



UNIVERSITY OF NAIROBI
COLLEGE OF EDUCATION AND EXTERNAL STUDIES
&
SCHOOL OF PHYSICAL SCIENCE
DEPARTMENT OF GEOLOGY

SGL 308:
INTRODUCTION TO GEOLOGICAL MAPPING

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PUBLISHED BY NAIROBI UNIVERSITY PRESS
P.O. BOX 30197-00100 GPO,
NAIROBI,
KENYA.

2010

PRINTED BY COLLEGE OF EDUCATION AND EXTERNAL
STUDIES,
UNIVERSITY OF NAIROBI,
P.O. BOX 30197,
NAIROBI,
KENYA.

2010

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INTRODUCTION TO THE UNIT

Introduction to Geological Mapping is a third year earth science study unit offered by the Department of Geology, University of Nairobi. The main aim of this unit is to introduce you to the basic procedures of carrying out a field geological mapping exercise and how to present the obtained field information data in a formal geologic report. As a student undertaking this course, you are expected to have covered some basic mineralogy and structural geology courses (e.g., SGL 201, SGL 202 and SGL 203). This knowledge in general geology will assist you to identify common rocks, minerals and geologic structures that you will encounter in the field.

The first lecture introduces you to the basic principles of geological mapping. Important topics in this lecture include the uses of geological maps, the necessary field equipment, planning procedures and production of geological maps. The second lecture deals with sustained geological mapping procedures while in the field. It reviews the preliminary preparations that one should undertake before starting a field mapping exercise. It explains how geologic notes and descriptions are taken and entered in the notebooks, and illustrates how specimens are collected and systematically labelled while in the field. Lecture 3 introduces you to the art of locating field data, geologic features and their subsequent plotting in a base map. Lecture 4 describes and illustrates to you the practical usage of the compass, clinometer and a hand level and how to use them in determining various attitude data (e.g., strike and dip) of rocks.

After accumulating sufficient data from the fieldwork session, Lecture 5 will introduce you to the necessary follow-up laboratory investigations of the samples you collected in the field. Among the topics you will cover in this lecture will include the study of rock thin sections using the petrographic microscope; routine mineral identification procedures; and some principle techniques of chemical and X-ray methods of rock and mineral analyses. The lecture concludes by introducing you on the method used in the plotting of some basic statistical projections such as the rose diagrams and the preparation of rock thin-sections. Lecture 6 and lecture 7 is a combined and integrated study on aerial photographs. Lecture 6 starts by introducing you on the use of aerial photographs, their nature, the concept of

stereoscopy, the architecture of stereoscopes and how they are used to interpret geological features. Lecture 7 goes a notch higher to introduce you on how various geological structures e.g. beddings, faults, folds, etc can be deduced and interpreted from aerial photographs. Using tone and relief features, this lecture provides an in-depth analysis on how to differentiate lithological units of igneous, metamorphic and sedimentary origin in aerial photographs. Lecture 8, which compliments the principles of analysis of lectures 6 and 7, introduces you to the remote sensing methods of data analysis. Broadly it introduces you to the method of operation, its importance and application in the study of regional geological features. Some case studies to illustrate the interpretation of satellite images are presented in this lecture. After analyses of your samples and subsequent interpretation of your data, the last lecture (LECTURE 9) provides you with the relevant information and the general format to be followed in the writing and production of completed reports, illustrations, maps and sections.

In order to assist you to identify various forms and structures, a number of illustrations have been included in the text. However, from the very nature of geology, they can never be final or complete. They are presented in this unit with the hope that they may be of some value at least in showing what features to observe in the field. You are encouraged to make use of other reference materials to complement the present unit content as indicated in the reference sections of each lecture topic.

In this unit you will find various types of activities that you are expected to work through before you proceed to the next section. You will also find questions integrated within the subject topics that you can reflect upon. In this unit you will be assessed by carrying out a guided field mapping exercise and writing an independent geological report of the studied area (which constitutes 70% of the overall grade marks), and carrying out the assignments and practical exercises given to you during your residential sessions (which will constitute 30% of the overall grade). As your tutor, I will be available to guide you through the unit course and explain to you any grey areas that you may encounter.



UNIT OBJECTIVES

At the end of this unit you should be able to:

1. Describe the necessary procedures to be carried out in the planning stage of a successful geologic field mapping program
2. Carry out an independent geological mapping in a given survey area.
3. Construct and produce a geological map from a given surveyed area
4. Use geological field equipment e.g. a compass, clinometers, a hand-level, or a GPS in measuring the attitudes of rocks in the field.
5. Describe the concept of stereoscopy and the use of stereoscopes in the study of aerial photographs.
6. Use aerial photographs to interpret various geological structures.
7. Use satellite imageries, their interpretation and application.
8. Explain the importance of geological maps and geologic mapping as a tool for scientific research study.
9. Write a comprehensive geological report of the surveyed area.

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