Saudi Arabia.
(use Network and any possible communications as you can)

Report 2

- Make a scientific report concerning different mine types in the world wild.
(use Network and any possible communications as you can)

Presentation 1

- Use the PowerPoint processing to make a presentation about the principle items of mine ventilation and mine safety.

Presentation 2

- Use the PowerPoint processing to make a presentation about the principle items of mineral processing and smelting.

Answer the following questions:

1- Define:

**Mine – Mining – Ore – Waste – Surface Mine
Underground Mine - Tonnage Factor – Cutoff Grade.**

2- What are the uses of the following minerals:

Copper – Feldspar – Gypsum – Lead – Micas – Phosphate – silica

3- Outline the following items:

- **Stages of mine cycle.**
- **Prospecting steps.**
- **Geological examination.**
- **Ground geophysical survey.**
- **Sampling types.**
- **Drill hole patterns.**
- **Sample analysis types.**
- **Ore reserve classification.**

4- Summarize the mineral resources in Saudi Arabia.

First Question (10)

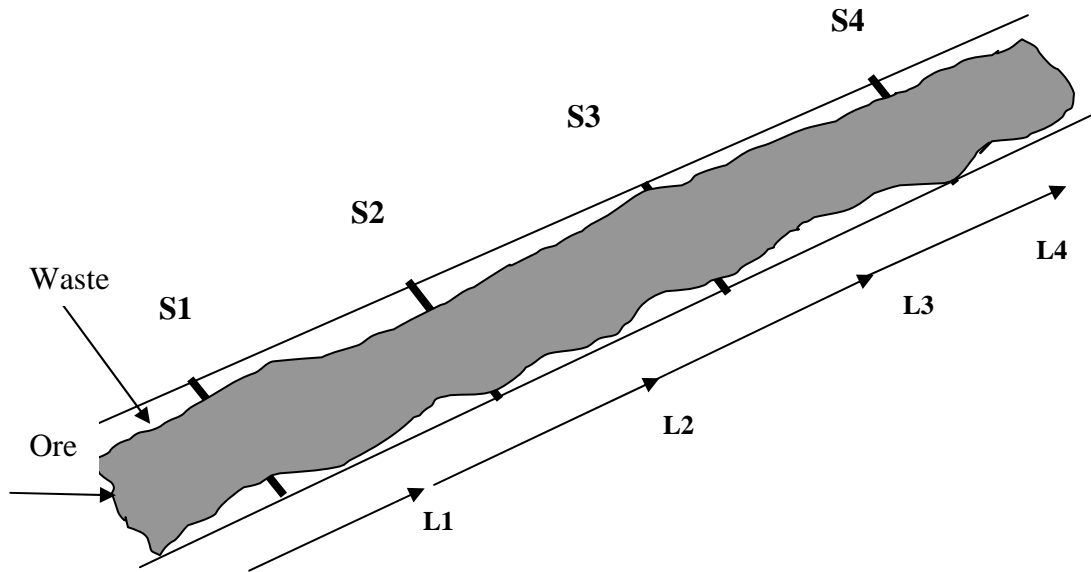
a- Define the following terms:

Resistivity - Seismic Methods - Channel sampling - Diamond Core Drilling

b- Identify the following items:

Geological testing - Metallurgical testing - Pilot testing - Feasibility studies

Second Question (10)



Sample	L	Wo	Ww	% pb	% Ag Oz/ton
S1	5.0	3.5	0.5	7.5	12.2
S2	7.0	3.0	1.0	6.8	11.5
S3	7.0	3.7	0.3	5.7	12.0
S4	5.0	3.6	0.4	8.5	10.5

a- In the shown figure and table, assume:

- The minimum mining width is 4 ft. in order to accommodate the mines extraction equipment.
- The density of vein material is $10 \text{ ft}^3/\text{ton}$, the density of the country rocks is $13 \text{ ft}^3/\text{ton}$.

Find the following:

- Average grade of pb and Ag - Dilution
- If you take 1 meter for thickness, calculate the tonnage of ore and waste.

