

C-18 - Curriculum

Diploma in Mining Engineering



State Board of Technical Education & Training
Telangana, Hyderabad

IV Semester

IV SEMESTER SYLLABUS

Sl No	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Instruction Period per week			Total Periods per semester	Credits	Continuous internal evaluation			Semester end examination			
			L	T	P			Mid Sem I	mid sem II	Internal evaluation	Max Marks/ Min Marks		total marks	Min marks for Passing including internal
	18MNG-401F	Advanced Engineering	3	1	0	60	3	20	20	20	40	14	100	35
2	18MNG-402C	Basic Mechanical Engineering	3	1	0	60	3	20	20	20	40	14	100	35
3	18MNG-403C	Methods of working Coal	3	1	0	60	3	20	20	20	40	14	100	35
4	18MNG-404C	Applied Mine Surveying	3	1	0	60	3	20	20	20	40	14	100	35
5	18MNG-405C	Mining Machinery	3	1	0	60	3	20	20	20	40	14	100	35
6	18MNG-406P	Mechanical Engineering	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18MNG-407P	Applied Mine Surveying Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18MNG-408P	Mining Machinery	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18MNG-409P	Underground Mine Planning and Design Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18MNG-410P	Advanced Communications & Life skills Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11		Skill Up-gradation	0	0	7	105	2.5	0	0	Rubrics			--	-
			20	5	17	630	25	200	200	200	1700	1000	425	
		Activities: student performance is to be assessed through Rubrics												

18MNG-401F :ADVANCED ENGINEERING MATHEMATICS

Course Title	: Advanced Engineering Mathematics	Course Code	: 18MNG-401F
Semester	: IV	Course Group	: Foundation
Teaching Scheme in periods (L : T :P)	: 45 : 15 : 0	Credits	: 3
Methodology	: Lecture + Tutorial	Total Contact Periods	: 60
CIE	: 60 Marks	SEE	: 40 Marks

Pre requisites

This course requires the knowledge of Engg. Mathematics at Diploma first year level and Applied Engg. Mathematics at Diploma 3rd Semester level.

Course Outcomes :

At the end of the course, the student will have the ability to:

CO 1	Solve simple Homogeneous Linear Differential Equations
CO 2	Solve simple Non-Homogeneous Linear Differential Equations
CO 3	Express f(x) as a Fourier series in the given interval
CO 4	Express f(x) as a Fourier Half-Range Cosine series and Sine series
CO 5	Find Laplace transforms of simple functions
CO 6	Find Inverse Laplace transforms of simple functions and solve Linear Differential Equations using Laplace Transformations.

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R		U	A
1	Homogeneous Linear Differential equations with constant coefficients	05	Q4	Q1	Q9(a)	Q13(a)
2	Non-Homogeneous Linear Differential equations with constant coefficients	15				
3	Fourier series	10		Q2	Q10(a)	Q14(a)
4	Fourier Half-range series	05				
5	Laplace Transforms	10	Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Inverse Laplace transforms	15		Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		60	8		8	8

Course Contents:

Unit – I

Duration: 05 Periods (L:3.0 – T:2.0)

Homogeneous Linear Differential equations with constant coefficients

Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.

Unit – II

Duration: 15 Periods (L:12.0 – T:3.0)

Non-Homogeneous Linear Differential equations with constant coefficients

Non-homogenous linear differential equations with constant coefficients of the form $f(D)y = X$, where X is in the form k (a constant), e^{ax} , $\sin ax$, $\cos ax$, x^n , ($n = 1, 2, 3$) Complimentary Function (CF), Particular Integral (PI) and General Solution (GS).

Unit-III

Duration: 10 Periods (L: 8.0 – T: 2.0)

Fourier series

Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c, c + 2\pi)$, Euler's formulae, sufficient conditions for existence of Fourier series for a function. Even, Odd functions and Fourier series over the Interval $(0, 2\pi)$ and $(-\pi, \pi)$

Unit – IV

Duration: 05 Periods (L: 3.0 – T: 2.0)

Fourier Half-range series

Representation of a function as Fourier Half-range Sine series and Cosine series over the interval $(0, \pi)$

Unit – V

Duration: 10Periods (L: 7.0 – T:3.0)

Laplace Transformations:

Definition, sufficient conditions for existence of Laplace Transform, Laplace Transform of elementary functions, linearity property, Change of scale property, First shifting theorem, multiplication by t^n , division by t , Laplace Transform of derivatives and integrals, unit step function, Laplace Transform of second shifting theorem

Unit – VI

Duration: 15 Periods (L: 12.0 – T: 3.0)

Inverse Laplace transforms:

Inverse Laplace transforms- shifting theorems and change of scale property, multiplication by s^n and division by s –Inverse Laplace Transform using partial fractions – convolution theorem (no proof) – application of Laplace Transformations to solve ordinary differential equations of second order with initial conditions.

Recommended Books:

1. Higher Engineering Mathematics, B.S.Grewal .
2. Laplace Transforms - Murray R. Spiegel .
3. Ordinary Differential Equations – R. S. Aggarwal.
4. Fourier Series – A.R. Vasishtha and Gupta.

Suggested E-Learning references:

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html
2. E-books:www.mathebook.net

Suggested Learning Outcomes

Unit-I

1.0 Solve Homogeneous linear differential equations with constant coefficients in engineering situations

- 1.1 Solve Differential equations of the type $(aD^2 + bD + c)y = 0$ when the roots of the auxiliary equation are real and different, real and repeated, complex.
- 1.2 Solve the higher order homogeneous Linear differential equations with constant coefficients.

Unit-II

2.0 Solve Non Homogeneous linear differential equations with constant coefficients in engineering situations

- 2.1 Explain the concept of complementary function, particular Integral and general solution of a differential equation.
- 2.2 Solve n^{th} order differential equation of the type $f(D)y = X$ where $f(D)$ is a polynomial of second order and X is a function of the form $k, e^{ax}, \sin ax, \cos ax, x^n$.
- 2.3 Solve simple problems on the above types of 2.2

Unit-III

3.0 Understand the Fourier series expansion of functions

- 3.1 Define the orthogonality of functions in an interval.
- 3.2 Define Fourier series of a function on the interval $(C, C+2\pi)$ and write the Euler's formulae for determining the Fourier coefficients.
- 3.3 Write sufficient conditions for the existence of Fourier series for a function.
- 3.4 Write Fourier series of simple functions in the range $(0, 2\pi)$ and $(-\pi, \pi)$.
- 3.5 Write Fourier series for even and odd functions in the interval $(-\pi, \pi)$.
- 3.6 Solve simple problems on even and odd functions in the interval. $(0, 2\pi)$ and $(-\pi, \pi)$.

Unit- I

4.0 Understand the Half – Range Fourier series expansion of functions

- 4.1 Write Half – Range Cosine series of a function in the range $(0, \pi)$.
- 4.2 Write Half – Range Sine series of a function in the range $(0, \pi)$.
- 4.3 Solve simple problems on Half – Range Cosine and Sine series over the interval $(0, \pi)$

Unit-V

5.0 Understand Laplace transforms

- 5.1 Write the definition of Laplace Transform and Laplace transform of standard functions.
- 5.2 Explain the sufficient conditions of existence of Laplace Transform.
- 5.3 Write the properties of Laplace Transform – Linearity property, First shifting theorem, Change of Scale property.
- 5.4 Solve simple problems using the above properties.
- 5.5 Write formulae for Laplace transform of $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u) du$ in terms of Laplace transform of $f(t)$
- 5.6 Solve simple problems using the above formulae.
- 5.7 Define unit step function and write the Laplace Transform of unit step function.
- 5.8 Write Second shifting theorem

Unit-VI

6.0 Use Laplace transforms and Inverse Laplace transforms to solve differential equation in engineering problems

- 6.1 Define inverse Laplace Transform and write inverse Laplace Transforms of standard functions.
- 6.2 Solve simple problems on Inverse Laplace Transforms.
- 6.2 Write Shifting theorems and Change of scale property of inverse Laplace Transform.
- 6.3 Solve simple problems on 6.2
- 6.4 Write inverse Laplace Transforms corresponding to Laplace Transform of the functions $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u) du$
- 6.5 Solve simple problems on 6.4

- 6.6 Define convolution of two functions and state convolution theorem.
- 6.7 Solve simple problems on Convolution theorem.
- 6.8 Use Laplace and inverse Laplace Transforms to solve simple differential equations of Second order.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2. Quiz
3. Group discussion
4. Surprise tests
5. Seminars
6. Home Assignments.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	2	2	1			1			3	1,2,3,4,7,10
CO2	3	2	2	1			1			3	1,2,3,4,7,10
CO3	3	2	2	1			1			3	1,2,3,4,7,10
CO4	3	2	2	1			1			3	1,2,3,4,7,10
CO5	3	2	2	1			1			3	1,2,3,4,7,10
CO6	3	2	2	1			1			3	1,2,3,4,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page, 1page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R		U		A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions		8		8	8

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –I, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours

Max. Marks: 20

PART-A

Instructions:

1. Answer **ALL** questions

04 X 01 = 04

2 Each question carries **ONE** mark

1. Write the General solution of $(aD^2+bD+c)y = 0$, whose roots of auxiliary equation are real and distinct.
2. Find the roots of auxiliary equation of the differential equation $(D^2 + 2D + 1)y = 0$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^{3x}$
4. Find the P.I of $(D^2 - 16)y = \sin 4x$

PART-B

Instructions:

1. Answer any **TWO** questions

02 X 03 = 06

2. Each question carries **THREE** marks

5 a) Solve: $(D^2 + 3D - 54)y = 0$

Or

5 b) Solve : $(D^2 + 16)y = 0$

6 a) Solve : $(D^2 + 4D + 4)y = e^{2x}$

Or

6 b) Find P.I of $(D^3 + D)y = \sin 2x$

PART C

Instructions:

1. Answer **ALL** questions

02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Solve : $(D^3 - 2D^2 - 4D + 8)y = 0$

Or

7 b) Solve : $(D^3 - D^2 - D + 1)y = 0$

8 a) Solve : $(D^2 + 36)y = \sin^2 x$

Or

8 b). Solve : $(D^2 + 3D + 2)y = x^2$

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –II, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours**Max. Marks: 20****PART-A**

Instructions: 1. Answer **ALL** questions 04 X 01 = 04
 2 Each question carries **ONE** mark

1. Define periodic function and give one example
2. Define Fourier series of the function $f(x)$ in the interval $(0, 2\pi)$
3. Write Half-range sine series of $f(x)$ in the interval $(0, \pi)$
4. Find a_0 for $f(x) = e^x$ in $0 < x < \pi$

PART-B

Instructions: 1. Answer any **TWO** questions 02 X 03 = 06
 2. Each question carries **THREE** marks

5 a). If $f(x) = x^2$ in $(0, 2\pi)$, then find the value of a_n in Fourier series of $f(x)$

Or

5 b) If $f(x) = |x|$ in $(-\pi, \pi)$, then find the value of a_1 in Fourier series of $f(x)$

6 a). Find the value of a_n in half-range Cosine series for the function $f(x) = e^x$ in $(0, \pi)$

Or

6 b). Obtain the Fourier Half – Range Sine series for $f(x) = (\pi - x)$ in the interval $(0, \pi)$

PART C

Instructions: 1. Answer any **TWO** questions 02 X 05 = 10
 2. Each question carries **FIVE** marks

7 a). Obtain the Fourier series for $f(x) = x$ in the interval $0 < x < 2\pi$

Or

7 b). Find the Fourier series for $f(x) = (x - x^2)$ in the interval $(-\pi, \pi)$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots + \frac{\pi^2}{12}$$

8 a) Express $f(x) = \pi x - x^2$ as a half-range Sine series in $(0, \pi)$

Or

8 b). Find the half –range cosine series for the function $f(x) = x^2$ in the interval $(0, \pi)$.

BOARD DIPLOMA EXAMINATION, (C-18)
SEMESTER END EXAM MODEL PAPER
IV SEMESTER EXAMINATION
ADVANCED ENGINEERING MATHEMATICS

Time: 2 hours

[Total Marks: 40]

PART-A

Instructions:

1. Answer **ALL** questions

08 X 01 = 08

2 Each question carries **ONE** mark

1. Find the roots of auxiliary equation of the differential equation $(D^2 + 4D)y = 0$.
2. Define Fourier Series for the function $f(x)$ in the interval $(c, c+2\pi)$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^x$
4. Find $L(e^{2t} + \cos 3t)$
5. Find $L(t + 5\cos ht)$
6. State the First Shifting theorem of Laplace Transforms.
7. Find $L^{-1}\left(\frac{1}{s-3} + \frac{s}{s^2+4}\right)$
8. Find $L^{-1}\left(\frac{1}{2s+5}\right)$

PART-B

Instructions:

1. Answer any **FOUR** questions

04 X 03 = 12

2. Each question carries **THREE** marks

9. a) Solve: $(D^2 + D + 1)y = 4e^{3x}$

Or

- 9 b) Find $L(t\cos 3t)$

- 10 a) Find Half Range Sine Series of $f(x) = x$ in $(0, \pi)$

Or

- 10 b) Find $L^{-1}\left(\frac{s+1}{s^2+6s-7}\right)$

- 11 a) If $L\{f(t)\} = \frac{20-4s}{s^2-4s+20}$, find $L\{f(3t)\}$

Or

- 11 b) Find $\int_0^\infty t \cdot e^{-2t} \sin 3t dt$ using Laplace Transform Technique

- 12 a) Show that $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right) = \frac{1-\cos at}{a^2}$

12 b) Find $L^{-1}\left(\frac{s}{(s+2)^2+4}\right)$

PART C

Instructions:

1. Answer any **FOUR** questions

04 X 05 = 20

2. Each question carries **FIVE** marks

13. a) Solve : Solve: $(D^2 + D - 2) y = x + \sin x$

Or

13 b) Find $L[te^t \sin 3t]$

14 a) Expand $f(x) = x^2$ as a Fourier series in the interval $(-\pi, \pi)$

Or

14 b) Find $L^{-1}\left(\frac{s}{(s+1)^2(s^2+1)}\right)$

15 a) Find $L\left(\frac{\sin 3t \cdot \cos t}{t}\right)$

Or

15 b) Evaluate $L\left\{\int_0^t \frac{\sin t}{t} dt\right\}$

16 a) Find $L^{-1}\left(\frac{1}{(s+1)(s+2)}\right)$ using Convolution theorem .

