SGL 513: EXPLORATION GEOCHEMISTRY STUDY GUIDE

ACADEMIC YEAR 2013/2014 – 1st Semester

Lecturer: Prof. Eric Odada
Tutorial Fellow: Christine Omuombo

Aim:
This course is designed for students who have taken introduction to geochemistry (SGL 404) in their undergraduate studies. The course begins by looking at the basic principle of Geochemistry previously covered to provide a foundation for the lectures that follow. The lectures look at isotope geology, thermodynamics and phase equilibria and partition geochemistry that are key aspects applied in the analysis and interpretation of geochemical samples in mineral exploration. A holistic outlook on geochemical exploration is provided in the final lectures that dwell on carrying out a geochemical exploration exercise and laboratory techniques. The tutorials focus on the basic principles of geochemistry covered in the lectures as well as communication science. These sessions cover data handling widely in programs such as excel, R and MATLAB that are used in the data presentation and analysis.

Recommended Reading:

1. A.W. Rose, H.E. Hakes & J.S. Webb, 1979 - Geochemistry in Exploration *(Ac. Press)* ***(This is the core text for the course)***
2. B. Mason & C.B. Moore, 1981 - Principles of Geochemistry *(Wiley & Sons)*
3. Rankana & Sahama, 1950 - Geochemistry
4. Goldschmidt, 1950 - Geochemistry
5. P. Henderson, 1982 - Inorganic Chemistry *(Perganon Press)*
6. C.S. Hutchinson, 1974 - Lab Handbook of Petrographic Techniques
7. J.C. Davis, 1973 - Statistics and Data Analysis in Geology
8. J.E. Fergusson, 1982 - Inorganic Chemistry and the Earth
9. Krauskopf, K.B. - Exploration Geochemistry
10. E.E. Levinson - Exploration Geochemistry
11. A.A. Bens & S.V. Grigorian, 1977 - Geochemical Exploration Methods for Mineral Deposits
12. A.H. Brownlow, 1979 - Geochemistry
13. J.E. Andrews, P. Liss, T.D. Jickells, 1996 - Introduction to Environmental Chemistry

Lecture program:
This course consists of 7 key lecturers that introduce the students to all aspects of Geochemistry. *(This unit is taught in the first semester if there are students who have selected the course and therefore, the dates and timings have not been scheduled on the timetable)*

LNo	Date	Time	MAIN SUBJECT	SUBJECT COMPONENTS
1			**BASIC PRINCIPLES OF GEOCHEMISTRY**	• Principle and Application of Geochemistry • Handling of Geochemical Data • Limitation of Analytical Data
2			**GEOCHEMICAL SAMPLING**	• Sampling materials • Water sampling • Sampling sediments
3			**PRINCIPLE AND APPLICATION OF ISOTOPE GEOLOGY**	• General principles • Types of nuclear decay • Measurements of Isotopes • Real Instruments • Application of Isotopes
4			**THERMODYNAMICS AND PHASE EQUILIBRIA**	• Thermodynamics • Introduction and Historical Development • Basic Concepts and Terminologies • Laws of Thermodynamics • Application of Thermodynamics • Phase equilibria • Phase Rule • Application of Phase Rule
5			**PARTITION GEOCHEMISTRY**	• Introduction to Partition Analysis • Chemical Partition Procedures • Qute Specification
6			**GEOCHEMICAL EXPLORATION**	• Introduction to Exploration • Exploration Techniques • Planning and Organization
7			**LABORATORY TECHNIQUES AND INTERPRETATION OF GEOCHMICAL DATA**	• Laboratory Techniques • Analysis and Interpretation • Multivariate Statistical Analysis

Practical/tutorial program - The program is based on the lectures that have been conducted and are as follows:

Session	Date	SUBJECT
1		BASIC PRINCIPLES OF GEOCHEMISTRY
2		SCIENTIFIC COMMUNICATION
3		SCIENTIFIC READING AND WRITING
4		ISOTOPE GEOLOGY TUTORIAL
5		COMPUTER HANDLING OF THERMODYNAMICS AND PHASE EQUILIBRIA DATA
6		DATA HANDLING IN EXCEL AND EXPLORATORY STATISTICS
7		DATA HANDLING IN R/ MATLAB

Assessment: The assessment of this course is through at least one Continuous Assessment Test, homeworks, term paper and group discussion and presentation. The allocation of assessment marks is as per the guidelines provided in the University of Nairobi, School of Physical Sciences statutes.

Class mark:.....30%
CAT (10%)
Term paper (10%)
homeworks (5%)
Group work (5%)
Exam mark: 70%