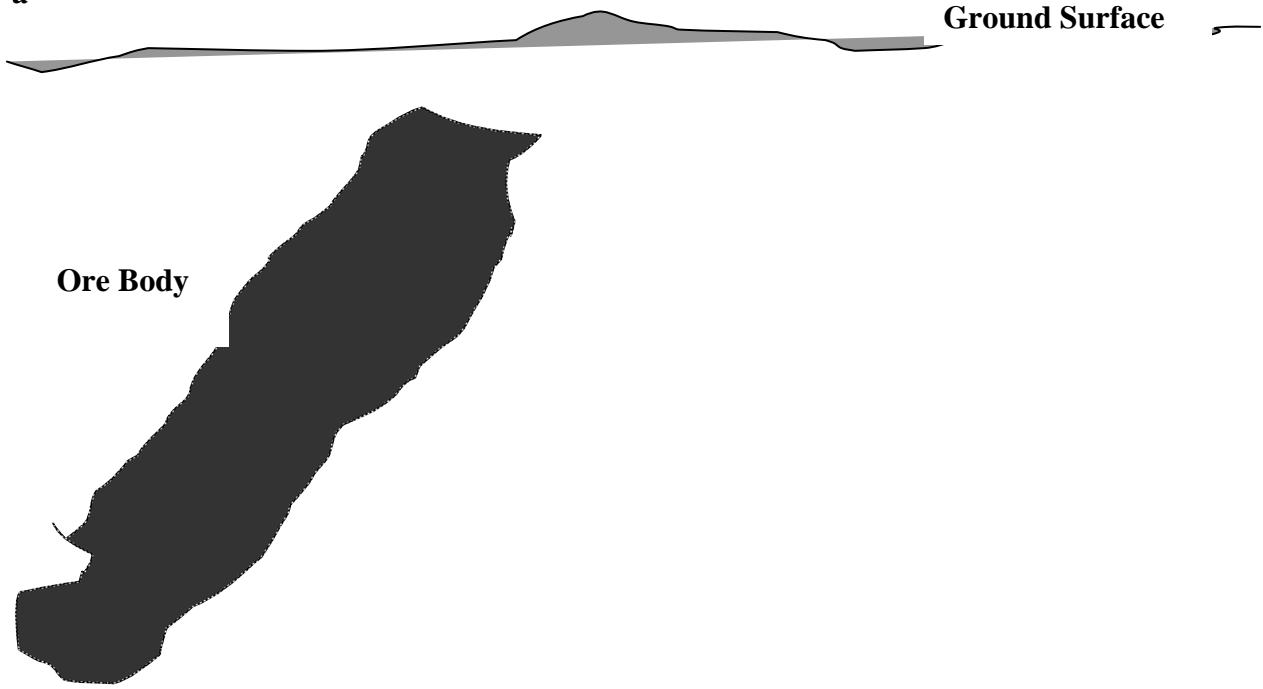
b- For the following table, fill down all the void spaces and find out total tonnage and average grade

Polygon	Area (ft ²)	Thickness (ft)	Volume (ft ³)	Tonnage Factor e	Tons	Grade % Cu	Tones * Grade
1	4400	180	.....	12.5	.....	0.82	.....
2	5520	175	.....	12.5	.....	0.75	.....
3	4690	180	.....	12.5	.....	0.97	.....
4	5840	150	.....	12.5	.....	0.93	.....
5	3760	120	.....	120	.....	0.81	.....