Or

16 b). Solve the differential equation $y'' - 2y' - 8y = \sin t$, when $y(0) = 3$, $y'(0) = 6$ by

Laplace Transform method.

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18MNG 402 C: BASIC MECHANICAL ENGINEERING

Course Title: BASIC MECHANICAL ENGINEERING	Course Code: 18COMMON 402C
SEMESTER : IV	Course Group: CORE
Teaching Scheme (L : T : P) : 36 :24 : 0 (in Periods)	Credits : 3 Credits
Type of Course : Lecture + Assignments	Total Contact Periods: 60
CIE : 60 Marks	SEE : 40 Marks
Programme: Core for Diploma Mining Engineering Programme	

Pre requisites

This course requires the basic knowledge of Engineering physics and mathematics.

Course Outcomes

CO1	Friction
CO2	Simple Machines
CO3	Transmission of the power
CO4	Simple stress and strain
CO5	Basics of Fluid Mechanics
CO6	IC Engines & Compressors

COURSE CONTENTS

1.0 Friction:

Definition of static friction limiting friction and sliding friction Co-efficient of friction
- Angle of friction, Laws of friction conditions of equilibrium on the -horizontal plane, up the plane, down the plane, angle of repose-calculation of problems on the above simple problem on screw jack

2.0 Simple Machines:

Introduction - Explanation of the terms-Mechanical advantage, Velocity ratio and efficiency, Derive an expression giving the equations for the above Ideal machine self locking machine, Reversibility of the machine practical machine, maximum efficiency of the machine-Linear Law of the machine-Study of different types of levers-Wheel and Axle, differential wheel and axle, work and work wheel, differential pulley block, single purchase winch crab, double purchase winch crab, 1st system of pulleys and 2nd system of pulleys 3rd system of pulleys-simple problems on the above.

3.0 Transmission of the power:

Introduction-Belt Drive - Velocity ratio- percentage slip and its effect on velocity ratio, thickness of belt, length of open and cross belt drive (without proof)-Chain Drive-Introduction, Types of chain drives in power transmission-Gear Drive-Introduction- Nomenclature-Types of gear drives-simple problems on drives.

4.0 Simple stresses and strains

Definition and explanation of Tensile stress, Compressive stress, Shear stress and Linear strain-Definition of elastic limit-Statement of Hooks law-stress-strain diagram- percentage of contraction and elongation, Working stress, ultimate or maximum stress, factor of safety, Elastic modulus and explanation of Young's Modulus-Modulus of rigidity-Bulk modulus,, Mechanical properties of materials-Definition and explanation of Lateral strain, Poisson's ratio, Relation between Young's modulus, rigidity modulus, bulk modulus and Poisson's ration (W/o proof) and volumetric strain-problems on the above-Types of Beams - Types of Loading-Definition of Shear force and Bending moment-Maximum bending moment formula in the case of cantilever and simply supported beams for standard cases(without proofs)

5.0 Basics of Fluid Mechanics

Definition of fluid, Types of fluids, Incompressible and Compressible fluids , Properties of fluids , Definition of liquid pressure, Pascal's law, Pressure head-Absolute, Atmospheric, Gauge and Vacuum Pressures, State and explain working principle of various pressure measuring devices- Simple and Differential Manometers, State and explain-continuity equation, Bernoulli's theorem, Explain working of venturi meter, Solve numerical problems on above

6.0 IC Engines & Air Compressors

Construction and working principle of two stroke and four stroke petrol and diesel engines - comparison of two stroke with four strokes –Types of fuels and their calorific values –HCV-LCV-fuel injection system and lubrication system - Working of diesel pump and atomizer - radiator and water pump - methods of governing in diesel engine - IHP, BHP and mechanical efficiency of an engine - care and maintenance - specification of diesel engine-simple problems on above-Types of Air Compressors and their applications - Uses of compressed air, Working principle of single stage reciprocating air compressor - multistage air compressor-Applications and advantages.

REFERENCE BOOKS

1. Thermal Engineering : R.S.Khurmi
2. Hydraulics : R.S.Khurmi
3. Strength of Materials : I.B.Prasad
4. Engg. Mechanics : Ramamrutham
5. Thermal Engineering : ZakriaBaig
6. Strength to Materials : T.Venkateswarlu
7. Engineering Mechanics : Pakirappa
8. Fluid Mechanics : R.K Bansal

OBJECTIVES: Upon completion of the course the student shall be able to

1.0 Know the Phenomenon of friction

- 1.1 Explain the Phenomenon of friction
- 1.2 Identify the types of friction
- 1.3 State the laws of friction
- 1.4 Explain the effect of friction as applied to an inclined plane
- 1.5 Solve the problems on Horizontal and Vertical Plane.
- 1.6 Calculation of Tractive effort.

2.0 Understand function and working of simple machine

- 2.1 Define mechanical advantage, velocity ratio and efficiency
- 2.2 Identify the different types of levers and examples
- 2.3 Describe the simple machines like simple wheel and axle, differential wheel and axle, Differential pulley block, single purchase crab winch, double purchase winch crab, 1st system of pulleys, 2nd system of pulleys and 3rd system of pulleys and screw jack.
- 2.4 Define ideal machine, self-locking machine
- 2.5 Distinguish between ideal machine and practical machine
- 2.6 State the linear law of machine
- 2.7 Calculate the simple problems involving mechanical advantage, velocity ratio, law of machine and efficiency

3.0 Comprehend the types of transmission of power in engine

- 3.1 Identify various powers transmitting media like belt, rope, chain and gears
- 3.2 Define the expression for velocity ratio for a belt drive
- 3.3 Explain the term Slip-in-belt and its effect on velocity ratio.
- 3.4 Explain the combined effect of belt thickness and slip and velocity ratio
- 3.5 Distinguish between open belt drive and Cross belt drive
- 3.6 Explain the formula to find the length of open belt and cross belt drive

- 3.7 Calculate the length of open belt and cross belt drive
- 3.8 Explain the tensions in tight and slack sides of a belt and also the initial tension
- 3.9 Explain the centrifugal tension and maximum tension in a belt drive
- 3.10 Explain the formula of ratio of tight side tension and slack side tension
- 3.11 Calculate the velocity ratio of tight side tension and slack side tension
- 3.12 Explain the rope drive
- 3.13 Select suitable materials for belt and rope
- 3.14 Explain the chain drive and its merits over belt drive
- 3.15 Categorises the gears
- 3.16 Discuss the simple and compound gear trains
- 3.17 Explain the nomenclature of spur gear and tooth
- 3.18 Explain the applications of the above drives in engineering
- 3.19 Explain the function of a coupling
- 3.20 List the types of coupling and their uses
- 3.21 Explain chain drive
- 3.22 Advantages of chain drive over other drives
- 3.23 Simple problems on Gear drive

4.0 Know the behaviour of materials subjected to simple stresses and strains

- 4.1 Explain the meaning and significance of simple stresses and strain, shear stress and strain, lateral strain and volumetric strain
- 4.2 State the need for working stresses and factor of safety
- 4.3 State and explain the Hooke's law
- 4.4 Explain the terms Poisson's ratio Young's modulus shear modulus and Bulk Modulus and relationship between them
- 4.5 Simple problems on above
- 4.6 Discuss the mechanical properties of materials
- 4.7 List the types of beams
- 4.8 List the types of loading
- 4.9 Explain the terms shear force and Bending Moment (Without problems)

5.0 Basics of Fluid Mechanics.

- 5.1 Definition of fluid.
- 5.2 Types of fluids.
- 5.3 Incompressible and Compressible fluids.
- 5.4 Properties of fluids.
- 5.5 Definition of liquid pressure, Pascal's law.

- 5.6 Pressure head.
- 5.6.1 Absolute, Atmospheric, Gauge and Vacuum Pressures
- 5.7 State and explain working principle of various pressure measuring devices such as:
- 5.7.1 Simple and Differential Manometers.
- 5.8 State and explain continuity equation.
- 5.9 State and explain Bernoulli's theorem.
- 5.10 Explain working of venturi meter.
- 5.11 Solve numerical problems on above.
- 6.0 Understand the construction and working of IC engines and Compressor**
- 6.1 Distinguish diesel and petrol engine
- 6.2 Explain the construction and the working of two stroke and four stroke diesel engines.
- 6.3 Compare the two stroke and four stroke engines.
- 6.4 List the various types of solid, liquid and gaseous fuels and their calorific values
- 6.5 Define Higher calorific value and Lower calorific value
- 6.6 Explain the different systems in I.C Engines such as fuel system, Lubrication system.
- 6.7 Explain the working of diesel pump and atomiser.
- 6.8 Explain the uses of radiator and water pump.
- 6.9 Explain the method of governing adopted in Diesel Engine.
- 6.10 State the specification of Diesel engine.
- 6.11 State the uses of compressed air.
- 6.12 State the types of air compressors and their application.
- 6.13 Explain the construction and working of single stage reciprocating air compressors and multistage reciprocating air compressor
- 6.14 State the uses and advantages of multistage air compressor.

CO / PO - MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	3	2	2	1			1			3	1,2,3,4,7,10
CO2	3	2	2	1			1			3	1,2,3,4,7,10
CO3	3	2	2	1			1			3	1,2,3,4,7,10
CO4	3	2	2	1			1			3	1,2,3,4,7,10
CO5	3	2	2	1			1			3	1,2,3,4,7,10
CO6	3	2	2	1			1			3	1,2,3,4,7,10

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM –II EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks	
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
		11(b)			15(b)		
6	VI		7,8	10(b)	14(b)		
				12(a)	16(a)		
				12(b)	16(b)		
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

18MNG 403 C: METHODS OF WORKING COAL

Course Title : METHODS OF WORKING COAL	Course Code: 18 MNG 403C
SEMESTER : IV	Course Group: CORE
Teaching Scheme (L : T : P) : 36 :24 : 0 (in Periods)	Credits : 3 Credits
Type of Course : Lecture + Assignments	Total Contact Periods: 60
CIE : 60 Marks	SEE : 40 Marks
Programme : Core for Diploma Mining Engineering Programme	

Pre requisites

This course requires the basic knowledge of Mining. The students shall undergo practical training for proper understanding of Mining methods. They shall have the knowledge of recent trends in mining like, Hydraulic mining, and Underground gasification.

Course Outcomes

CO1	Bord and Pillar method of working- Development
CO2	Bord and Pillar method of working- Depillaring
CO3	Long wall Advancing method
CO4	Long wall Retreating method and Thin Seam Mining
CO5	Thick Seam Mining
CO6	Hydraulic Mining, Under Ground Gasification, Blasting Gallery Method

COURSE CONTENT

Upon completion of the course the student should be able to

COURSE CONTENT**1. Bord and Pillar Method of working-Development:**

Bord and Pillar method –definition, applicablities, merits, demerits, limitations, Panels-definitions, types, applicablities, general considerations, factors influencing, merits and demerits, method of development in Bord and Pillar mining-with three Headings, development along the dip, development along strike, development by cross-cuts, with side discharge loader, with load haul dumper.

2. Bord and Pillar Method of working-Depillaring:

Method of Depillaring- terms, conditions of Caving, arrangements during planning and before commencement, Sequence of operations, terminology-split, rib, chowkidar pillar, goaf edge line of extraction, diagonal line of extraction, step diagonal line of extraction, knife line of extraction, straight line of extraction, method of extraction-by caving under weak roof condition, by load haul dumper, side discharge loader, local fall, main fall, Air Blast-dangers, precautions, stowing method-preparatory arrangements, precautions-against danger of water below goaved areas, fire during and after depillaring.

3. Long wall Advancing Method:

Long wall advancing related Terminologies, Long wall Advancing –factors governing, mechanized mine with Long wall Advancing by caving, cutting operations- push sumping method, Inclined sumping method, mechanized mine with Long wall Advancing by stowing, machinery employed, continuous mining method.

4. Long wall Retreating Method and Thin seam Mining:

Long wall Retreating-definition, Longwall gate roads drivages by AM 50,with Dosco Road Header, & continuous miner-single unit and double unit faces, mechanized mine with Long wall face retreating with caving, mechanized mine with Long wall face retreating with stowing, - Top coal caving method-applicablities, merits, demerits description of method, coal plough-over-passing, uni, bi directional methods, cutting operations.

5. Thick Mining Methods:

Thick Seam Mining- difficulties, different methods, principles, Inclined Slicing-applicablities, merits, demerits method of working by caving, by stowing, Horizontal Slicing- applicablities, merits, demerits, method of extraction by caving, by stowing method, Sub-Level caving-applicablities, merits, demerits, method of extraction, Room and Pillar method- applicablities, merits, demerits, method of extraction, Horizon Mining- applicablities, merits, demerits, method of extraction.

