

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD  
B.Tech. in MINING ENGINEERING**

**III YEAR LABS SYLLABUS (R18)  
Applicable From 2018-19 Admitted Batch**

**MINERAL PROCESSING ENGINEERING LAB**

**III B.Tech. Mining. Engg. I-Semester**

**L T P C  
0 0 3 1.5**

**Pre-Requisites:** NIL

**Course Objectives:** To study various mineral processing techniques to enrich minerals

**Course Outcomes:** At the end of the course, students will be able to

1. Know different sample division techniques.
2. Determine the grinding and crushing characteristics of a given mineral sample.
3. Know the washability characteristic of a coal sample.
4. Determine the moisture content by drying of mineral sample.
5. Determine the average size of samples.

**LIST OF EXPERIMENTS:**

1. Study of grab sampling and different sample division techniques like coning and quartering, riffle sampling techniques, etc.
2. Determination of crushing characteristics of a given mineral sample using jaw crusher
3. Determination of the grinding characteristics of a given mineral sample using ball mill.
4. Sieve analysis of a given sample and to calculate (a) percentage sample retained on screens (b) average size of sample material and (c) to plot sizing curves
5. Concentration of a given mineral using Wilfley table
6. Concentration of a given mineral using froth flotation cell
7. concentration of a given mineral using magnetic separator
8. Study of washability characteristic of coal samples using sink-float tests.
9. Study of sedimentation characteristics of a given sample

## MINE ENVIRONMENTAL ENGINEERING LAB

III B.Tech. Mining. Engg. I-Semester

L T P C  
0 0 3 1.5

Pre-Requisites: NIL

### Course Objectives:

- To determine the psychrometric properties, gas percentage in atmosphere.
- To study the principles and characteristics governing mine fans.
- To understand lamp design and perform underground illumination surveys.

**Course Outcomes:** The students will get practical knowledge about underground mine ventilation equipment's functions, usage and interpretation of data.

### LIST OF EXPERIMENTS (Any 10 to 12 Experiments to be done minimum)

1. Detection of mine gases
2. Orsat/Haldane apparatus for gas analysis.
3. Measurement of relative humidity by hygrometer.
4. Kata thermometer.
5. Characteristic curves for fans.
6. Operation of fans in series and parallel.
7. Design of various ventilation devices, Airshaft, Evasese, Doors crossing regulators.
8. Reversal of Ventilation system.
9. Measurement of air quantity by anemometer velometer and smoke tube, pressure survey.
10. Measurement of relative humidity by hygrometer.
11. Study and analysis ventilation network circuit.
12. Study of mine air-conditioning plant.
13. Study of Constructional features of a flame safety lamp and cap lamp,
14. Study of Layout of lamp room.
15. Assessing spontaneous heating susceptibility of coal using DTA/Wet oxidation Apparatus
16. Study of MSA type gas mask i) Filter type apparatus ii) Self Rescue
17. Study of self-contained breathing apparatus i) Drager BG-174 ii) By Travox -120
18. Study of Drager pulmotor (Model: PT-60)
19. Estimation of SPM concentration in air using high volume sampler.
20. Study of construction and working of explosion proof fire stopping.
21. Determination of susceptibility of coal by chemical method or by puff Temperature method.
22. Determination of water quality parameters using water analyzer kit.
23. Determination of flammability temperature of coal by using inflammability index apparatus.
24. Determination of nutrient status in soil using soil test kit.
25. Measurement of Noise level by integrated sound level meter.
26. Measurement of Lux by light meter.
27. Air born dust modeling
28. Air pollution modeling

## MINE MECHANIZATION LAB

III B.Tech. Mining. Engg. I-Semester

L T P C  
0 0 2 1

**Pre-Requisites:** NIL

**Course Objectives:** To impart knowledge to students about:

1. Construction as operations of various types of engineer, mining equipment etc.
2. Testing procedure for determination of various properties of mining machinery like efficiency, strength friction etc.

**Course Outcomes:** The students will be able to

1. Describe the constructional details of various mining equipment.
2. Explain the working of mining machinery.
3. Evaluate the properties of mining machinery.

### LIST OF EXPERIMENTS (Any 10 to 12 Experiments to be done minimum)

1. To find out the angle of friction for different materials.
2. Coefficient of friction between belt / rope and pulley
3. Determination of Efficiency of a screw jack
4. Study of construction and operation of 4stroke SI engine model.
5. Study of construction and operation of 4 stroke CI engine model.
6. Performance testing of a 4 stroke Diesel engine.
7. Performance test of reciprocating air compressor
8. Study of different types of gear and gear trains.
9. To study the construction of multi-speed gearbox used in dozer.
10. Study of rope brake dynamometer.
11. Study of different types of couplings.
12. Study of multiple clutches
13. To study the jump phenomena of Cam and Follower
14. Study of gate end box
15. Study of drill panel and hand held electrical in a drill
16. Study of mining type electric cable.
17. Study of pillar switch
18. To develop different hydraulic circuits in hydraulic trainer.
19. To study the construction and operation of hydraulic pumps, motors and valves
20. To study the construction and operation of hydraulic fittings and hoses.
21. Performance investigation of hydrostatic transmission systems with different motors.
22. To develop different pneumatic logic circuits in pneumatic trainer
23. Performance test of centrifugal pumps
24. Performance test on reciprocating pump
25. Dismantling and assembly of Jack Hammer Drill machines
26. Determination of fatigue strength of steel wires
27. Determination of Breaking strength of steel wire ropes