Third Question (10)

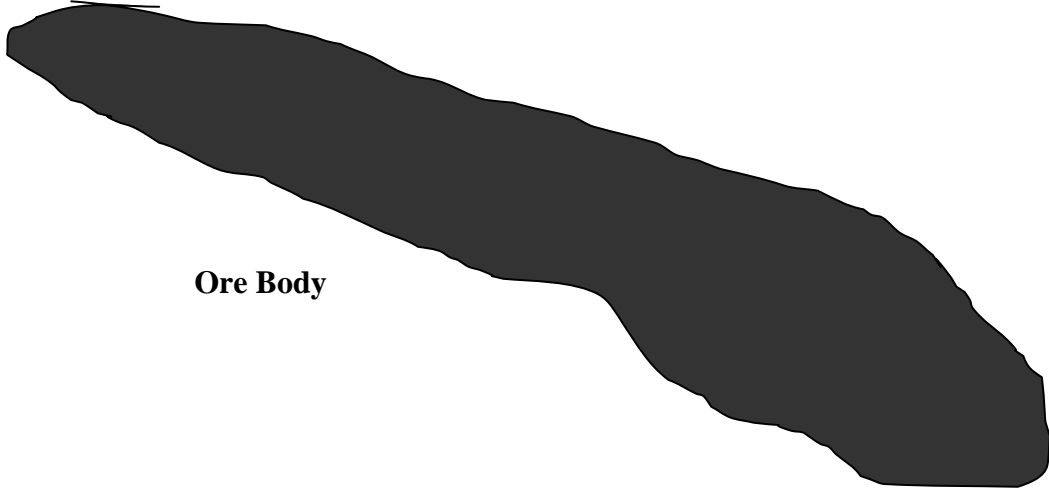
Layout out different access to the ore body of the following shapes:

a-



b-

Ground Surface



Ore Body



Ore Body

Fourth Question (10)

a- Define the following terms;

Surface Mining - Bench – Overburden - Pit Slope - Stripping Ratio –Adit – Drift - Shaft – Sump – Winze.

b- How can you trace successively blasting round on a D shape mine heading?

c- What are different types of mine supporting materials?

Results of Direct Assessment Tools

(From Software)

End of Semester Course assessment and Improvement Report

(From Software)

DIVIDER 3: Supported program Outcomes "a"

Outcome 3.a:
*an ability to apply knowledge of mathematics, science,
And engineering fundamentals.*

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Instructional Methods used to address the outcome "a":

**Course: MinE301
Principles of Mining Engineering
Fall 2006**

As seen from the course articulation matrix, this outcome is addressed through the following course learning objectives as well as assessment tools& activities:

Course: MinE301 – Principles of Mining Engineering							
Course Learning Objectives addressing the Outcome "a"		Level of Learning Achieved (LOL)	Assessment Tools & Activities				
			Homework	Quizzes	Computer & Statistic Works	Mid Exam.	Final Exam
C.L.O.2	Analyze principle stages of mine cycle (prospecting, exploration)	2	X	X	-	X	X
C.L.O.3	Estimate ore reserves	3	-	X	X	X	X
C.L.O.5	Analyze mining operations (development, blasting, supporting)	2	X	X	-	-	X

**3= High = Synthesis & Evaluation levels,
2= Medium = Application & Analysis Levels
1= Low = knowledge & Comprehension Levels**

Course Materials used to address outcome "a"

Materials used to address the above mentioned course learning objectives are also used to address the outcome. The outcomes which are corresponding to the course materials are shown in appendix A.

Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006**

Outcome 3.a

an ability to apply knowledge of mathematics, science, and engineering fundamentals

<i>This course has increased my ability to:</i>		Agree	Not sure	Disagree
a.1	Use math in solution of mining engineering problems			
a.2	Use science in solution of mining engineering problems			
a.3	Use engineering principles (ex. from fluid mechanics, dynamics, strength of materials, etc.) in solution of mining engineering problems.			