6. Hydraulic Mining, Under Ground Gasification, and Blasting Gallery Method:

Hydraulic Mining- applicable conditions, merits, demerits, breaking of coal, layouts of hydraulic mining in thick seams, in steep seams, Under Ground Gasification- principle, process of gasification, linkage between holes, Blasting Gallery Method- applicable conditions, merits, demerits, development work, supporting and loading operations, drilling

and blasting pattern in BG mines, machinery used, mechanized layout of BG mine, spacers, production calculation in BG mines.

REFERENCE BOOKS:

1. R.D.Singh principles of coal mining practice
2. T.N.Singh underground winning of coal.
3. Singh & Dhar, Thick Seam Mining.
4. Samir Kumar Das, Modern coal mining
5. Hartman Introduction to Mining Engineering
6. Universal mining schools.
7. Bhandari, Engineering rock blasting operations

Suggested E-learning resources

1. <https://elearningindustry.com>
2. <https://www.commlabindia.com/resources>
3. <https://www.skillsoft.com/online-learning-resources>
4. www.edumine.com

SPECIFIC LEARNING OUTCOMES

Upon completion of the course the student should be able to

1.0 Bord & Pillar method of working-development

- 1.1 Define the term Bord and Pillar
- 1.2 List applicablities, merits, demerits, imitations of Bord and Pillar
- 1.3 List the types of panels.
- 1.4 Explain different types of panels and their applicablities
- 1.5 Define the panel
- 1.6 List general considerations of Panel system.
- 1.7 List the factors influencing the size of the panel.
- 1.8 List the merits and demerits of Panel system
- 1.9 Explain the factors to be considered while opening out a district.
- 1.10 Explain the method of development of Bord and Pillar panel with three Headings
- 1.11 Explain the method of development in Bord and Pillar panel along the dip.
- 1.12 Explain the method of development in Bord and Pillar panel along the strike.
- 1.13 Explain the method of development with help of cross-cuts in steeply dipping seams in Bord and pillar mining method.

- 1.14 Explain the method of development in Bord and Pillar system with Side Discharge Loaders, chain conveyor and belt conveyor
- 1.15 Explain the method of development in Bord and Pillar system with Load Haul Dumper, chain conveyor and belt conveyor

2.0 Bord and Pillar method of working-Depillaring

- 2.1 Classify the methods of depillaring systems
- 2.2 Define the terms caving and stowing.
- 2.3 List the conditions under which caving method is adopted.
- 2.4 List preparatory arrangements during planning for Depillaring Operation.
- 2.5. List preparatory arrangements immediately before commencement of Depillaring.
- 2.7 Explain the sequence of operations involved in Depillaring.
- 2.8 Define the terms split, rib, chowkidar pillar, Goaf edge line of extraction, Diagonal line of extraction, Step-Diagonal line of extraction, Knife Edge line extraction, and Straight line of extraction
- 2.9 Explain the method of extraction of pillar by caving under weak roof conditions.
- 2.10 Explain the method of pillar extraction by Load Haul Dumper.
- 2.11 Explain the method of pillar extraction by Side Discharge Loader.
- 2.12 Define the terms Local Fall and Main Fall
- 2.13 Explain the term Air Blast.
- 2.14 List the dangers due to Air Blast.
- 2.15 List the precautions against the Air Blast.
- 2.16 Explain stowing method.
- 2.17 Explain the preparatory arrangements for depillaring by stowing method.
- 2.18 Explain precautions against the dangers of water while working below goaved areas.
- 2.19 Explain precautions taken against the fire during and after Depillaring.
- 2.20 Explain the method of extraction of contiguous seams.

3.0 Long wall Advancing Method:

- 3.1 Define the terms longwall advancing.
- 3.2 Define the terms gate roads: tail gate main gate, Stable, Pack walls.
- 3.3 List applicablities, merits, demerits, and limitations of Long wall mining in indian mining conditions.
- 3.4 List the different factors governing the length of Long wall face.
- 3.5 List the machinery employed on a mechanized Long wall face.
- 3.6 Describe SERD (single ended ranging drum shearer) and DERD (double ended ranging drum shearer).

- 3.7 Write short notes on: (a) cyclic longwall (b) prop-free front (c) non cyclic longwall. (d) single unit longwall panel (e) double unit longwall panel.
- 3.8 Explain the layout of mechanized Long wall face Advancing with caving.
- 3.9 Explain the layout of mechanized Long wall face Advancing with stowing.
- 3.10 List the cutting operations of Long wall mining.
- 3.11 Explain the method push- sumping method in Long wall mining.
- 3.12 Explain the method inclined push-sumping method in Long wall mining.

4.0 Long wall Retreating Method and thin Seam Mining:

- 4.1 Define the term Long wall retreating.
- 4.2 List applicablities, merits, demerits, and limitations of Long wall retreating method in indian mining conditions.
- 4.3 Write short notes on:
(a) single unit longwall panel (b) double unit longwall panel.
- 4.4 Explain development of gate roads with Alpine Miner 50 and Dosco road header
- 4.5 Explain the development of Gate Roads by cut and loaded by continuous miner.
- 4.6 Explain the layout of mechanized Long wall face retreating with caving.
- 4.7 Explain the layout of mechanized Long wall face retreating with stowing.
- 4.8 List applicablities, merits, demerits of Long wall Top Coal Caving method.
- 4.9 Explain the method of Long wall Top Coal Caving method.
- 4.10 Compare Long wall Advancing method with Long wall Retreating method.
- 4.11 List applicablities, merits, demerits of Coal Ploughing.
- 4.12 Describe Coal Ploughs.
- 4.13 Define the term over passing.
- 4.14 Explain the method of Unidirectional, Over-passing Ploughing.
- 4.15 Explain the method of Bi-directional, over-passing Ploughing.
- 4.16 Explain the cutting operations of Ploughing.

5.0 Thick Seam Mining:

- 5.1 List the difficulties in working with seams.
- 5.2 List the different methods of thick mining.
- 5.3 Explain the Principles of working thick seams.
- 5.4 List the applicablities, merits, demerits of Inclined Slicing.
- 5.5 Explain the method of Inclined Slicing with caving.
- 5.6 Explain the method of Inclined Slicing with stowing.
- 5.7 List the applicablities, merits, demerits of Horizontal Slicing.
- 5.8 Explain the method of Horizontal Slicing with caving.
- 5.9 Explain the method of Horizontal Slicing with stowing

- 5.11 The applicability, merits, demerits of Sub-Level caving method.
- 5.12 Explain the method of Sub-Level Caving
- 5.13 The applicabilities, merits, demerits of Room and Pillar method.
- 5.14 Explain the method of Room and Pillar Method of extraction.
- 5.15 List the applicabilities, merits, demerits of Horizon Mining.
- 5.16 Explain method of extraction of Horizon Mining

6.0. Hydraulic Mining, Underground Gasification and Blasting Gallery Method:

- 6.1. List the applicable conditions of Hydraulic Mining.
- 6.2. List the merits and demerits of Hydraulic Mining.
- 6.3. Explain Breaking of Coal.
- 6.4. Explain Hydraulic transport in Hydraulic Mining.
- 6.5. Explain Layout of Hydraulic Mining in thick seams.
- 6.6. Explain Layout of Hydraulic Mining in steep seams.
- 6.7. List the applicable conditions of Under Ground Gasification.
- 6.8. List merits and demerits of Under Ground Gasification.
- 6.9. Explain the principle and process of Under Ground Gasification
- 6.10. Explain Linkages between bore holes.
- 6.11. List applicabilities, merits, demerits of Blasting Gallery Method.
- 6.12. Compare Bord and Pillar Mining with Blasting Gallery Method.
- 6.13. Explain Supporting and Loading operations in Blasting Gallery method.
- 6.14. Explain development work of B.G panel.
- 6.15. List machinery used in Blasting Gallery panel.
- 6.16. Explain the mechanized layout of Blasting Gallery method.
- 6.17. List uses of spacers.
- 6.18. Calculate the production in 0.5 million tons per annum producing BG mine
- 6.19 Explain Drilling and Blasting pattern in the BG mines.

Suggested student Activities:

- 1) Case Studies: The students can visit nearby Mines by doing project work in Long wall mining, Blasting gallery method in SCCLtd,
- 2) Assignments: The students are given topics in different Mining methods.
- 3) Seminars: The students will give Seminars on methods of Mining.
- 4) Field Visits: Students will visit Long wall mines, BG Mines in SCCLtd.
- 5) Workshops: Students will participate in Workshops conducted by various Organizations.
- 6) Sketch Books: Students will write sketch books also.

CO-PO MAPPING MATRIX

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Bord and Pillar method of working- Development	R/U	1,2,3,4,6,7	10
CO2	Bord and Pillar method of working- Depillaring	R/U/A	1,2,3,4,7	10
CO3	Long wall Advancing method	R/U/A	1,2,3,4,6	08
CO4	Long wall Retreating method and Thin Seam Mining	R/U/A	1,2,3,4,7	08
CO5	Thick Seam Mining	R/U/A	1,2,3,4,7	12
CO6	Hydraulic Mining, Under Ground Gasification, Blasting Gallery Method	R/U/A	1,2,3,4,5,7	12

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM –II EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks	
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI	7,8		10(b)	14(b)		
				12(a)	16(a)		
				12(b)	16(b)		
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

METHODS OF WORKING COAL

IV SEMESTER MID SEMESTER – I MODEL PAPER

Time: 1 Hour

Maximum Marks: 20 Marks

PART-A

1x4=4 Marks

Note: Answer All question

1. Define the term Bord and Pillar
2. Define the panel and List the types of panels.
3. Define the terms caving
4. Define the terms Local Fall

PART-B

3x2=6 Marks

5. (a) List the factors influencing the size of the panel.
OR
(b) Explain the method of development in Bord and Pillar panel along the dip.
6. (a) Explain the Explain the method of pillar extraction by Load Haul Dumper.
OR
(b) Explain the preparatory arrangements for depillaring by stowing method.

PART-C

5x2=10 Marks

7. (a) Explain the factors to be considered while opening out a district.
OR
(b) In a seam worked by Bord and pillar, the actual coal pillars left unworked are 30 m square, the bords are 4.5 m wide, and the walls are 2.5m wide. Calculate the percentage of coal extracted in the first working
8. (a) Explain with a, sketch, what is meant by working (a) "on the face," (b) "on the end,"
OR
(b) Explain precautions against the dangers of water while working below goaved areas.

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

METHODS OF WORKING COAL

IV SEMESTER MID SEMESTER – II MODEL PAPER

Time : 1 Hour

Maximum Marks : 20 Marks

PART-A**1x4=4****Marks****Note: Answer All question**

1. Define the term main gate.
2. List the machinery employed on a mechanized Long wall face.
3. List the applicability conditions of longwall retreating method.
4. Define the term Long wall retreating.

PART-B**3x2=6****Marks**

5. (a) Illustrate the layout of mechanized Long wall advancing face with caving.
OR
(b) State the importance of gate roads.
6. (a) describe the term over passing of plough.
OR
(b) Compare Long wall Advancing method with Long wall Retreating method.

PART-C**5x2=10 Marks**

7. (a) In longwall working, some faces advance more quickly than others. What do you consider to be the best rate of advance? Discuss the matter in a general way.
OR
(b) Write short notes on: (a) cyclic longwall (b) prop-free front (c) non cyclic longwall.
8. (a) Give a layout of a longwall retreating face with a DERD shearer. What output can be reasonably achieved by a DERD shearer in a day ?
OR
(b) Explain the method of Long wall Top Coal Caving method.

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

METHODS OF WORKING COAL

IV SEMESTER END SEMESTER MODEL PAPER

Time : 3 Hours

Maximum Marks : 40 Marks

PART-A

1x8=8

Note: Answer All question

1. Define the term Bord & pillar system
2. List the merits of longwall mining.
3. List the merits of Hydraulic Mining
4. Define the term chowkidar pillar
5. List the difficulties in working with thin seams.
6. The applicablities of Sub-Level caving method.
7. List the applicable conditions of Hydraulic Mining.
8. List machinery used in Blasting Gallery panel.

PART-B

3x4=12

9. (a) Explain the method of development with help of cross-cuts in steeply dipping seams in Bord and panel.
OR
(b) Explain the method of Horizontal Slicing with stowing
10. (a) Explain the method of pillar extraction by Load Haul Dumper.
OR
(b) Explain development work of B.G panel.
11. (a) List the applicablities, merits, demerits of Horizontal Slicing.
OR
(b) List the different methods of thick mining.
12. (a) List the merits and demerits of Hydraulic Mining.
OR
(b) List the applicable conditions of Under Ground Gasification.

PART-C

5x4=20

13. (a) It is decided to depillar the panel by the manager of mine state the preparatory arrangements before commencement of Depillaring.

OR

- (b) Explain semi mechanized method of mining with huge production from thick seam Mining panel by 6m to 12m seam thickness.

14. (a) Give the comparisons between Long wall Advancing method with Long wall Retreating method.

OR

- (b) Explain Hydraulic transport in Hydraulic Mining.

15. (a) Explain the method of Sub-Level Caving

OR

- (b) Explain a method of working of a coal seam steeply dipping deposit, justify your answer with a neat sketch.

16. (a) List merits and demerits of Under Ground Gasification of coal.

OR

- (b) Explain the conditions, principle and process of Under Ground Gasification.

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18MNG-404C APPLIED MINE SURVEYING

Course Title	APPLIED MINE SURVEYING	Course Code	18MNG-404C
Semester	IV	Course Group	Core
Teaching Scheme in Periods (L: T:P)	3:1:0	Credits	3
Type of course	Lecture + Assignments	Total Contact Periods	60 Periods
CIE	60 Marks	SEE	40 Marks

PRE REQUISITES

Basic knowledge of Surveying, Mathematics, Physics and Engineering Drawing.

