MINERAL RESOURCES INSTITUTE (MRI)

(Fully Accredited by NACTE)

DEPARTMENT OF GEOLOGY AND MINERAL EXPLORATIONS

SHORT COURSES

S/N	COURSE NAME	COURSE CONTENTS	DURATION
1.	**Exploration Geophysics (Geophysical Exploration)**	a) Types of geophysical exploration b) Application of geophysical exploration methods in mineral and petroleum exploration c) Gravity and magnetic surveys d) Geo-electric surveys e) Concepts of geophysical data processing and interpretation f) Simple geophysical data processing g) Simple interpretation of geophysical data results	3 Weeks

2.	**Practical identification of minerals and rocks in hand specimen**	a) The use of physical properties of minerals in their identification b) Hand specimen identification of the common rock-forming, ore and industrial minerals c) Review of the classification of igneous, sedimentary and metamorphic rocks and its use in the practical identification of rocks d) Hand specimen identification of igneous, sedimentary and metamorphic rocks	One Month
3.	**Exploration Geochemistry (Geochemical Exploration**)	a) Application of geochemical exploration methods in mineral exploration b) Types of geochemical surveys c) Principles of geochemical sampling d) Geochemical sampling equipment e) Establishment of geochemical survey grids f) Sample preparation and submission g) Geochemical analysis (Analytical techniques) h) Interpretation of geochemical results	3 Weeks
4.	**Introduction to**	**1. Introduction to GIS (Principles and Concepts)**	One Month

	Geographical Information Systems (GIS)	a) Basics of GIS b) GIS Spatial data types c) Spatial Data Structures (Raster and Vector data structures, topology and spaghetti data models) d) GIS Data Sources (Aerial Photographs, Remote Sensing and ground survey) e) GIS Data Input Techniques (Spatial and attribute data) - Digitizing • Manual digitizing, • Scan digitizing, and • On-screen digitizing - ElectronicDataTransfer (spatial data collection and processing using hand held GPS) - Attribute Data input (Tabular data entry and importing Non Spatial data from MS Excel) **2. Introduction to ArcGIS software**	

		a) Getting to know ArcGIS Environment (Arc Catalog, ArcMap and Arc Toolbox) b) Workspaces and Geodatabases c) GIS Data input d) Creating Shape files **3. Spatial Data Analysis** • Spatial Data Analysis: Spatial Querying, Buffering, Overlaying and Proximity **4. GIS data Output (Data visualization)** a) Map elements and Cartographic symbols b) Layout Preparation	

5.	**Mining Geology and Grade Control Course**	a) An integrated geological framework for effective grade control and mining operations b) Grade control sampling theory c) Sampling methods in open pit mines d) Sample preparation, assaying and geochemical analysis e) Tools for quality control f) Cut-off grade determination g) Delineation and mark-out of mineable ore blocks h) Statistical and geo-statistical foundations of ore block estimation i) Sources and methods for control of dilution and ore loss j) Reconciliation between ore reserves, grade control and production k) Ore Block Optimization and other applications using conditional simulation	One Month
6.	**Geo-Laboratory Technology**	a) Explain laboratory regulations and safety rules b) Practice safe working procedures in the laboratory c) Comply with rules for handling emergencies in	3 Weeks

		the laboratory d) Explain appropriate procedures of handling various samples e) Prepare rock thin sections for laboratory analysis f) Conduct sample crushing, grinding, sieving and splitting g) Classify geo-laboratories h) Classify geo-laboratory instruments i) Explain operating principles of geo-laboratory instruments j) Calibrate geo-laboratory instruments	
7.	**Geological Mapping**	a) Roles of geological mapping in mineral exploration b) Geological mapping principles and techniques c) Outcrop description and documentation d) Geological mapping equipment and tools e) Preparation of geological maps and cross section f) Practice Geologic Mapping and Specific Field Techniques g) Prepare Geological mapping Report	One Month

Note

1. Certificate of attendance will be awarded to participants who successfully complete each topic
2. All payments should be done via CRDB Account Number **01J1082316900**, Account Name **Madini Institute – Dodoma**

1. Head of Research and Short Course

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