Results of Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Outcome 3.a

an ability to apply knowledge of mathematics, science, and engineering fundamentals

<i>This course has increased my ability to:</i>		Agree %	Not sure %	Disagree %
a.1	Use math in solution of mining engineering problems	100	0	0
a.2	Use science in solution of mining engineering problems	100	0	0
a.3	Use engineering principles (ex. from fluid mechanics, dynamics, strength of materials, etc.) in solution of mining engineering problems.	0	100	0
Average		67	33	0

Comment:

The percentage of student's opinion is attained to 67% in (agree rank), and to 33% in (not sure & disagree rank)

Direct Assessment Tools for Outcome "a"

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Course Learning Objectives addressing the Outcome "a"		Assessment Tools & Activities				
		Homework	Quizzes	Computer & Statistic Works	Mid Exam.	Final Exam
C.L.O.2	Analyze principle stages of mine cycle (prospecting, exploration)	HW1	QZ1	-	MQ2	FQ2
C.L.O.3	Estimate ore reserves	-	QZ2	CW2	MQ3	FQ3
C.L.O.5	Analyze mining operations (development, blasting, supporting)	HW2	QZ3	-	-	FQ4

Results of Direct Assessment Tools for Outcome "a"

Average achievement of passing students on Outcome 3a is 78% (See adjoin sheet)

Outcome Assessment and Improvement Results:

This outcome is satisfied and no improvements are required.

DIVIDER 4: Supported program Outcomes "e"

Outcome 3.e:

an ability to identify, formulate, and solve engineering problems

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Instructional Methods used to address the outcome "e"

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Instructional Methods used to address the outcome "e":

As seen from the course articulation matrix, this outcome is addressed through the following course learning objectives as well as assessment tools& activities:

Course: MinE301 – Principles of Mining Engineering						
Course Learning Objectives addressing the Outcome "e"		Level of Learning Achieved (LOL)	Assessment Tools & Activities			
			Quizzes	Computer & Statistic Works	Mid Exam.	Final Exam
C.L.O.3	Estimate ore reserves	3	X	X	X	X

**3= High = Synthesis & Evaluation levels,
2= Medium = Application & Analysis Levels
1= Low = knowledge & Comprehension Levels**

Course Materials used to address outcome "e"

Materials used to address the above mentioned course learning objectives are also used to address the outcome. The outcomes which are corresponding to the course materials are shown in appendix A

Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

**Outcome 3.e:
an ability to identify, formulate, and solve engineering problems**

<i>This course has increased my ability to:</i>		Agree %	Not sure %	Disagree %
e.1	Read and understand the information given about a problem.			
e.2	Research and gather information pertaining to the problem.			
e.3	Use a process, as well as a variety of tactics and approaches to tackle problems.			
e.4	Focus on accuracy rather than speed when I solve problems.			
e.5	Be organized and systematic when I solve problems			

Results of Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

**Outcome 3.e:
an ability to identify, formulate, and solve engineering problems**

<i>This course has increased my ability to:</i>		Agree	Not sure	Disagree
e.1	Read and understand the information given about a problem.	100	0	0
e.2	Research and gather information pertaining to the problem.	100	0	0
e.3	Use a process, as well as a variety of tactics and approaches to tackle problems.	0	100	0
e.4	Focus on accuracy rather than speed when I solve problems.	100	0	0
e.5	Be organized and systematic when I solve problems	100	0	0
Average		80	20	0

Comment:

The percentage of student's opinion is attained to 80% in (agree rank), and to only 20% in (not sure & disagree rank)

Direct Assessment Tools for Outcome "e"

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Course Learning Objectives addressing the Outcome "e"		Assessment Tools & Activities			
		Quizzes	Computer & Statistic Works	Mid Exam.	Final Exam
C.L.O.3	Estimate ore reserves	QZ2	CW2	MQ3	FQ2

Results of Direct Assessment Tools for Outcome "e"

Average achievement of passing students on Outcome 3e is 74% (See adjoin sheet)

Outcome Assessment and Improvement Results:

This outcome is satisfied and no improvements are required.