COURSE CONTENT

Upon completion of the course the student should be able to

UNIT 1

Traversing problems with Theodolite

Duration: 12 Periods (L: 9– T:3)

Rectangular Co-ordinates- calculation of latitude and departure – problems on Rectangular Coordinates – calculation of Areas – Bowditch Rule

UNIT2

Setting out Curves

Duration:8 Periods (L: 6– T:2)

Classification – Definitions – elements of simple curve – Method of setting out curves – by chord and offset –chord and angle – solves problem

UNIT3

Correlation Survey

Duration: 8 Periods (L: 6– T:2)

Purpose – methods of correlation – Direct Traversing – Co – planning – Weisbach Triangle– solves problem

UNIT 4

Tacheometer

Duration: 12 Periods (L: 9– T:13)

Purpose – methods of correlation – Direct Traversing – Co – planning – Weisbach Triangle– solves problem

UNIT5

Dip, Strike, Fault problems

Duration:10 Periods (L: 8– T:2)

Definitions of Dip, Strike, Fault, True Dip, Apparent Dip-Relation among them- Solving the problems relating to them – determines the rate and direction of true dip or strike of a mineral bed- Solving the problems related to strike and fault – calculate the length of drift, passing through the fault-Bore hole problems- cross measure drift problems.

UNIT 6

Modern Surveying Equipment's

Duration: 10 Periods (L:8 – T:2)

Modern surveying Equipment- Principle of working of - EDM – GPS –advantages of DGPS – Total station Instrument – applicability in Mines. –key components of GIS– Remote sensing- Applicability

COURSE OUTCOMES

1.0 Traversing problems with Theodolite

- 1.1 Explain the term rectangular co-ordinates
- 1.2 Calculates the latitudes and departures from the traverse data.
- 1.3 Solves the problems related with rectangular co-ordinates, Calculating the length and bearing of the closing line of the traverse.
- 1.4 Calculates the area of closed traverse from the rectangular co-ordinates
- 1.5 State the rules for distribution of error of closure
- 1.6 State the Bowditch Rule of balancing the traverse.

2.0 Setting Out Curves

- 2.1 Classifies the curves
- 2.2 Define (a) Simple curve (b) Reverse curve (c) Compound curve (d) Transition curve (e) Vertical curve (f) Super elevation
- 2.3 State the elements of Simple curve
- 2.4 List the methods of setting out curve
- 2.5 Explain the method of setting out Simple curve by Chord and Offset (a)on Surface (b) In an Underground
- 2.6 Explain the method of setting out curve by Chord and Angle (a) on surface (b) in an Underground
- 2.7 Explain the method of setting out road way in underground from a main road at a given bearing (direction)and gradient
- 2.8 Simple problems to find the Elements of simple curve

3.0 Correlation Survey

- 3.1 Define the term correlation.
- 3.2 State the purpose of correlation.
- 3.3 List the different methods of correlation.
- 3.4 Describe the method of correlation by Direct traversing
- 3.5 Describe the method of correlation by Co-Planning or Exact alignment method
- 3.6 Write short notes on Lateral shift of the instrument in Coplaning method
- 3.7 Describe the methods of correlation by Weisbach triangle or approximate

alignment method

- 3.8 Write short notes on weisbach Triangle
- 3.9 Simple problem to find out the Azimuth of the line (draft) with the given data in weisbach triangle.

4.0 Tacheometric Surveying

- 4.1 State the principle of Tacheometric Surveying
- 4.2 List the (a) merits (b) demerits of Tacheometric survey
- 4.3 List the methods of Tacheometric survey
- 4.4 Explain the stadia method of Tacheometric survey
- 4.5 List the relative merits of vertical and normal staff holding in stadia method
- 4.6 Explain the determination of Tacheometric constants of a given Tacheometer
- 4.7 Write short notes on Analytic lens
- 4.8 Derives the relation (formula) among stadia reading, horizontal distance and vertical distances when the line of sight is inclined and the staff is held vertical
- 4.9 Solve problems for horizontal distances and vertical heights.

5.0 Dip, Strike, Fault problems

- 5.1 Define the terms (a) Dip (b) True dip (c) Apparent dip (d) Strike (e) Fault.
- 5.2 State the inter relation between true dip, apparent dip and strike of a mineral bed
- 5.3 Derives a formula relating them
- 5.4 Solves the problems relating to them – determines the rate and direction of true dip or strike of a mineral bed
- 5.5 Solves problems related to strike and fault – calculate the length of drift, passing through the fault.
- 5.6 Solves problems basing on bore hole data- Calculates the rate and direction of true dip of the seam.
- 5.7 Solves problems connected to cross – measure drift driven between two parallel seams with given data.

6.0 Modern Surveying Equipment

- 6.1 List the modern surveying Equipment
- 6.2 State the Principle of working of EDM (Electronic Distance Measuring Instrument) used in mines
- 6.3 State the principle of working of GPS used in Mines.
- 6.4 State the applicablities of GPS in Mines.
- 6.5 State the advantages of DGPS
- 6.6 List the key components of GIS

- 6.7 List the applications of GIS in Mining
- 6.8 Explain the principle of working of Total Station Instrument Used in Modern Surveying
- 6.9 List the applicablities of Total station
- 6.10 State the applications of Remote sensing in Mining.
- 6.11 Explain the following related to Remote sensing.
(a) Scale (b) Resolution (c) Electro Magnet Radiation (EMR).

Reference Books

- 1 Dr.B.C.Punmia, Surveying Vol. I,II & III, Pub: Laxmi Publication New-Delhi
- 2 Kanetkar, Surveying & Levelling, Vol I &II, Geeta book store Dhanbad
- 3 S.Ghatak ,Mine Surveying and Levelling Vol-II , Lovely Prakashan, Dhanbad

Suggested Student Activities

ACTIVITIES

1. Survey at different locations for practice.
2. Survey in underground mine for practices.
3. Visit to survey department of a mine and study instruments and drawings.
4. Prepare sheets for various survey conducted.
5. Interact with mine surveyor and their team and discuss practical problems faced by them while surveying.
6. Study of various mine plans and sections.
7. Watch surveying videos and prepare a report on modern surveying.

Suggested E-Learning references

<http://en.wikipedia.org/wiki/Triangulation>
<http://www.youtube.com/watch?v=CBlhQ76LAyI>
<http://www.teara.govt.nz/en/modern-mapping-and-surveying/page-3>
<http://en.wikipedia.org/wiki/Tacheometry>
<http://surveying2012.blogspot.in/2013/08/tacheometry-surveying.html>
<http://nptel.ac.in/courses/105107122/modules/module11/html/38-4.htm>
<http://nptel.ac.in/courses/105107122/modules/module11/html/39-10.htm>
<http://www.youtube.com/watch?v=aHwg-1CGoTMix>.<http://geosun.sjsu.edu/paula/285/285/marc.htm>
<http://nptel.ac.in/video.php?subjectId=105104101>
<http://media.sakshat.ac.in/NPTEL-IIT-Videos/>
http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm

CO PO Mapping Matrix

On Successful completion of the course, the student will be able to attain the following Course Outcomes (COs):

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Traversing problems with Theodolite	R/U/A	1,2,3,9,10	10
CO2	Setting out Curves	R/U/A	1,2,3,9	10
CO3	Correlation Survey	U/A	1,2,3,9,10	10
CO4	Tacheometry	U/A	1,2,3,4,9,10	10
CO5	Dip, Strike, Fault problems	R/U/A	1,2,3,9	10
CO6	Modern Surveying Equipments	U/A	1,2,3,9,10	10

SCHEME OF VALUATION

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R		U	A	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3	5, 6	9(b)	13(b)
					11(a)	
					11(b)	15(b)
6	VI		7,8	10(b)	14(b)	
				12(a)	16(a)	
				12(b)	16(b)	
Total Questions		8		8	8	

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

APPLIED MINE SURVEYING

IV SEMESTER MID SEMESTER – I MODEL PAPER

Time: 1 hour

Max. Marks: 20

PART-A**Answer All questions. Each carry 1 mark.****1X4=4 Marks**

1. Explain the term rectangular co-ordinates
2. Explain the Bowditch Rule of balancing the traverse.
3. Classify the curves
4. Define (a) Simple curve (b) Reverse curve

PART-B**Answer All questions. Each carry 3 marks.****3X2=6 Marks**

5. (a) The following are the notes of an underground traverse:
- | line | Quadrant bearing | Hor. Distance |
|------|------------------|---------------|
|------|------------------|---------------|

AB	N36°14'E	320m
----	----------	------

BC	N6°18'W	420m
----	---------	------

CD	S81°44'E	115m
----	----------	------

The coordinates of A are 443.7m south and 186.1m west based on a local origin. Calculate the coordinates of the station B, C and D and determine the length and bearing of closing line DA

OR

(b) Differentiate Protractor method Vs Rectangular Co-ordinate method to draw the Plan of a closed traverse

- 6 (a) Explain the method of setting out road way in underground from a main road at a given bearing (direction) and gradient

OR

- (b) What are the similarities and differences on setting a curve in underground and at surface?

PART-C

Answer All questions. Each carry 5 marks.

5X2=10 Marks

7(a) The following are the notes of an underground survey:

line	Azimuth	Dist in meters
AB	333 ⁰	200
BC	62 ⁰	210
CD	118 ⁰	190
DE	197 ⁰	200

Calculate the length and the bearing of the drivage EA. Plot the results on a suitable scale

OR

(b) The co-ordinates, in meters of five stations, A, B, C, D, and E, forming a polygon are as follows:

Station	Latitude in (m)	Departure (m)
A	0	0
B	220 N	40W
C	600 N	220 E
D	450N	400 E
E	200 N	420 E

Calculate the area of the figure ABCDE to square meters

8. (a) Explain the method of setting out simple curve by Chord and Angle on surface

OR

(b) Explain the method of setting out simple curve by Chord and offset belowground.

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

APPLIED MINE SURVEYING

IV SEMESTER MID SEMESTER – II MODEL PAPER

Time: 1 hour

Max. Marks: 20

PART-A

Answer All questions. Each carry 1 Mark.

1X4=4 Marks

1. Define the term correlation.
2. Write short notes on weisbach Triangle
3. List the methods of Tacheometric survey
4. Write short notes on Analytic lens

PART-B

Answer All questions. Each carry 3 marks.

3X2=6 Marks

5. (a) Describe the method of correlation by Direct traversing

OR

- (b) State the purpose of correlation

6. (a) List the relative merits of vertical and normal staff holding in stadia method

OR

- (b) State the principle of Tacheometric Surveying

PART-C

Answer All questions. Each carry 5 marks.

5X2=10 Marks

- 7.(a) Describe the methods of correlation by Weisbach triangle or approximate alignment method

OR

- (b) Describe the method of correlation by Exact alignment

8. (a) Explain the determination of Tacheometric constants of a given Tacheometer

OR

(b) To determine the multiplying constants of a Tacheometer the following observations were taken on the staff held vertical at a distance measured from the instrument:

Observation	H.Distance	V.Distance	Staff intercept
1	50m	+3°48'	0.50m
2	100m	+1°06'	1.00m
3	200m	+0°36'	1.50m

The focal length of the object glass is 20cm and the distance from the object glass to the Trunnion Axis is 10cm. Find the multiplying constant.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABAD

C18MNG-404C APPLIED MINE SURVEYING

SEMESTER END EXAMINATION MODEL QUESTION PAPER

Time: 2 hours

Max. Marks:40

PART-A

Answer All questions. Each carry 1 mark.

1X8=8 Marks

1. Define the terms ((a) Vertical curve (b) Super elevation
2. State the purpose of correlation.
3. Define the terms (a) Apparent dip (b) Fault
4. In a weisbach triangle, the azimuth of a plumb plane marked by two wires A and B is $115^{\circ} 23'49''$. And C is a theodolite station on the south side of the eastern prolongation of AB. Given the following data, Calculate the Azimuth of the line CD. AB= 3.481 m, BC = 2.674m, CA= 6.155 m, $\angle ACD = 179^{\circ} 14'33''$, $\angle VCD = 179^{\circ} 10'17''$
5. Define the term apparent dip
6. Define the term strike
7. List the applications of Remote sensing in Mining.
8. List the modern surveying Equipment

PART-B

Answer All questions. Each carry 3 marks.

3X4=12 Marks

9. (a) what is a transition curve. Where it is introduced. What is the purpose of it.

OR

(b) State the inter relation between true dip, apparent dip and strike of a mineral bed

10. (a) Write short notes on Lateral shift of the instrument in Coplaning method

OR

(b) State the applications of GIS in Mining.

11. (a) classify the faults with sketch

OR

(b) what is meant by a cross-measure in coal mining

12. (a) Explain Scale and Resolution in Remote sensing

OR

(b) State the applicabilities of Total station.

PART-C

Answer any two questions

10X2=20Marks

13. (a) The following are the notes of an underground traverse in level seam:

Line	Azimuth	Distance
AB	170^0	400M
BC	95^0	200M
CD	50^0	420M
DE	145^0	550M

Calculate the azimuth and length of a roadway to be driven to connect the stations E and A

OR

(b) Three bore holes A, B and C supplied the following information of a coal seam:

Line	Bearing	Gradient
AB	S 35° E	1 in 6.5
BC	S 40° E	1 in 4.5

Calculate the direction and gradient of the true dip of the coal seam

14. (a) Explain the determination of Tacheometric constants of a given Tacheometer

OR

(b) Explain the principle of working of Total Station Instrument Used in Modern Surveying

15. (a) Two seams of coal are separated by 42 meters (vertical) of strata which dip at an angle of 20° to the horizontal. Calculate the length of the cross-measure drift driven to connect them If the drift is

- a) level
- b) If it rises 1 in 10 towards the dip of the seam and,
- c) If it dips 1 in 2 in the same direction as the seams.

