**SSL 2105 SOIL MORPHOLOGY AND CLASSIFICATION (3 CU)**

**Lecturer:** Mrs. Joy Kyomugisha Tumuhairwe (BSc. Agric. MSc. Soil Sc); PhD candidate

**Course Type**: CORE for Bachelor of Science in Agricultural Land Use and Management (B.Sc. ALUM) degree programme**.**

**1. COURSE DESCRIPTION**

**Course Credits (CU)**: **3 CU**

**Course Duration**: 15 weeks of class work and 2 weeks of Evaluation / Examination. These are equivalent to 45 Contact Hours (CH) comprising of 30 Lecture Hours (LH) and 15 contact practical hours (PH). Each PH = 2 actual hours of practical training

**Course Description**

Definition of soil morphology and classification. Soil body and its development. Soils as autonomous bodies. Principles, practices and applications of soil morphology. Soil profile & site description and interpretation. Importance and application soil classification. Procedures in soil classification. Soil taxonomy, categories and nomenclature. Soil classification systems. Advances in soil classification.

1. **COURSE OBJECTIVES**

**General objective**

To enable students classify soils according to their morphology and a prerequisites for soil management course.

The **specific objectives** are to:

1. Students to understand the uniqueness of soils
2. Students gain skills to characterise soil
3. To build the capacity of students to classify soils using different systems
4. Students learn soil classification language.

**3. Reference Materials**

**Brady, C.N. (1990).** Nature and Properties of Soil. Tenth edition, Macmillan Publishing Company

**Fitzpatrick, E.A. (1980).** Soil: Their formation, classification and distribution. Longman Group (FE) Ltd.

**Fitzpatrick, E.A. (1986).** An Introduction to Soil Science. Second edition, Longman Scientific and Technical Publishers

**Foth and Turk (1972).** Fundamentals of Soil Science. 5th Ed.

**FAO (1990)**. Guidelines for Soil Description. FAO & ISRIC

**FAO (2006)**. World Reference base for Soil Resources: A framework for International classification, correlation and communication.

**Gobat, J.M., Aragno, M. and W. Matthey (2004).** The Living Soil: Fundamentals of Soil Science and Soil Biology. Science Publishers, Inc., USA.

**Government of Uganda. (1964).** Atlas of Uganda**.**

**USDA (1988).** Soil Taxonomy. Guidelines to Soil Profile Description and Soil Classification.

**Yost, D. and Eswaran,H. (1990).** Major Land Resource Areas of Uganda. Unpublished Mission Report .

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

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| **TOPIC** | **CONTENT** | **METHOD OF INSTRUCTION / Time allocated** | **TOOLS / EQUIPMENT NEEDED** |
| 1.INTRODUCTION | * Recap on concepts & functions of soil and its importance to man. * Relevancy of Soil Information to Agriculture, Development, Environment, Food Security, Natural Resources Management & * Definitions and Relevance of soil morphology and classification | Interactive lectures  (2 hrs) &  take home reading exercise & presentation (2 hrs) | Desk & Lap top computers, wired / wireless internet, Stationary & Photocopy services for Course Instructors. Chalk & BB or Markers &Flip charts,  Power point / slide/overhead projectors & curtains/blinders.. I |
| 2. THE SOIL BODY | * The soil body and its 2, 3 & 4 dimensions * Variability of ‘Soils’ as autonomous natural bodies * Soil profile development: agents, factors, processes, reactions and resultant horizon characteristics. | Interactive lectures (6 hrs)  MUARIK field visits & practical classes  (6hrs =4CH) | As in 1 above PLUS  Labour to dig/clean profile pits, PLUS Student & staff transport hoes, munsel soil colour charts & other soil surveyor field tools and practical guide handouts |
| 3. THE SOIL MORPHOLOGY TOOL | * Principles and practices & procedures of the soil morphology tool | Interactive lectures (6 hrs),  Station & field practical (3hrs=2PH) | As in 1 and 2 above  Field Practical guide hand outs |
| 4. SOIL PROFILE DESCRIPTIONS | * Soil profile description and interpretation * Detailed soil profile description | Interactive lectures (2 hrs). field practical classes (6hrs) | As in 1& 2 above PLUS  Field Practical guide hand outs |
| SOIL SITE CHARACTERISATION | * Soil site description & interpretation |  | Field Practical guide hand outs |
| SOIL VARIABILITY & SAMPLING | * Causes & importance of soil variability in time & space * Soil sampling principles and practices * Soil characterisation and mapping * Top soil sampling for chemical & mechanical analyses * Sampling soil horizons | Interactive lectures (4 hrs),  Station & field practical classes in different localities (6hrs=4PH) | Field Practical guide hand outs + Sampling bags, pails, labels &trays |
| 5. SOIL CLASSIFICATION | * Importance, Principles and procedures of soil classification * Soil classification systems: technical versus natural, historical versus modern; basis, strength & weaknesses. * Criteria &nomenclature * Evolution of soil classification systems | Interactive lectures (6 hrs);  Station & field practical classes (3hrs)  Computer lab practical classes ( 6hrs) | As in 1& 2 above PLUS Student computers PLUS relevant hard & soft ware |
| 6. SOIL CLASSIFICATON SYSTEMS | * Soil Taxonomy Categories & nomenclature, * Systems used in Uganda: D’Hoore, USDA, FAO, FCC, Productivity rating, Indigenous, e.t.c. and equivalents | Interactive lectures (4 hrs);  Computer Lab. practical classes (3hrs)  Map Reading& lab practical classes (3hrs) | As in 1, 2, & 5 above PLUS Soil Maps & Word Map reference illustrations. |
| 7. Practices and procedures of soil classification | * Detailed soil profile & site descriptions & soil classification at MUARIK | Interactive lecture (2hrs). Field practicals (6hrs) |  |
| 8. MAJOR SOIL CLASSES | * World & regional Soil References * Major soils of Uganda: nomenclature,   Characteristics & management requirements.& local case studies excursion /field trip | Interactive Lectures (4 hrs)  Laboratory Practical (3 hrs)  Field Trips (36 hrs) | As in 1,2 & 5 above PLUS Local / regional  Soil Maps & Word Map reference illustrations |
| 9. ADVANCES IN SOIL MORPHOLOGY & CLASSIFICATION | * Updates on procedures, tools, systems & issues * Progress in Uganda and the region * Constraints to soil classification in Uganda * Possible solutions to the constraints | Interactive Lecture(1hr)  Reading assignments; Group  Discussions, seminar/ presentations (6hours) | As in !,-7 above PLUS Local  Soil Map sheets & Recent publications. |
| 10. APPLICATIONS OF SOIL MORPHOLOGY & CLASSIFICATION | * In Soil surveying & mapping, Land evaluation, Land capability Classification, Land use planning Land use Impact Assessment, Mitigation strategies * Matching soil quality and land use |  |  |
| 11. EVALUATION | * Attendance & Participation in Practical sessions * Continuous assessment test * End of Semester Examination | Practical class register/participation scores &Test (2hrs). Examination (3hrs). | Stationary, Photocopy services  And spacious examination rooms |

**5. SUMMARY OF TIME NEEDED**

Interactive lectures covering theory 30 hrs

Class and station-based practical classes 24 hrs

Laboratory practical classes 15 hrs

Field visits / regional excursion 39 hrs

Group discussions & seminar 06 hrs

Evaluation (test & exam) 05 hrs

**6. OVERALL COURSE EVALUATION**

Continuous Assessment Tests 20%

Participation in practical classes & Field work, Write-ups/ presentations 20%

Final examination 60%