DIVIDER 5: Supported program Outcomes "g"

Outcome 3.g:
an ability to communicate effectively

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

Instructional Methods used to address the outcome "g"

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

As seen from the course articulation matrix, this outcome is addressed through the following course learning objectives as well as assessment tools& activities:

Course: MinE301 – Principles of Mining Engineering							
Course Learning Objectives addressing the Outcome "g"		Level of Learning Achieved (LOL)	Assessment Tools& Activities				
			Homework	Computer & Statistic Works	Reports	Mid Exam.	Final Exam
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia	2	-	x	x	x	-
C.L.O.4	Define mining terms and Describe types of mining	2	x	x	x	-	x

3= High = Synthesis & Evaluation levels,
2= Medium = Application & Analysis Levels
1= Low = knowledge & Comprehension Levels

Course Materials used to address outcome "a"

Materials used to address the above mentioned course learning objectives are also used to address the outcome. The outcomes which are corresponding to the course materials are shown after divider 12.

Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

**Outcome 3.g:
an ability to communicate effectively**

<i>This course has increased my ability to:</i>		Agree	Not sure	Disagree
g.1	Produce well-organized reports, following guidelines			
g.2	Use clear and correct language and terminology while describing experiments, projects, or solutions to engineering problems			
g.3	Describe accurately in a few paragraphs a project / experiment performed, the procedure used, and the most important results when writing abstracts or summaries			
g.4	Give well-organized presentations, following guidelines			

Results of Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

**Outcome 3.g:
an ability to communicate effectively**

<i>This course has increased my ability to:</i>		Agree %	Not sure %	Disagree %
g.1	Produce well-organized reports, following guidelines	100	0	0
g.2	Use clear and correct language and terminology while describing experiments, projects, or solutions to engineering problems	0	100	0
g.3	Describe accurately in a few paragraphs a project / experiment performed, the procedure used, and the most important results when writing abstracts or summaries	100	0	0
g.4	Give well-organized presentations, following guidelines	100	0	0
Average		75	25	0

Comment:

The percentage of student's opinion is attained to 75% in (agree rank), and to only 25% in (not sure & disagree rank)

Direct Assessment Tools for Outcome "g"

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

Course Learning Objectives addressing the Outcome "g"		Assessment Tools & Activities				
		Homework	Computer & Statistic Works	Reports	Mid Exam.	Final Exam
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia	-	CW1	R1	MQ1	-
C.L.O.4	Define mining terms and Describe types of mining	HW2	CW3	R2	-	FQ3

Results of Direct Assessment Tools for Outcome "g"

Average achievement of passing students on Outcome 3g is 72% (See adjoin sheet)

Outcome Assessment and Improvement Results:

This outcome is satisfied and no improvements are required.

DIVIDER 6: Supported program Outcomes "h"

Outcome 3.h:

the broad education necessary to understand the impact of engineering solutions in a global and societal context

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Instructional Methods used to address the outcome "h"

**Course: MinE301
Principles of Mining Engineering
Fall 2006 Fall 2006/2007
Fall 2006/2007**

As seen from the course articulation matrix, this outcome is addressed through the following course learning objectives as well as assessment tools& activities:

Course: MinE301 – Principles of Mining Engineering							
Course Learning Objectives addressing the Outcome "h"		Level of Learning Achieved (LOL)	Assessment Tools& Activities				
			Homework	Computer & Statistic Works	Reports	Mid Exam.	Final Exam
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia	2	-	X	X	X	-
C.L.O.4	Define mining terms and Describe types of mining	2	X	X	X	-	X

**3= High = Synthesis & Evaluation levels,
2= Medium = Application & Analysis Levels
1= Low = knowledge & Comprehension Levels**

Course Materials used to address outcome "h"

Materials used to address the above mentioned course learning objectives are also used to address the outcome. The outcomes which are corresponding to the course materials are shown in appendix A.