OR

(b) Two seams of coal are separated by 35 meters (vertical) of strata which dip at an angle of 12° to the horizontal. Calculate the length of the cross-measure drift driven to connect them if the drift is

- a) Level
- b) If it rises 1 in 6 towards the dip of the seam
- c) If it dips 1 in 4 in the same direction as the seams.

16. (a) State the Principle of working of EDM (Electronic Distance Measuring Instrument) used in mines

OR

(b) Explain the principle of working of GPS used in Mines

18MNG 405C :MINING MACHINERY

Course Title: MINING MACHINERY	Course Code: 18MNG 405C
SEMESTER : IV	Course Group: CORE
Teaching Scheme (L : T : P) : 36 :24 : 0 (in Periods)	Credits : 3 Credits
Type of Course : Lecture + Assignments	Total Contact Periods: 60
CIE : 60 Marks	SEE : 40 Marks
Programme : Core for Diploma Mining Engineering Programme	

Pre requisites

This course requires the basic knowledge of different types face machinery used and different types of drilling machines with power loaders, -face machinery used in long wall face-types of signaling system used in underground-different types of cables used –winding system used-at pit- top and pit bottom.

COURSE CONTENTS

UNIT:I

Coal face machinery

- a)** Hand held drills – classification Electric Rotary drills: Hammer Drills, Air leg, CCM,
- b)** Power Loader – Types of loaders, field of applications, working operation

UNIT:II

Long wall face machinery Principle, design and application of long wall face machinery shearer, AFC, Lump breaker, power pack, chock shield supports used in long wall mining, SERDS and DERDS- their applications- principle of working of AFC (Armoured Face conveyor) - names the constituent parts of AFC-application of Twin Bord AFC, bottom closed AFC - principle of lump breaker- purpose of power pack-classification of Powered supports in long wall mining – Hydraulic control system.

UNIT:III

Flameproof, intrinsically safe apparatus and signalling - Outlines the necessity, FLP vs intrinsically safe apparatus field of application, Frame proofing – constructional features methods of intrinsic safety field of application. Method of signalling in mines –electrical signalling, Mining telephones operation.

UNIT:IV

Mine Cables — Classification – Types – Constructional details – Cable jointing – Care and maintenance – Distribution of three phase electric power in underground mines – Cables used for signalling – Mining Telephones and Switch gear (G.E.P).

UNIT-V

Winding Part-I

Winding in shafts, equipments required – purpose of head gear –Shaft fittings –purpose of each fittings, guides – Head gear pulley, keps – detaching hook's, - guides ropes in winding, cage and skip winging – Cage winding and skip winding,

UNIT-VI

Winding Part-II

Types of winding systems-Drum and koepe / friction winding- safety devices/equipment used on winding system-principles of koepe /friction winding- safety equipment used in drum winding- principle of braking in winding - suspended calliper brake-electrical braking.

REFERENCES:

- | | |
|-------------------------------------|-------------------------|
| 1. Elements of mining | : D.J Deshmukh Vol. III |
| 2. Mine Pumps, Haulages and Winding | : S. Ghatak |
| 3. Mining Machinery | : S. Ghatak |
| 4. Statham Series | : Statham Vol.III |
| 5. U.M.S Series | : U.M.S Volumes |
| 6. Mine Transportation | : KERLIN |

UNIT WISE OUT COME.

After the completion of these topics the student should be able to power loaders

UNIT-I Coal face machinery

- 1.0 Knows the types of drilling machines & Power loaders
- 1.1 State the field of use of each of them.
- 1.2 Draws the sketch of electric rotary drill
- 1.3 Names the parts of the electric rotary drill
- 1.4 Describe the working of electric rotary drill
- 1.5 Draw the sketch of hammer Rock drill operated by compressed air.
- 1.6 Name the parts of the hammer Rock Drill
- 1.7 State the function of each part of Hammer Rock Drill.

- 1.8 Describe the working of hammer rock drill.
- 1.9 Give the classification of the coal cutting machines.
- 1.10 State the applications of the coal cutting machines.
- 1.11 State the types of power loaders used underground with their applicablities.
- 1.12 Explain the principle of working of SDL
- 1.13 Explain the principles of working of LHD
- 1.14 Explain the principles of working of Rocker shovel
- 1.15 Explain the principles of working of AM-50 Road header.
- 1.16 Explain the principles of working of Joy continuous Miner Ripper Type.

UNIT-II

KNOW THE LONG WALL MACHINERY.

- 2.0 Know the Long wall face Machinery
- 2.1 Describe the SERDS and DERDS
- 2.2 State the application of SERDS and DERDS
- 2.3 Explain the principle of working of Armoured Face Conveyor (AFC)
- 2.4 State the names the constituent parts of Armoured Face Conveyor
- 2.5 State Application of Twin Bord AFC & bottom closed AFC
- 2.6 Explain the principle of lump breaker
- 2.7 State purpose of power pack.
- 2.8 List the factors governing the selection of power supports.
- 2.9 List the various types of power supports used in Longwall mining.
- 2.10 State the purpose of the following in Power supports
 - a) Canopy b) Caving Shield c) Lemniscates Links
 - d) Extension Canopy e) Face Guard f) Double acting Advancing Ram
- 2.11 Sate the composition of Hydraulic fluid.
- 2.12 List the types of Hydraulic control system used in power supports.

UNIT-III

KNOW THE FLAME PROOF, INTRINSICALLY SAFE APPARATUS AND SIGNALLING SYSTEM USED IN MINES.

3.0 Know Flame proof, intrinsically safe apparatus and Signalling system used in mines

3.1 State the necessity of flame proofing and the intrinsically safety apparatus used in mines

3.2 Define the terms flame proof apparatus and intrinsically safe apparatus.

3.3 State the field of use of FLP & intrinsically safe apparatus

3.4 Describe the constructional features of flame proofing.

3.5 List the methods of intrinsic safety

3.6 Describe the gate-end switch gear used for coal drills.

3.7 State various methods of signalling in mines.

3.8 Describe electrical signalling system used in underground haulage roadway with a neat sketch

3.9 Describe the signalling system in winding shafts.

3.10 State the operation of mining telephones.

UNIT-IV Know the Mine cables

4.1 Classifies types of cables used in mines

4.2 Explain the constructional details of each lay with its cross sectional sketch

4.3 Explain cable jointing methods in U/G vertical shaft

4.4 State the care and Maintenance of cables

4.5 State the types of cables used for transmitting three phase (3 Ø) electrical power supply in underground mines.

4.6 a) In a vertical shaft b) Along an underground level c) Between the switch gear & Motor of belt conveyor d) To supply a travelling coal cutting machine e) To supply a electric coal drilling machine

4.7 Explain the layout of distribution of power supply from gate end panel to the drilling equipment.

4.8 Explain the layout of distribution of power supply from switch gear to the coal face equipment

4.9 List the cables used for signalling in U/G mines and mining telephones

UNIT-V WINDING PART-I

- 5.1 Know the Winding system.
- 5.2 State the purpose of winding in shafts.
- 5.3 List the equipment required in a winding scheme.
- 5.4 State the purpose of a Head gear.
- 5.5 List the shaft fittings.
- 5.6 State the purpose of the shaft fitting
- 5.7 Draw the comparison between cage winding and skip winding.
- 5.8 State the necessity of guides for cage/skip
- 5.9 Explain the suspension and weighting of flexible guides.
- 5.10 Explain rigid guides and attachment to the cage/skip
- 5.11 State the applicability of rigid and flexible guides.
- 5.12 List the merits and de-merits of rigid and flexible guides
- 5.13 Describe the working of keps
- 5.14 Describe the working of safety catches.
- 5.15 List the types of safety hooks
- 5.16 Explain the working of kings detaching safety hook.

UNIT -VI WINDING PART-II

- 6.1 List the types of winding systems-Drum and koepe / friction winding
- 6.2 Explain the Drum winding.
- 6.3 List the types of drums and their application.
- 6.4 List the safety devices/equipment used on winding system,
- 6.5 Explain the principles of koepe/friction winding.
- 6.6 State the merits and demerits of multi rope friction winding over single rope friction winding.
- 6.7 List the merits and demerits of koepe/friction winding.
- 6.8 Draw the comparison between drum winding and friction winding.
- 6.9 List the safety equipment used in drum winding
- 6.10. State the principle of braking in winding.
- 6.11. Describe the suspended calliper brake.

6.12. List the electrical braking.

Suggested Student Activity.

Students are grouped into batches and each batch should not have more than five students.

1. Each student should do any one of the following type activities or any other similar activity related to the course and before conduction, get it approved from concerned Teacher and HOD.
2. Each student should conduct different activity and no repetition should occur
3. Make a Visit to any nearest mine or use the information obtained during the vocational training and Submit hand written report of 5 to 10 pages or ppts or sketches from the following suggested activities or similar activities.
4. Recognize the importance of DRILLING MACHINES AND POWER LOADERS used in mines
5. Recognize the importance of machinery used in long wall face machinery.
6. Identify the flame proof and intrinsically safe apparatus used in transportation.
7. Identify the different types of suspension gears used in winding system

LIST OF OPEN SOURCE SOFTWARE/LEARNING REFERENCE.

<http://en.wikipedia.org/wiki/Mining>

www.youtube.com

<http://www.mining-journal.com/>

<http://www.miningiq.com/>

<http://www.mining-technology.com>

CO PO Mapping Matrix

On Successful completion of the course, the student will be able to attain the following Course Outcomes (COs):

Course Outcome		CL	Linked PO
CO1	Various Coal face machinery	R/U/A	1,2,3,9,10
CO2	Select appropriate Long wall face machinery Principle, design and application	R/U/A	1,2,3,9
CO3	Select appropriate Flameproof, intrinsically safe apparatus and signalling	U/A	1,2,3,9,10
CO4	Mine Cables — Classification – Types	U/A	1,2,3,4,9,10
CO5	Winding in shafts	R/U/A	1,2,3,9

CO6	types of winding systems	U/A	1,2,3,9,10
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MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks	
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
		11(b)		15(b)			
6	VI		7,8	10(b)	14(b)		
				12(a)	16(a)		
				12(b)	16(b)		
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

C18MNG-405C MINING MACHINERY

IV SEMESTER MID SEMESTER – I MODEL PAPER

Time : 1 Hour

Maximum Marks : 20 Marks

PART-A

Answer All questions. Each carries one marks.

4X1=4

1. List the applications of the coal cutting machines.
2. State the field use of Electric rotary drill.
3. State the application of DERDS.
4. State the composition of Hydraulic fluid.

PART-B

2X3=6

Answer any all questions, and each question carries three marks

- 5 (a) Names the parts of the electric rotary drill.

or

(b) Give the classification of the coal cutting machines.

- 6 (a) State purpose of power pack.

or

(b) List the various types of power supports used in Longwall mining.

PART-C.

2X5=10

Answer any all questions, and each question carries five marks.

- 7 (a) Describe the working of electric rotary drill.

or

(b) Explain the principles of working of AM-50 Road header

8. (a) Explain the principle of working of Armoured Face Conveyor (AFC).

or.

(b) State the purpose of the following in Power supports

(i) Canopy (ii) Caving Shield (iii) Lemniscates Links

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18MNG-405C

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

C18MNG-405C MINING MACHINERY

IV SEMESTER MID SEMESTER – II MODEL PAPER

Time : 1 Hour

Maximum Marks : 20 Marks

PART-A

Answer All questions. Each question carries one marks.

4X1=4

1. Define the terms flame proof apparatus.
2. State the operation of mining telephones.
3. State the care and Maintenance of cables.
4. List the cables used for signalling in U/G mines and mining telephones.

PART-B

2X3=6

Answer any all questions, and each question carries three mark

5. (a) State the necessity of flame proofing and the intrinsically safety apparatus used in mines.

or

(b State the field of use of FLP & intrinsically safe apparatus.

6. (a) Classifies types of cables used in mines.

or

(b) Explain cable jointing methods in U/G vertical shaft.

PART-C.

2X5=10

Answer all questions and each question carries five marks.

7. (a) Describe the gate-end switch gear used for coal drills.

or

(b) Describe the signalling system in winding shafts.

8. (a) Explain the layout of distribution of power supply from gate end panel to the drilling equipment

or

(b) Explain the constructional details of each lay with its cross sectional sketch

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

MINING MACHINERY

IV SEMESTER END SEMESTER: MODEL PAPER

Time : 1 Hour

Maximum Marks : 20 Marks

PART-A

Answer All questions. Each question. carries 1 mark.

8X1=8

1. Names the parts of the electric rotary drill.
2. State various methods of signalling in mines.
3. List the types of safety hooks.
4. List the electrical braking.
5. State the purpose of winding in shafts.
6. State the purpose of a Head gear.
7. List the types of Drum winding systems.
8. List the safety devices/equipment used on winding system.

Part-B

Instructions: i. Answer any Four question.

ii. Each question carries three marks.

4X3=12

9. (a) List the factors governing the selection of power supports.

OR

(b) State the applicability of rigid and flexible guides

10. (a) State the operation of mining telephones.

OR

(b) List the types of drums and their application.

- 11 (a) State the necessity of guides for cage/skip Winding.

OR

(b) Draw the comparison between cage winding and skip winding in any three aspects.

12. (a) Explain the Drum winding.

OR

(b) List the safety equipment used in drum winding.

PART-C.

Instructions :

a. Answer any four question.

b. Each question carries five marks.

4X5=20

13(a) Explain the principle of lump breaker.

OR

13.(b) Describe the working of safety catches.

