**SSL 2102 SOIL SURVEY AND LAND EVALUATION**

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 Cert. Data Analysis, Cert. Gender, Cert. Computer Skills, PhD (Env. Sci))

**Course Type**: **CORE (B.Sc. LUM )**

**Course Credits (CU)**: **3 CU i.e. 45 Contact Hours per semester**

**Course Duration**: **15 weeks (45 hours) i.e. 30 LH, 30 PH**

**1. COURSE DESCRIPTION**

### Concept of soil survey. The soil survey procedure, soil survey aspects and methods. Priciples of photogrametry. Soil survey reports. Applications of soil survey information. Introduction to land evaluation. Basic principles of land evaluation. Land evaluation procedure. Land capability classification. Relationship between soil survey, land evaluation and land use planning.

**2. COURSE OBJECTIVES**

The **overall objective** of this course is to introduce students to the use of soil survey and land evaluation techniques for effective land use planning

The **specific objectives** are:

1. To give students basic knowledge and skills on soil survey for land evaluation purposes
2. To enable students learn how to integrate soil survey and land evaluation into land use planning

**3. SUGGESTED READING LIST**

1. Avery, B.W. 1987. Soil survey methods: a review. Technical Monograph No. 18, Silsoe: Soil Survey &

 Land Resource Centre. 86p.

2. Basamba, T.A. 1998. Changes in soil quality under different land uses of formerly natural forest soils: A

 case study of Mabira forest reserve, Mukono district, Uganda. M.Sc. thesis, AgriculturalUniversity of

Norway, 88p.

3. Brady, N.C. and Weil, R.R. 1996. The nature and properties of soils. Prentice-Hall, Inc. London. 881p.

4. Dent, D. and Young, A. 1981. Soil survey and land evaluation. George Allan and Unwin. London.

5. Van Zuidan, R. A. 1986. Aerial photo interpretation in terrain analysis and geomorphology mapping.

 International Institute for aerospace survey and earth sciences (ITC). Smits Publisher. The Hague, The

Netherlands.

**4. COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND EQUIPMENT REQUIRED**

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| **TOPIC/WEEK** | **CONTENT** | **METHOD OF INSTRUCTION / Time allocated** | **TOOLS / EQUIPMENT NEEDED** |
| 1.**INTRODUCTION**  | * Over view of soil survey and land evaluation
* Objectives of a soil survey
* Challenges in soil survey
* Benefits of land evaluation
 | Lectures (3 hrs) | Chalk / Black board or Markers / Flip charts |
| 2. **THE SOIL SURVEY**  **PROCEDURE** | * Filed reconnaissance
* Field soil survey
* Soil sampling
 | Lectures (2 hrs)Laboratory practicals (3 hrs) | Chalk / Black board or Markers / Flip charts/Soil survey equipment |
| 3. **SOIL SURVEY**  **ASPECTS** | * Soil mapping
* Soil classification
* Soil characterisation
* Soil survey interpretation
 | Lectures (2 hrs)Field-based practicals (5 hrs) | Chalk / Black board or Markers / Flip charts |
| 4. **SOURCES OF**  **SPATIAL DATA** | * Existing maps
* Field measurements and observations
* Aerial photographs
* Satellite imagery
* Radar
 | Lectures (2 hrs) | Chalk / Black board or Markers / Flip charts/Maps/Satellite imagery |
| 5. **SOIL AND OTHER**  **TYPES OF MAPS** | * Soil maps
* Topographic maps
* Cadastral maps
* Thematic maps
* Special purpose maps
 | Lectures (2 hrs) | Chalk / Black board or Markers / Flip charts/Maps |
| 6. **TECHNOLOGIES**  **FOR LAND**  **RESOURCE**  **SURVEYS** | * Land surveying
* Photogrammetry
* Cartography
* Digital mapping
* GIS
 | Lectures (2 hrs) | Chalk / Black board or Markers / Flip charts/Aerial photos/Map production equipment/GIS hardware and software |
| 7. **SOIL SURVEY**  **METHODS** | * Conventional methods
* GPS-assisted
* Spectral reflectance
* Scale issues (reconnaissance, exploratory, detailed and semi-detailed soil surveys)
 | Lectures (2 hrs)Laboratory practicals (6 hrs) | Chalk / Black board or Markers / Flip charts/Aerial photos/GIS hardware and software |
| 8. **BRIEF INTRODUCTION TO THE USE OF REMOTE SENSING AND GIS IN SOIL SURVEY AND LAND EVALUATION** | * Definition of remote sensing and GIS
* Brief history of remote sensing and GIS
* Comparison of aerial photography and satellite remote sensing
* Applications of remote sensing and GIS in soil survey and land evaluation
 | Lectures (3 hrs) | Chalk / Black board or Markers / Flip charts/Aerial photos/Mirror stereoscope and other map production equipment/GIS hardware and software |
| 9. **PRINCIPLES OF**  **PHOTOGRAMETRY** | * Meaning of photogrammetry
* Overlapping stereophotography
* Image and relief displacement
* Orthophotography
 | Lectures (3 hrs) | Chalk / Black board or Markers / Flip charts/Aerial photos/Mirror stereoscope and other map production equipment |
| 10. **PRINCIPLES OF**  **AERIAL PHOTO**  **INTERPRETATION** | * The photo interpreter
* Image elements
* Photo interpretation procedures
* The landscape/land unit approach in photo interpretation
* Field check
* Photo interpretation costs
 | Lectures (2 hrs)Laboratory practicals (3 hrs)Field practicals (3 hrs) | Chalk / Black board or Markers / Flip charts/Aerial photos/Mirror stereoscope and other map production equipment |
| 11. **SOIL SURVEY**  **REPORTS** | * Format of a soil survey report
* Information in a soil survey report
* Interpretation of soil survey reports
 | Lectures (2 hrs) | Chalk / Black board or Markers / Flip charts |
| 12. **BASIC**  **PRINCIPLES OF**  **LAND**  **EVALUATION** | * Assessment of land classification
* Comparison of benefits from different land types
* Multidisciplinarity
* Land suitability
* Comparison of land use types
 | Lectures (2 hrs) | Chalk / Black board or Markers / Flip charts |
| 13.**LAND** **EVALUATION****PROCEDURE** | * Selection and description of land use types
* Determination of the requirements of the land use types
* Comparison of land qualities with land mapping units
* The matching process
 | Lectures (2 hrs)Seminar (3 hrs) | Chalk / Black board or Markers / Flip charts/GIS hardware and software |
| 14. **LAND CAPABILITY** **CLASSIFICATION** | * Methods used
* Structure of land capability classification
* Land suitability classes and sub-classes
* Types of land suitability classifications
* Economic analysis
* Environmental impacts
 | Lectures (2 hrs) | Chalk / Black board or Markers / Flip charts |
| 15. **RELATIONSHIP** **BETWEEN SOIL**  **SURVEY, LAND**  **EVALUATION AND**  **PLANNING** | * How soil survey and land valuation fit into land use planning
 |  Lectures (2 hrs) | Chalk / Black board or Markers / Flip charts |
|  | * Evaluation
 | Tests (2 hrs) |  |

**5. SUMMARY OF TIME NEEDED**

Lectures covering theory 30 hrs

Laboratory-based practicals 12hrs

Field-based practicals 8 hrs

Seminar 03 hrs

Evaluation 02 hrs

**6. OVERALL COURSE EVALUATION**

Continuous Assessment Test 20%

Field and laboratory-based practicals 20%

Final examination 60%