Indirect Courses Assessment Program Outcomes Students' Survey

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

Outcome 3.h:

the broad education necessary to understand the impact of engineering solutions in a global and societal context

	<i>This course has increased my ability to:</i>	Agree	Not sure	Disagree
h.1	Evaluate and describe accurately the environmental impact of various engineering products			
h.2	Evaluate and describe accurately environmental and economic tradeoffs of engineering products			
h.3	Evaluate and describe accurately the health / safety and economic tradeoffs of engineering products			
h.4	Take into consideration the environmental impact when designing an engineering product			
h.5	Take into consideration the health / safety impact when designing an engineering product			

Results of Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Outcome 3.h:

the broad education necessary to understand the impact of engineering solutions in a global and societal context

<i>This course has increased my ability to:</i>		Agree %	Not sure %	Disagree %
h.1	Evaluate and describe accurately the environmental impact of various engineering products	100	0	0
h.2	Evaluate and describe accurately environmental and economic tradeoffs of engineering products	100	0	0
h.3	Evaluate and describe accurately the health / safety and economic tradeoffs of engineering products	100	0	0
h.4	Take into consideration the environmental impact when designing an engineering product	100	0	0
h.5	Take into consideration the health / safety impact when designing an engineering product	100	0	0
Average		100	0	0

Comment:

The percentage of student's opinion is attained to 100% in (agree rank), and to 0% in (not sure & disagree rank)

Direct Assessment Tools for Outcome "h"

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Course Learning Objectives addressing the Outcome "h"		Assessment Tools & Activities				
		Homework	Computer & Statistic Works	Reports	Mid Exam.	Final Exam
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia	-	CW1	R1	MQ1	-
C.L.O.4	Define mining terms and Describe types of mining	HW2	CW3	R2	-	FQ3

Results of Direct Assessment Tools for Outcome "h"

Average achievement of passing students on Outcome 3h is 72% (See adjoin sheet)

Outcome Assessment and Improvement Results:

This outcome is satisfied and no improvements are required.

DIVIDER 7: Supported program Outcomes "j"

Outcome 3-j:
a knowledge of contemporary issues

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

Instructional Methods used to address the outcome "j"

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

As seen from the course articulation matrix, this outcome is addressed through the following course learning objectives as well as assessment tools & activities:

Course: MinE301 – Principles of Mining Engineering									
Course Learning Objectives addressing the Outcome "j"		Level of Learning Achieved (LOL)	Assessment Tools & Activities						
			Homework	Quizzes	Computer & Statistic Works	Reports	Presentations	Mid Exam.	Final Exam
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia	2	-	-	X	X	-	X	-
C.L.O.3	Estimate ore reserves	1	-	X	X	-	-	X	X
C.L.O.4	Define mining terms and Describe types of mining	2	X	-	X	X	-	-	X
C.L.O.6	Illustrate mine ventilation and sa	2	X	-	-	-	X	-	-
C.L.O.7	State in brief outlines of principles of mineral processing and smelting processing	2	X	-	-	-	X	-	-

3= High = Synthesis & Evaluation levels,
2= Medium = Application & Analysis Levels
1= Low = knowledge & Comprehension Levels

Course Materials used to address outcome "j"

Materials used to address the above mentioned course learning objectives are also used to address the outcome. The outcomes which are corresponding to the course materials are shown in appendix A.

Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

**Outcome 3-j:
a knowledge of contemporary issues**

<i>This course has increased my ability to:</i>		Agree	Not sure	Disagree
j1	Identify contemporary issues (ex. bioethics, market and workforce globalization, mobile technology and communications, information management and security) and explain what makes them particularly problematic or controversial in the present time			
j2	Identify possible solutions to contemporary problems, as well as any limitations of such strategies			

Results of Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

**Outcome 3-j:
a knowledge of contemporary issues**

<i>This course has increased my ability to:</i>		Agree %	Not sure %	Disagree %
j1	Identify contemporary issues (ex. bioethics, market and workforce globalization, mobile technology and communications, information management and security) and explain what makes them particularly problematic or controversial in the present time	100	0	0
j2	Identify possible solutions to contemporary problems, as well as any limitations of such strategies	0	100	0
Average		50	50	0

Comment:

The percentage of student's opinion is attained to 50% in (agree rank), and to 50% in (not sure & disagree rank)

Direct Assessment Tools for Outcome "j"