14.(a) Describe the constructional features of flame proofing.

OR

14 (b) State the merits and demerits of multi rope friction winding over single rope friction winding.

15. (a) Describe the working of keps.

OR

15. (b) Explain rigid guides and attachment to the cage/skip.

16.(a) Draw the comparison between drum winding and friction winding

OR.

16 (b) List the safety devices/ equipment used on winding system.

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18MNG 406 P -MECHANICAL ENGINEERING LAB

Course Title: MECHANICAL ENGINEERING LAB	Course Code: 18MNG 406P
SEMESTER: IV	Course Group: PRACTICAL
Teaching Scheme (L: T: P) : 36 :24 : 0 (in Periods)	Credits : 1.5 Credits
Type of Course : Lecture + Assignments	Total Contact Periods: 45
CIE : 60 Marks	SEE : 40 Marks
Programme: Core for Diploma Mining Engineering Programme	

COURSE CONTENTS

S.No	Name of Experiment	No. of Periods
1	Verification of Hooks law using Mild steel sample	03
2	Verification of Hooks law using Timber material	03
3	Determine the Characteristics of Centrifugal Pump	03
4	Determine the Characteristics of Reciprocating Pump	04
5	Determine the Characteristics of Turbine Pump	04
6	Determination of Flash point and Fire point of Diesel oil	04
7	Determination of Flash point and Fire point Petrol	04
8	Determination the Calorific value of Coal	04
9	Determine the Calorific value of Gaseous fuels	04
10	Determine the IHP, BHP and efficiency of diesel engine	04
11	Determine the IHP, BHP and efficiency of petrol engine	04
12	Study the properties of Compressor and determine Volumetric efficiency	04
	Total	45

COURSE OUTCOMES

On successful completion of the course, the students will be able to attain below Course Outcome

Course Outcome		Linked Exercises	CL	Linked PO	Teaching Periods
CO1	Apply the skills to verify the hooks law on various sample, timber	1,2	R/U/A	1,2,3,4,5,6	6
CO2	Carry out the experiments to understand the principle of Hydraulic pumps such as Reciprocating, Centrifugal, Turbine Pump	3,4,5	R/U/A	1,2,3,4	11
CO3	Carry out the experiment to determine Flash Point and Fire Point of fuels	6,7	R/U/A	1,2,3,4,9,10	8
CO4	Carry out the experiment to determine the Calorific value of Fuels and coal	8,9	R/U/A	1,2,3,10	8
CO5	Understand the basic principle of operation of IC Engines and Air Compressor	10,11,12	U/A		12

OBJECTIVES:

After the completion of these topics the student should be able to

COURSE CONTENTS:

1.0 Hooks Law verification

Draw the stress and strain diagram for Mild Steel specimen and verify Hooks Law-compression test on timber- bending test on timber.

2.0 Study of Hydraulic Pumps

Reciprocating pumps-Study of centrifugal pumps- turbine pump- pump characteristics of centrifugal pump- pump characteristics of reciprocating pump, turbine pump

3.0 Determination of Flash and Fire points of Fuels and Lubricants

Determine the flash and fire points of kerosene and diesel oils use Able's flash and fire point tester-Determination of given lubricating oil using Cleveland Flash and Fire point tester

4.0 Determination of Calorific values of fuels

Bomb calorimeter and determine calorific value of a given fuel- Junkers gas calorimeter to determine calorific value ``+of gaseous fuel

5.0 Performance of IC engines

Study of given Petrol engine and determination of IHP, BHP and mechanical efficiency- diesel engine and determination of IHP, BHP and mechanical efficiency

6.0 performance of Air Compressors

Study of air compressor and determination of volumetric efficiency

LIST OF EXPERIMENTS:

1.0 Hooks Law verification

1.1 Draw the stress and strain diagram for Mild Steel and verify Hooks Law

1.2 Conduct compression test on timber

1.3 Conduct bending test on timber

2.0 Study of Hydraulic Pumps

2.1 Study of reciprocating pumps

2.2 Study of centrifugal pumps

2.3 Study of turbine pump

2.4 Determine the pump characteristics of centrifugal pump

2.5 Determine the pump characteristics of reciprocating pump

3.0 Determination of Flash and Fire points of Fuels and Lubricants

3.1 Determine the flash and fire points of kerosene and diesel oils using Able's flash and fire point tester

3.2 Determination of flash and fire points of given lubricating oil using Cleave land's Flash and Fire point tester

4.0 Determination of Calorific values of fuels

4.1 Study of Bomb calorimeter and determine calorific value of a given fuel.

4.2 Study Junkers gas calorimeter to determine calorific value of gaseous fuel

5.0 Performance of IC engines

5.1 Study of given Petrol engine and determination of IHP, BHP and mechanical efficiency

5.2 Study of given diesel engine and determination of IHP, BHP and mechanical efficiency

6.0 Performance of Air Compressors

6.1 Study of air compressor and determination of volumetric efficiency

Experiments	Key Competences
1.Hooks law verification	1. Understand Regarding UTM 2. Understand size of specimen, calculation of

	elongation and contraction 3. Understand how to calculate stress and strain. 4. Understand to draw stress-strain diagram. 5. Understand marking various properties on stress-strain diagram of mild steel specimen 6. Understand how to apply tensile load and compressive load on timber.
2. Study of Hydraulic Pumps	1. Understand working principle of Reciprocating and centrifugal pumps. 2. Understand various parts of pumps and their condition. 3. Understand working principle of jet pump. 4. Understand various characteristics of pumps and their efficiency. 5. Understand to plot graph representing various characteristics of pumps.
3. Determination of flash and fire points of fuels and lubricants.	1. Understand various types of fuels and their densities. 2. Understand flash and fire points of fuels and their limits. 3. Understand various flash and fire point tester like Ables flash and fire point tester and Cleveland's Flash and Fire point tester. 4. Understand to tabulate readings of different fuels and lubricants.
4. Determination of Calorific values of Fuels	1. Understand various types of solid, liquid and gaseous fuels and their calorific values. 2. Understand combustion process of various fuels. 3. Understand different types of calorimeters and their working process. 4. Understand condition of different parts of Bomb calorimeter and Junker's gas calorie meter. 5. Understand formula's of Higher Calorific Value and Lower Calorific Value and calculation. 1. Understand different types of engines and various

5. Performance of I.C. Engine	components of engine. 2. Understand two stroke and four stroke petrol and diesel engines and their working principles. 3. Understand to record speed, stroke and area of the engine cylinder. 4. Understand to tabulate and calculate B.H.P, I.H.P, and Mechanical efficiency of the engine. 5. Understand to plot graphs representing various characteristics of engines. 1. Understand different types of air compressor. 2. Understand clearance volume, Volumetric efficiency of single stage and multistage air compressors. Understand to plot graph of various characteristics of air compressor
6.Performance of Air compressor	

MID EXAMINATION -I and II

One questions to be chosen from the list of experiments 1 to 6 for Mid examination -I and from 7 to 12 for mid examination -II. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	5
2	Sketch / Drawing	5
3	Experiment	5
4	Viva voice	5
Total		20

INTERNAL EVAULATION

The internal evaluation of a student in the laboratory will be carried out based on the following objectives

Sl. No	Description	Marks
1	Assignment	10
2	Seminar /Model preparation	10
Total		20

END EXAMINATION

One questions to be chosen from the list of experiments 1 T to 12. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	10
2	Sketch / Drawing	05
3	Experiment	15
4	Viva voice	10
Total		40

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD
SEMESTER END EXAMINATION MODEL QUESTION PAPER
APPLIED MINE SURVEY PRACTICE

Time: 3-hours

Max. Marks: 40

Instructions to the Candidates:

(i) Answer any One of the following Questions.

1. Verify the hooks law using Mild steel specimen and draw the corresponding the stress strain diagram. Determine the Youngs Modulus, poisons ratio of the specimen
2. Verify the characteristics of hooks law by conducting experiment on wooden prop . Draw the stress strain diagram. Determine is compressive strength, Youngs Modulus, poisons ratio.
3. Study the principle of operation and Characteristics of Centrifugal pump
4. Study the principle of operation and Characteristics of Reciprocating Pump
5. Study the principle of operation and Characteristics of Turbine Pump
6. Determine the Flash point and Fire point of Kerosene oil
7. Determine the Flash point and Fire point of Diesel oil
8. Determine the properties of Lubricating oil
9. Determine the calorific values of fuels using Bomb Calorimeter
10. Determine the calorific value of coal using Bomb Calorimeter
11. Determine the Calorific value of Gaseous fuel using Junker's gas calorimeter
12. Determine the IHP,BHP and mechanical efficiency of diesel engine
13. Determine the IHP, BHP and mechanical efficiency of petrol engine
14. Study the principle of operation of Compressor and determine volumetric efficiency.

18MNG-407P: APPLIED MINE SURVEY LAB PRACTICE

Course Title :	APPLIED MINE SURVEY PRACTICE	Course Code	18MNG407P
Semester	IV	Course Group	Core
Teaching Scheme in Periods(L:T:P)	0:2:4 1:0:2	Credits	1.5
Type of Course	Lecture + Practical	Total Contact Periods :	45Pds
CIE	60 Marks	SEE	40 Marks

PRE- REQUISITES

This course requires the Basic Knowledge of **Fundamentals of Surveying lab Practice**, mine surveying and Mathematics

COURSE OBJECTIVE

The objective of APPLIED MINE SURVEY LAB PRACTICE is to help the student in understand the different difficulties occur during mine workings, planning and designing, their probable causes and remedies by accurate surveying

COURSE CONTENTS

S. No	Name of the Exercise	Periods
1	Theodolite traversing	9
2	Setting out Curves	9
3	Tacheometric Surveying	9
4	Total Station	12
5	GPS Survey	6

COURSE OUTCOMES

On successful completion of the course, the students will be able to attain below Course Outcome

Course Outcome		Linked Exercises	CL	Linked PO	Teaching Periods
CO1	Apply the skills to conduct traverse survey & to find the missing length and to calculate the area of the traverse.	1,2	R/U/A	1,2,3,4,5,6	9
CO2	Carry out the setting out curves on Surface and in Underground and also to find the different elements of curve	3,4	R/U/A	1,2,3,4	9
CO3	Carry out the tachometric survey and also analyze their various problems.	5,6,7	R/U/A	1,2,3,4,9,10	9
CO4	Familiar with Total station and Field Exercises using total station	8 to 15	R/U/A	1,2,3,10	12
CO5	Surveying with GPS to measure areas of Traverses	16,17,18	U/A		6

LIST OF EXPERIMENTS

1. Plot the traverse by meridian method
2. Plot the traverse survey by Rectangular co- ordinates
3. Sets out curve by chord and offset.
4. Sets out curve by Chord and Angle.
5. Determines the Tacheometric constants.
6. Determines the R.L of points by fixed hair method.
7. Determines the R.L.s of points by tangential method.
8. Orientation of total station to true north
9. To measure distance between two given points using total station
10. To measure angle between to surveying stations
11. To measure multiple sets (rounds) of observations with total station
12. To carryout the traverse of a given area
13. Calculation of traverse area using total station
14. Calculation of perimeter of given surveyed area
15. Find out the height of remote object using Remote elevation method

16. Identifies the parts and the functions of Global Positioning System.
17. Determine the Coordinates of various points on the ground using GPS
18. Link the G.P.S data with Total Station.

Suggested Student Activities

The topic of the project will be decided by the faculty and care should be taken that task should not be repeated among students the students will work in an individual or group of 3 – 5 on each topic. The topic should be related to the subject taught by the faculty and should have proper utility and importance to enhance his practical skill & knowledge and lifelong learning.

Few suggested activities:

1. Perform theodolite traverses survey by closed traversing and open traversing method and plot it.
2. Calculate latitude and departure of closed traversing survey.
3. Measure the area of a closed traverse.
4. Check accuracy of close traversing and balancing by Bowditch rule
5. Set out different curves
6. Tacheometric survey
7. Survey with total station
8. Survey with GPS

E Learning Resources

1. <https://www.youtube.com/watch?v=C8knKG05lYA>
2. <http://en.wikipedia.org/wiki/Triangulation>
3. <http://www.youtube.com/watch?v=CBlhQ76LAyI>
4. <http://www.teara.govt.nz/en/modern-mapping-and-surveying/page>
5. <http://en.wikipedia.org/wiki/Tacheometry>
6. <http://surveying2012.blogspot.in/2013/08/tacheometry-surveying.html>
7. <http://nptel.ac.in/courses/105107122/modules/module11/html/38-4.htm>
8. <http://nptel.ac.in/courses/105107122/modules/module11/html/39-10.htm>
9. <http://nptel.ac.in/video.php?subjectId=105104101>
10. <http://media.sakshat.ac.in/NPTEL-IIT-Videos/>
11. http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm

SCHEME OF VALUATION

MID EXAMINATION -I and II

One questions to be chosen from the list of experiments 1 to 7 for Mid examination -I and from 8 to 18 for mid examination -II. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	5
2	Sketch / Drawing	5
3	Experiment	5
4	Viva voice	5
Total		20

INTERNAL EVALUATION

The internal evaluation of a student in the laboratory will be carried out based on the following objectives

Sl. No	Description	Marks
1	Assignment	10
2	Seminar /Model preparation	10
Total		20

END EXAMINATION

One questions to be chosen from the list of experiments1 T to 10. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	10
2	Sketch / Drawing	05
3	Experiment	15
4	Viva voice	10
Total		40

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD
SEMESTER END EXAMINATION MODEL QUESTION PAPER
APPLIED MINE SURVEY PRACTICE

Time: 3-hours

Max. Marks: 40

Instructions to the Candidates:

(ii) Answer any One of the following Questions.