**GROUND CONTROL & INSTRUMENTATION LAB AND  
COMPUTER APPLICATIONS IN MINING LAB**

**III B.Tech. Mining. Engg. II-Semester**

**L T P C  
0 0 3 1.5**

**Pre-Requisites:** NIL

**Course Objective:** To study the computer programming for mining problems, mine ventilation network analysis, modeling of surface and underground workings using various software.

**Course Outcome:** The students will able use the planning software for surface and underground mining methods.

**LIST OF EXPERIMENTS:**

1. Design of pillars
2. Blast design
3. Subsidence prediction.
4. Mine ventilation network analysis.
5. Modelling of airflow through underground workings using CFD.
6. Ore body modeling.
7. Slope stability analysis in soil and rocks.
8. Fragmentation Analysis
9. Truck dispatch system optimization
10. Digital Terrain and Wire-frame modelling
11. Surface Mine Design using MPD Software
12. Underground Mine Design using MPD Software
13. Pit optimization using MPD Software
14. Production Scheduling for grade control
15. Design of experiments.

**LIST OF EXPERIMENTS:**

1. Studies on CONVERGENCE METER for monitoring convergence in mines
2. Studies on BOREHOLE STRESS CELL for monitoring stress in underground workings.
3. Studies on VIBRATING WIRE TYPE LOADCELL for monitoring load on supports.
4. Studies on LAYOUT OF INSTRUMENTS for monitoring ground behavior around Longwall
5. Studies on LAYOUT OF INSTRUMENTS for strata behavior monitoring in thick seams.
6. Studies on LAYOUT OF INSTRUMENTS for monitoring ground behaviour in metal mines.
7. Studies on LAYOUT OF INSTRUMENTS for slope monitoring in opencast mines.
8. Studies on REMOTE CONVERGENCE INDICATORS for roof fall monitoring in mines.
9. Studies on BOREHOLE EXTENSOMETER for monitoring bed separation in mines.
10. Studies on VIBROGRAPH for monitoring ground vibrations due to blasting.

**REFERENCE BOOKS:**

1. E Balagurusamy, Fundamentals of Computers, Mc Graw Hills Publication, 2009
2. MPD Software Manual.
3. Fragalyst Software Manual

## ROCK MECHANICS LAB

III B.Tech. Mining. Engg. II-Semester

L T P C  
0 0 3 1.5

Pre-Requisites: NIL

### Course Objectives:

- To study the various of methods to determine the properties of rocks.
- To study the operation of various instruments and equipment.

**Course Outcomes:** The students will have knowledge on strength and deformation characteristics of rock using different methods.

### LIST OF EXPERIMENTS (Any 10 to 12 Experiments to be done minimum)

1. Determination of RQD of rocks.
2. Determination of Protodyaknov index of a given rock sample
3. Determination of point load index strength of a given rock sample
4. Determination of porosity of rocks.
5. Determination of uniaxial compressive strength of a given rock sample
6. Determination of tensile strength of a given rock sample using Brazilian method
7. Determination of shear strength of rocks
8. Determination of modulus of elasticity of given rock sample using strain gauge.
9. Determination of triaxial strength of rock and drawing of Mohr's envelope
10. Determination of slake durability of rocks
11. Study of drillability index of rocks.
12. Study of different types of roof convergence and other ground control instruments.
13. Determination of time dependent deformation of rocks.
14. Determination anchoring capacity of rock bath
15. Blast induced ground vibration and air-ore pressure determination
16. Determination of percentages shrinkages of different blowing materials
17. Determination of in-situ stress by flatjack
18. Determination of port failure behavior of rocks.

## ADVANCED COMMUNICATION SKILLS LAB

III B.Tech. Mining. Engg. II-Semester

L T P C  
0 0 2 1

### 1. Introduction:

The introduction of the Advanced Communication Skills Lab is considered essential at 3<sup>rd</sup> year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

### 2. Objectives: This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

### 3. Syllabus: The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

#### 4. Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

1. **Prescribed Lab Manual:** A book titled **A Course Book of Advanced Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

2. **Suggested Software:** The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)**
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

#### 7. Books Recommended:

1. **Effective Technical Communication** by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd. 2<sup>nd</sup> Edition
2. **Academic Writing: A Handbook for International Students** by Stephen Bailey, Routledge, 5<sup>th</sup> Edition
3. **Learn Correct English – A Book of Grammar, Usage and Composition** by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
4. **Professional Communication** by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
5. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
6. **Technical Communication** by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
7. **English Vocabulary in Use** series, Cambridge University Press 2008.
8. **Handbook for Technical Communication** by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. **Communication Skills** by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. **Job Hunting** by Colm Downes, Cambridge University Press 2008.
11. **English for Technical Communication for Engineering Students**, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.