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

Course Learning Objectives addressing the Outcome "j"		Assessment Tools & Activities						
		Homework	Quizzes	Computer & Statistic Works	Reports	Presentations	Mid Exam.	Final Exam
C.L.O.1	Introduce to minerals needs and mineral resources in Saudi Arabia	-	-	CW1	R1	-	MQ1	-
C.L.O.3	Estimate ore reserves	-	QZ2	CW2	-	-	MQ3	FQ2
C.L.O.4	Define mining terms and Describe types of mining	HW2	-	CW3	R2	-	-	FQ3
C.L.O.6	Illustrate mine ventilation and sa	HW4	-	-	-	PR1	-	-
C.L.O.7	State in brief outlines of principles of mineral processing and smelting processing	HW5	-	-	-	PR2	-	-

Results of Direct Assessment Tools for Outcome "j"

Average achievement of passing students on Outcome 3j is 75% (See adjoin sheet)

Outcome Assessment and Improvement Results:

This outcome is satisfied but required some improvement in .j2 (possible solutions to contemporary problems).

DIVIDER 8: Supported program Outcomes "k"

Outcome 3-k:

an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Instructional Methods used to address the outcome "k"

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

As seen from the course articulation matrix, this outcome is addressed through the following course learning objectives as well as assessment tools& activities:

Course: MinE301 – Principles of Mining Engineering					
Course Learning Objectives addressing the Outcome "k"		Level of Learning Achieved (LOL)	Assessment Tools& Activities		
			Homework	Quizzes	Final Exam
C.L.O.5	Analyze mining operations (development, blasting, supporting)	2	x	x	x

- 3= High = Synthesis & Evaluation levels,
- 2= Medium = Application & Analysis Levels
- 1= Low = knowledge & Comprehension Levels

Course Materials used to address outcome "k"

Materials used to address the above mentioned course learning objectives are also used to address the outcome. The outcomes which are corresponding to the course materials are shown in appendix A.

Indirect Courses Assessment Program Outcomes Students' Survey

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Outcome 3-k:

an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

<i>In this course I became aware of:</i>		Agree	Not sure	Disagree
k1	State-of-the-art tools and practices used in industry through plant visits and presentations by practicing engineers			
<i>This course has increased my ability to:</i>				
K.2	Use modern equipment and instrumentation to perform experiments			
k.3	Perform web-based research			
k.4	Use Word and Excel to produce high quality technical reports			
k.5	Use computer simulations to conduct parametric studies			
k.6	Use state-of-the-art technology for engineering system design, control, and analysis			

Results of Indirect Courses Assessment Program Outcomes Students' Survey

Course: MinE301
Principles of Mining Engineering
Fall 2006/2007

Outcome 3-k:

an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

<i>In this course I became aware of:</i>		Agree %	Not sure %	Disagree %
k1	State-of-the-art tools and practices used in industry through plant visits and presentations by practicing engineers	100	0	0
<i>This course has increased my ability to:</i>				
K.2	Use modern equipment and instrumentation to perform experiments	100	0	0
k.3	Perform web-based research	100	0	0
k.4	Use Word and Excel to produce high quality technical reports	100	0	0
k.5	Use computer simulations to conduct parametric studies	100	0	0
k.6	Use state-of-the-art technology for engineering system design, control, and analysis	100	0	0
Average		100	0	0

Comment:

The percentage of student's opinion is attained to 100% in (agree rank), and to 0% in (not sure & disagree rank)

Direct Assessment Tools for Outcome "k"

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Course Learning Objectives addressing the Outcome "k"		Assessment Tools & Activities		
		Homework	Quizzes	Final Exam
C.L.O.5	Analyze mining operations (development, blasting, supporting)	HW3	QZ3	FQ4

Results of Direct Assessment Tools for Outcome "k"

Average achievement of passing students on Outcome 3k is 88% (See adjoin sheet)

Outcome Assessment and Improvement Results:

This outcome is satisfied and no improvements are required.

DIVIDER 9: Appendices

**Course: MinE301
Principles of Mining Engineering
Fall 2006/2007**

Appendix A:

Samples of Course Lectures

Appendix B:

Samples of Students Works