1. Conduct a theodolite closing traverse ABCD of a given area. Plot the traverse by meridian method
2. Conduct a theodolite closing traverse ABCD of a given area. Plot the traverse by Rectangular Co- ordinates
3. Set the curve by chord and offset method. Assume your own conditions
4. Sets out curve by Chord and Angle. Assume your own conditions
5. Determine the Tacheometric constants of a given Instrument
6. Determines the R.L. of points by fixed hair method.
7. Measure the distance between two given points using total station
8. Find the given area of the field using total station
9. Calculation of perimeter of given area using total station
10. Find out the height of remote object using Remote elevation method
11. Write down the procedure and determine the Coordinates of various points on the ground using GPS

18MNG-408P:: MINING MACHINERY LAB PRACTICE

Course Title:	MINING MACHINERY LAB PRACTICE	Course Code	18MNG 408P
Semester	IV	Course Group	Core
Teaching Scheme in Periods(L: T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Periods	45
CIE	60 Marks	SEE	40 Marks

PRE-REQUISITE

Requires the Knowledge of Mining Machinery and Mine Transportation Equipment.

COURSE OBJECTIVE

The objective of Mining machinery Lab Practice is to analyze the operation of mining machinery during the mining activity. It also gives knowledge of optimal utilization of mining machinery. In this course main emphasis is given to the operation of mining machinery to be carried out for safe day to day mining activity.

COURSE CONTENTS

S. No	Name of the Exercise	Periods
1	Identify different wire ropes , rope capping and cables used in mines	12
2	To Carry out the Method of Splicing the Wire Rope	3
3	Identify the various equipment used in Rope Haulage and Signaling system	6
4	To study the layout of signaling system used in haulage roadways	3
5	Identify the parts of the Pumps and Study the Characteristics Curves of pump	6
6	To study the Salient features of electrical rotary drill	3
7	Identify Different types of Chock shield supports used in Long wall Mining and salient features of DERDS	6
8	To study the methods of making the circuit intrinsically safe	3
9	To study the constructional features of Gate end Box along with its safety features	3

COURSE OUTCOMES

Students who had completed the course will be able to

Course outcome		Linked Exercise	CL (R/U/A)	Linked PO	Teaching Periods
CO1	Recognize the different Cross section of wire ropes, Rope Capping and Mine cables.	1,2,3	R/U	1,2,3,6	13
CO2	Identify the various equipment used in Rope Haulage and Signaling system	2,4	R/U	1,2,5	9
CO3	Identify the parts of the Pumps, starting and stopping of Pumps and Study the Characteristics Curves of pump	4,5,7	U/A	2,3,5	5
CO4	Recognize the Salient features of drilling machine	3,6	R/U/A	3,4,8	5
CO5	Identify Different types of Chock shield supports used in Long wall Mining and salient features of DERDS	4,8	R/U	2,3,4,	5
CO6	Constructional features of Flame Proof apparatus, Gate end box to connect electrical equipments in mines	2,4,7	R/U/A	2,3,6	8

LIST OF EXPERIMENTS

S.No	Name of the Experiment	Periods
1	To Study the various cross sections of wire Ropes	3
2	To study Various Methods of Capping Wire Ropes	2
3	To Carry out the Method of Splicing the Wire Rope	2
4	To Study the various cross sections of Mine Cables.	2
5	To Study the direct rope haulage system	2
6	To Study the endless rope haulage system	2
7	To Study the various Safety devices in haulage system	2
8	To study the layout of signaling system used in haulage roadways	2
9	To study the different types of pumps used in Mines	3
10	To study the methods of starting and stopping of turbine pump	2
11	To study the Salient features of electrical rotary drill	3
12	To study Sun and Planet gear used in electrical rotary drill	2
13	To study the various types of drill rods and drill bits used with electric rotary drill	3
14	To study the constructional details of Chock Shield supportt	3
15	To study the purpose of various components of Chock shield support	3
16	To study the important components of SERDS and DERDS.	3
17	To study the methods of making the circuit intrinsically safe	3
18	To study the constructional features of Gate end Box along with its safety features	3
	Total	45

LIST OF EQUIPMENTS

S. No.	NAME OF THE EQUIPMENTS REQUIRED
1	Wire ropes
2	Rope capels
3	Spike and Tucker
4	Mine Cables
5	Model of Direct rope haulage system
6	Model of Endless rope haulage system
7	Safety Devices like Back stay, back catch, Stop block etc
8	Electric Bell and Haulage Signaling model
9	Pump Models
10	Turbine Pump
11	Electric rotary drill
12	Sun and planet gear
13	Drill rods and Drill bits
14	Models of powered supports
15	Model of Chock Shield support
16	Models of SERDS and DERDS
17	Capacitors ,induction coil and Multi meter
18	Flame proof Drill Panel

REFERENCES

1. Elements of Mining Technology VOL-III D.J.Deshmukh
2. Mine pumps, haulages and Winding-S.GHATAK
3. Mine Transportation- - KERLIN
4. UMS Series-- UMS Volumes
5. Statham series-- Statham Volumes
6. Introduction to Mining Engineering--Hartman

LIST OF OPEN SOURCE SOFTWARE/LEARNING WEBSITE

1. www.novamining.com
2. www.coaleducation.org
3. http://www.tcf.com/industries-applications/applications/Mining_machinery
4. https://en.wikipedia.org/wiki/Underground_mine_mechanisation
5. http://miningquiz.com/Transportation_in_mines
6. http://miningquiz.com/powerpoints/Face_machinery
7. <http://miningquiz.com/pdf/Winding>
8. http://miningquiz.com/pdf/mine_cables
9. http://miningquiz.com/pdf/Flame_proof_apparatus

SCHEME OF VALUATION

MID EXAMINATION -I and II

One questions to be chosen from the list of experiments 1 to 4 for Mid examination -I and from 5 to 9 for mid examination -II. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	5
2	Sketch / DrawingS	5
3	Experiment	5
4	Viva voice	5
Total		20

INTERNAL EVAULATION

The internal evaluation of a student in the laboratory will be carried out based on the following objectives

Sl. No	Description	Marks
1	Assignment	10
2	Seminar /Model preparation	10
Total		20

END EXAMINATION

One questions to be chosen from the list of experiments1 T to 10. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	10
2	Sketch / Drawing	05
3	Experiment	15
4	Viva voice	10
Total		40

STATE BOARD OF TECHNICAL EDUCATION & TRAINING: TS: HYDERABAD

SEMESTER END EXAMINATION MODEL QUESTION PAPER

MINING MACHINERY LAB PRACTICE

Time: 3-hours

Max. Marks: 40

Instructions to the Candidate:

(i) Answer any One of the following questions

1. Illustrate with sketch different Cross section of wire ropes.
2. Draw the interlocking wedge type Capel and label its parts.
3. Carry out the Method of Splicing the Wire Rope
4. Illustrate with sketch different Cross section of cables used in mines.
5. Draw the layout of signaling system used in underground haulage roadways.
6. Describe the methods of starting and stopping of turbine pump.
7. Draw the sketch of electrical rotary drill and label its parts.
8. Illustrate with a sketch the various components of Chock shield support
9. Illustrate with a sketch the important components of SERDS and DERDS.
10. Draw the constructional features of Gate end Box along with its safety features.

18MNG-409P :UNDER GROUND MINE PLANNING AND DESIGN LAB PRACTICE

Course Title:	UNDER GROUND MINE PLANNING AND DESIGNLAB PRACTICE	Course Code	18MNG-409P
Semester	IV	Course Group	Core
Teaching Scheme in Periods(L:T:P)	15:0:30	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours :	45Pds
CIE	60 Marks	SEE	40 Marks

Rationale:

The course is designed to help the student in understanding the planning and designing of underground mine.

Pre requisites

This course requires the basic knowledge of underground methods.

Course outcomes

On successful completion of the course, the students will be able to attain below Course Outcome.

Course Content

Unit No.	Name of the Experiment	Periods
1	Study of Project reports and Mine Planning	6
2	Drawing of layouts of underground mine	6
3	Design of mine pillars	6
4	Calculation of production in Underground Mines.	12
5	Application of CPM/PERT in Mine Planning	9
6.	Organization charts	6
	Total	45

Course outcomes

Course Outcome		Linked PO
CO1	Understand the importance of various project reports of underground mines and objective of mine planning	1,2,3,5,6,,8,9
CO2	Understand and identification of various Drawing of layouts of underground mine.	1,2,5,6,8,9,10
CO3	Understand and able to calculate strength of pillar design-based depth of mine	1,2,3,4,5,7,8,9,10
CO4	Calculation of production in Underground Mines.	1,2,3,5,6,,8,9
CO5	Application of CPM/PERT in Mine Planning	1,2,3,5,6,,8,9
CO6	Organization charts	1,2,3,5,6,,8,9

LIST OF EXPERIMENTS:

I. Study of Project Reports and Mine Planning

1. Objectives of mine planning
2. Technical inputs required for mine planning.
3. Reserve estimation.
4. Study various underground mine projects.

II. Drawing of layouts of underground mine

5. Draw a pit-top & pit Bottom layouts of shaft
6. Draw a layout of Bord and pillar showing development work and ventilation network, transport network.
7. Draw a layout of Development of Bord and Pillar mining using LHD
8. Draw a layout of Depillaring by Bord and Pillar by using SDL
9. Draw a layout of Pillar extraction by a) Diagonal line of extraction b) Step Diagonal line of extraction.
10. **Draw a layout of Longwall Retreating and Advanced face**

III. Design of mine pillars

11. Calculate the load which is coming into the pillars
12. Calculate the strength of the pillars and their mode of failure.
13. Calculate the factor of safety of the pillars.

IV. Calculation of production in Underground Mines

14. Calculate the output for 5 heading faces in development of Bord and pillar
15. Calculate the output for Bord and pillar development work by using SDL
16. Calculate the output for depillaring in Bord and pillar mining using LHD
17. Calculate the Quantity of Explosive required for given output with reference to Bord and Pillar during development and depillaring.
18. Calculation of Production Capacity of Longwall Face per day.

V. Application of CPM/PERT in Mine Planning.

19. Scheduling
20. Production planning
21. Project monitoring
22. Management information systems

VI. Organization charts

23. Draw the Organizations chart for a large conventional Underground Mine
24. Draw the Organizational chart of large mechanized underground coal mine.

REFERENCE BOOKS.

1. Modern Coal Mining Technology : Samir Kumar Das
2. Mine planning for Coal, S.P.Mathur.,M.G Consultants,Bilaspur ,1993
3. Explosives and blasting technology by G.K Pradhan.
4. Explosives and blasting practices in mines by S.K Das
5. Elements of mining technology volume – I by D.J Deshmukh

MID EXAMINATION -I and II

One questions to be chosen from the list of experiments 1 to 4 for Mid examination -I and from 5 to 9 for mid examination -II. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	5
2	Sketch / DrawingS	5
3	Experiment	5
4	Viva voice	5
Total		20

INTERNAL EVAULATION

The internal evaluation of a student in the laboratory will be carried out based on the following objectives

Sl. No	Description	Marks
1	Assignment	10
2	Seminar /Model preparation	10
Total		20

END EXAMINATION

One questions to be chosen from the list of experiments1 T to 10. Student can select one question by lottery method.

Sl. No	Description	Marks
1	Writing procedure	10
2	Sketch / Drawing	05
3	Experiment	15
4	Viva voice	10
Total		40

State Board of Technical Education and Training, Telangana

Semester End Examination Model Question paper

DMNG IV Semester Practical Examination

Corse Code: 18MNG409P

Duration: 3 hours

UNDER GROUND MINE PLANNING AND DESIGN LAB PRACTICE
Max.Marks:40

Instructions to the Candidates:

Answer any One of the following Questions.

- 1 Identification of salient features from Mine Projects and List the Technical inputs required for Mine planning?
- 2 Draw a pit- top & pit bottom layouts of shafts?
- 3 Draw a layout of Bord and Pillar showing development ,ventilation network and transport net work?
- 4 A Bord and Pillar panel having square pillars is designed for 30% extraction during development .if the gallery width is 5 m, Calculate the side of the pillar in meter?
- 5 A 2.5 m thick coal seam lying at an average depth of 100 m has been developed by Bord and pillar method. The width of the square pillars is 30 m (center to centre) and the gallery width is 4 m. The average density of the overlying strata is 26 kN/m^3 and the pillar strength is 4500 kN/m^2 .
 - i) Calculate the extraction ratio during the development of the pillar ?
 - ii) Calculate the safety factor of the pillar?
- 6 In a 4.2 m wide and 3.0 high gallery in a coal seam, twelve shot holes are blaster per round. The holes are charged with 2 explosive cartridge of 435 g each. If the powder factor of the blast is 2.2 tonne/ kg, and specific gravity of coal is 1.4 .Calculate the pull per round of blast in meter?
- 7 Maximum number of coal faces in an underground bord and pillar development district is Calculate the number of headings in the district?
- 8 A Long wall panel with a face height of 3 m and face length of 150 m is worked in 3 shifts per day employing 40 men per shift. The depth of web of the shearer cutting coal is 0.5 m. The unit weight of the coal is 1.4 tonne/m^3 .Two full face cuts are executed per Shift.
 - i) Calculate the daily production from the panel in tonne

ii) Calculate the panel OMS in tonns

- 9 A mining project is composed of five activities whose three time estimates in months are given below.

Activity	Estimated duration (Months)		
	Optimistic time	Most likely time	Permissible time
1-2	1	1	7
1-3	2	5	8
2-4	1	1	7
3-4	2	5	14
4-5	3	6	15

Calculate the expected duration of the mining project in months.

- 10 Draw the Organizational chart of large mechanized underground coal mine?

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18 MNG 410 P Advanced Communication Skills and Life Skills

Course Title	Advanced Communication Skills and Life Skills	Course Code	18MNG 410 P
Semester	IV	Course Group	Foundation
Teaching Scheme in Periods- L:T:P	15:0:30	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45 Periods (3 Periods per Week)
CIE	60 Marks	SEE	40 Marks

Rationale:

This course is designed to impart writing skills and employability skills to the students of diploma which will help them in obtaining and maintaining the employment.

Prerequisites:

This course requires the basic knowledge of vocabulary, grammar and four language learning skills, viz. Listening, Speaking, Reading and Writing.

Course Outcomes:

Modules	At the end of the course the students will have the ability to:
Presentation Skills	Prepare a presentation. Use presentation aids effectively. Develop public speaking skills. Learn to make PowerPoint Presentations effectively. Present a Paper using appropriate body language.
	Learn kinds of reports. Learn the format of a report.

Writing Reports	Organise ideas. Develop essential vocabulary useful to write scientific and technical reports.
Interview Skills	Learn the techniques to face an interview. Learn the etiquette to communicate with employers. Learn the dos and don'ts of an interview. Learn the frequently asked questions in interviews. Use appropriate body language. Learn to face interviews telephonically. Gain the confidence to face an interview by attending mock interview.
Group Discussion	Learn the dos and don'ts of a Group Discussion. Participate in a Group Discussion in a healthy manner. Use effective non-verbal communication. Use appropriate phrases and expressions useful in a group discussion.
Workplace Awareness	Learn workplace etiquette. Identify the knowledge, skills and attributes useful at workplace. Build strong workplace relationships. Learn professional ethics.

	Understand gender equality at the workplace Develop a sense of responsibility towards the society.
Writing Skills Useful at Workplace	Learn various writing formats useful at workplace. Develop an ability to apply technical information in documentation. Revise and edit written documents effectively. Develop corresponding skills - learn the kinds of business letters - the format of a business letter. Learn effective e-mail writing skills. Learn Business Memos. Learn Notes and Narratives. Learn Forms and Applications. Prepare templates for different purposes. Prepare an agenda of a meeting. Prepare the minutes of a meeting. Prepare Notices / Circulars for various purposes. Prepare Press release.

CO-PO Matrix

	Course Outcome		Linked PO
CO 1	Making effective presentations	R/U/A	1, 2, 3,4, 5,6,7,8,9,10
CO 2	Writing scientific and technical reports	R/U/A	1,2,3,4, 5,6,7,8,9,10
CO 3	Learn to face oral and telephonic interviews	R/U/A	1,2,3,4, 7,9,
CO 4	Learn to face group discussion	R/U/A	1,2,3,7,8,9
CO 5	Learn to write various formats useful at workplace	R/U/A	1,2,3,5,7,8,9,10
CO6	Learn workplace etiquette and ethics	R/U/A	1,2,3,7,8,9,10

Course Contents:

I. Presentation Skills	Duration: 6
periods	
II. Writing Reports	Duration: 9
periods	
III. Interview Skills	Duration: 9
periods	
IV. Group Discussion	Duration: 6
periods	
V. Workplace Awareness	Duration: 6
periods	
VI. Writing Skills Useful at Workplace	Duration: 9
periods	

Suggested Student Activities:

- Paper Presentations
- Seminars
- Mock Interviews

- Telephonic Interviews
- Group Discussions
- Role Plays
- Creating advertisements
- Five-minute activities
- Creating a model of workplace

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

- | | |
|--------------------------------|----------|
| a. Mid Sem - I | 20 marks |
| Syllabus: | |
| i. Presentation Skills | |
| ii. Writing Reports | |
| b. Mid – II: | 20 Marks |
| Syllabus: | |
| i. Interview Skills | |
| ii. Group Discussion | |
| c. Internal assessment: | 20 marks |
| i. Seminars: | 10 marks |
| ii. Assignments: | 5 marks |
| iii. Lab record submission: | 5 marks |

II. Semester End Examination : 40 Marks

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|---|----------|
| a. Write an essay on a given topic or participate in an activity: | 15 Marks |
| b. Interview or Group Discussion: | 15 Marks |
| c. <i>Viva Voce</i> | 10 marks |

References:

- Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.
- Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.
- Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004.
- Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.
- Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D
- Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011

E-Learning Resources:

- <http://www.dailywritingtips.com/>
- <http://www.englishdaily626.com/c-errors.php>
- <http://www.owl.net.rice.edu/~cainproj/>
- <http://www.thehumorsource.com/>
- <http://www.indiabix.com/group-discussion/topics-with-answers/>
- <http://networketiquette.net/>
- <https://public.wsu.edu/~brians/errors>
- <http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15>

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER :MNG:410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS
MID SEM - I

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. Write the guidelines for preparing a PowerPoint presentation.
2. How do you prepare yourself for presenting a technical paper?
3. Mention a few presentation aids and how do you use them effectively?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. Write the format of a report and describe it.
5. Write a report on the accident you have seen recently.
6. Give the outline of a project report and describe it.

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BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER :MNG:410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS
MID SEM - II

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. What are the dos and don'ts for a formal interview?
2. What at least ten frequently asked questions in a formal interview?
3. How do you prepare for a telephonic interview?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. What are the dos and don'ts of a group discussion?
5. Mention some phrases and expressions commonly used in a group discussion.
6. Write a short paragraph on the steps you take while participating in a group discussion.

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BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER C:18 MNG:410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS
SEMESTER END EXAM

Time : 3 Hours

Total Marks: 40 Marks

Part – A

10 marks

Instruction: Pick any one question from the given lot.

1. Prepare the outline of a project report and describe it.
2. Write the guidelines for preparing the slides of a PowerPoint presentation.
3. Write the minutes of the meeting conducted at the Principal's chamber to conduct the annual day celebrations. Prepare the agenda of the annual day celebrations.
4. Describe the workplace etiquette.
5. Prepare a press note for the '*Job Mela*' which is going to be conducted at your institute.

Part – B

15 marks

6. Interview / Group Discussion

Part – C

15 marks

7. *Viva Voce*

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DMNG SKILL UPGRADATION ACTIVITY SHEET

Course Title	: Skill Upgradation	Credits	:2.5
Semester	: IV	Total Contact Periods	: 105
Methodology	: Activities		

Suggested Course Outcomes

CO.1 Address the identified needs of the community collaboratively to facilitate positive social change.

- a. Prepare a chart related to the topics covered in the present semester.
- b. Listen to expert talk, guest lecture, YouTube video and write a summary.
- c. Participate in Haritha Haram and submit a small report about the activities.
- d. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
- e. Seminar on problems with possible solutions in the campus or nearby places
- f. Group discussions or enacting a play on topics creating awareness about socio-economic problems
- g. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
- h. Participate in NCC

(PO 5, 6, 7, 8, 9, 10)

CO.2 *Listen attentively to others and respond appropriately*

- a. Listen to expert talk, guest lecture, YouTube video and write a summary.
- b. Participating in Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
- c. Participate in quiz on technical aspects or current affairs
- d. Participate in Mock Interview

(PO 5, 7, 8, 9, 10)

CO.3 Adapt your style to the occasion, task, and audience

- a. Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
- b. Seminar on problems with possible solutions in the campus or nearby places
- c. Participate in Mock Interview

(PO5, 6, 7, 8, 9, 10)

CO.4 Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices.

- a. Prepare a chart related to the topics covered in the present semester.
- b. Refer to an e-journal and submit a summary report on upcoming technologies.

- c. Visit factory / industry and submit a report/PPT on the observations made.
- d. Prepare a mini project and submit report.
- e. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
- f. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
- g. Seminar on problems with possible solutions in the campus or nearby places
- h. Participate in Mock Interview

(PO5, 6, 7, 8, 9, 10)

CO.5 *Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations*

- a. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
- b. Seminar on problems with possible solutions in the campus or nearby places

(PO5, 6, 7, 8, 9, 10)

CO.6 *Analyze the interconnections between individuals and society as well as how individual actions have an impact on others.*

- a. Participate in Haritha Haram and submit a small report about the activities.
- b. Participate in Swatch Bharath and write an essay on the importance of the program
- c. Participate in NCC

(PO5, 6, 7, 8, 9, 10)

CO.7 *Utilize others' ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others*

- a. Prepare a mini project and submit report.
- b. Participate in Haritha Haram and submit a small report about the activities.
- c. Participate in Swatch Bharath and write an essay on the importance of the program
- d. Participate in NCC

(PO5, 6, 7, 8, 9, 10)

CO.8 *Ability to recognize their strengths and those of others to work towards a shared vision.*

- a. Prepare a mini project and submit report.
- b. Participate in Haritha Haram and submit a small report about the activities.
- c. Participate in Swatch Bharath and write an essay on the importance of the program
- d. Participate in NCC

(PO5, 6, 7, 8, 9, 10)

CO.9 *Act in alignment with one's own values to contribute to one's life-long growth and learning.*

- a. Physical activities such as sports, yoga, meditation and other relaxation techniques

(PO5, 6, 7, 8, 9, 10)

CO.10 **Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people.**

- a. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
- b. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
- c. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
- d. Seminar on problems with possible solutions in the campus or nearby places

(PO5, 6, 7, 8, 9, 10)

CO	Outcome	CO/PO Mapping
CO1	Address the identified needs of the community collaboratively to facilitate positive social change.	5, 6, 7, 8, 9, 10
CO2	Listen attentively to others and respond appropriately	5, 6, 7, 8, 9, 10
CO3	Adapt your style to the occasion, task, and audience	5, 6, 7, 8, 9, 10
CO4	Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices.	5, 6, 7, 8, 9, 10
CO5	Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations	5, 6, 7, 8, 9, 10
CO6	Analyze the interconnections between individuals and society as well as how individual actions have an impact on others.	5, 6, 7, 8, 9, 10
CO7	Utilize others' ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others	5, 6, 7, 8, 9, 10
CO8	Ability to recognize their strengths and those of others to work towards a shared vision	5, 6, 7, 8, 9, 10
CO9	Act in alignment with one's own values to contribute to one's life-long growth and learning.	5, 6, 7, 8, 9, 10
CO10	Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people.	5, 6, 7, 8, 9, 10

Note: The above COs may map to other POs from 1 to 4 apart from PO's 5 to 10 depending on the topic

Suggested Student Activities

1. Prepare a chart related to the topics covered in the present semester.
2. Refer to an e-journal and submit a summary report on upcoming technologies.
3. Visit nearby Mines / Processing plants and submit a report/PPT on the observations made.
4. Prepare a mini project and submit report.
5. Listen to expert talk, guest lecture, YouTube video and write a summary.
6. Participate in Haritha Haram and submit a small report about the activities.
7. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
8. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
9. Participate in Swatch Bharath and write an essay on the importance of the program
10. Group discussions or enacting a play on topics creating awareness about socio-economic problems
11. Physical activities such as sports, games, yoga, meditation and other relaxation techniques
12. Participate in quiz on technical aspects or current affairs
13. Seminar on problems with possible solutions in the campus or nearby places
14. Participate in NCC
15. Participate in Mock interviews

Note: The above student activities will be assessed using rubrics. A sample rubrics template is given below. The subject teacher can assess students using rubrics with at least four relevant aspects.

RUBRICS MODEL (For assessing Presentation skills)

Aspects	Needs improvement	Satisfactory	Good	Exemplary
Collection of data	Collects very limited information	Collect much Information with very limited relevance to the topic	Collects some basic information with little bit of irrelevance	Collects a great deal of information with relevance
Presentation of data	Clumsy presentation of data	Presents data well; but presentation needs to be more meaningful	Presents data well but need to improve clarity	Presents data in an understandable yet concise manner
Fulfill team's roles & duties	Performs very little duties but Unreliable.	Performs very little duties and is inactive	Performs nearly all duties	Performs all duties of assigned team roles
Shares work equally	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded
Interaction with other team mates	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening to others	Listens, but sometimes talks too much	Listens and speaks a fair amount
Audibility and clarity in speech	Hardly audible and unclear	Very little audibility and clarity	Audible most of the time with clarity	Audible and clear
Understanding content	Lacks content understanding and is clearly a work in progress	Little depth of content understanding	Some depth of content understanding is evident but needs improvement	Insight and depth of content understanding are evident
Content Presentation	Content is inaccurate and information is not presented in a logical order making it difficult to follow	Content is accurate and information is not presented in a logical order making it difficult to follow	Content is accurate but some information is not presented in a logical order but is still generally easy to follow	Content is accurate and information is presented in a logical order

Suggested additional aspects for assessing Leadership Qualities:

1. Carrying self
2. Punctuality
3. Team work abilities
4. Moral values
5. Communication skills
6. Ensures the work is done in time

Suggested additional aspects for assessing “Participation in social task”

- 1 Interested to know the current situation of society.
- 2 Shows interest to participate in given social task.
- 3 Reliable
- 4 Helping nature
- 5 Inter personal skills
- 6 Ensures task is completed

Suggested additional aspects for assessing “Participation in Technical task”

1. Updated to new technologies
2. Identifies problems in society that can be solved using technology
3. Interested to participate in finding possible technical solutions to identified project
4. Reliable
5. Interpersonal skills

Suggested additional aspects for Carrying Self:

- 1 Stand or sit straight.
- 2 Keep your head level.
- 3 Relax your shoulders.
- 4 Spread your weight evenly on both legs.
- 5 If sitting, keep your elbows on the arms of your chair, rather than tightly against your sides.
- 6 Make appropriate eye contact while communicating.
- 7 Lower the pitch of your voice.
- 8 Speak more clearly.

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