**CRS 1202 INTRODUCTION TO ENTOMOLOGY AND NEMATOLOGY**

2. COURSE INSTRUCTORS:

Dr. Jeninah Karungi (BSc. Agric., MSc Crop Science, PhD, MUK) ; specialist in Entomology and Pest management

Dr Herbert Talwana (BSc. Agric., MSc Crop Science, PhD, Leuven Belgium); specialist in Nematology and Crop protection

3. COURSE TYPE: CORE (B.Sc. Agric. I, B.Sc. FST I, BSc Hort.)

4. COURSE STRUCTURE

3 Credit units: 30 lecture hours (2 contact hours per week for 15 study weeks) and 30 practical hours (1 contact hour (= 2 hrs of practical) per week for 15 study weeks), = 45 contact hours.

5. COURSE DESCRIPTION:

Introduction to the Phylum Arthropoda. Importance of Insects. The success of the Class Insecta. General structure of insects with details of the various body appendages/parts. Discussion on the maintenance systems including digestion, circulation, respiration, locomotion, as well as reproduction and life cycles. The central nervous system and the associated sense organs. Response of insects to different factors in the environment. Classification, nomenclature and identification of insects. Introduction to the Phylum Nematoda: historical and current perspectives; morphology, biology of nematodes; Nematode classification and Nomenclature; Nematode techniques, Importance of nematodes

6. SPECIFIC COURSE OBJECTIVE:

* To provide undergraduate students of BSc. Agriculture, BSc Food Science and Technology, and BSc. Horticulture with the basic knowledge and skills about the anatomy and physiology of insects and nematodes as a foundation for a better understanding of agricultural pests and hence their management.
* To enable the students to relate insect body parts to function and to crop damage
* To provide the students with the skills to differentiate between different insect groups
* To show the students the multiple roles of insects in the environment

7. READING LIST:

* Entomology and Pest Management by Pedigo, L. 1996. 2nd edition, Prentice Hall.
* The Science of Entomology by Romoser, W.S. and Staffolano, J.G. 1998. The McGraw-Hill Companies, Inc.
* An introduction to the Study of Insects by Borror, D.J., Triplehorn, C. A., and Johnson, N.F. 1989. Sixth Edition. Thomson Learning, Inc.
* Nematology - Advances and Perspectives. Volume 1.Nematology morphology, physiology and Ecology, Edited by Chen, Z.X., Chen, S.Y. and Dickson, D.W. 2004. CAB International.

8. COURSE OUTLINE:

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| TOPIC | CONTENT | METHOD OF INSTRUCTION / Time allocated | TOOLS / EQUIPMENT NEEDED |
| 1. Introduction to Entomology | * Definition of entomology
* Classes of Phylum Arthropoda
* Importance of class Insecta
* Factors that have led to the success of insects
 | Interactive lectures (2 hrs)Practical session on key features of classes Insecta, Arachnida, Diplopoda, Chilipoda, andCrustacea (3 hrs) | LCD projectorBB/chalkMicroscopes,Petri dishes,Arthropod samples, ethanol,Paper for printing handouts, Printer cartridge |
| 2. Insect Anatomy | * Insect physical structures
* The insect’s integument (body wall)
* Head of insects: Mouthparts and feeding adaptations
 | Lectures (2 hrs)Practical session on the different types of mouthparts (3 hrs) | LCD projectorBB/chalkMicroscopes,Petri dishes,Arthropod samples, ethanol,Paper for printing handouts |
| 3. Insect Anatomy | The antennae of insects and the different types* The eyes of insects
* Legs of insects and their modifications
 | Lectures (2 hrs)Practical session on types of antennae (3 hrs) | LCD projectorBB/chalkMicroscopes,Petri dishes,Arthropod samples, ethanol,Paper for printing handouts |
| 4. Insect Anatomy | * Wings, venation and morphology
* Abdomen and its structures
 | Lectures (2hrs)Practical session on the different types of insects wings (3 hrs) | LCD projectorBB/chalkMicroscopes,Petri dishes,Arthropod samples, ethanol,Paper for printing handouts |
| 5. Life systemsInsect digestive system | * Structure and function of the digestive tract of insects (foregut, mid gut and hindgut)
* The process of digestion
 | Lectures (2 hrs)Practical session on insects legs (3 hrs) | LCD projectorBB/chalkMicroscopes,Petri dishes,Arthropod samples, ethanol,Paper for printing handouts |
| 6. Insect Life systems | * Excretory system; excretory organs, types of excretion
* Ventilatory/Respiratory system; the tracheal system
 | Lectures (2 hrs) | LCD projectorBB/chalkPaper for printing handouts |
| 7. Insect Life systems | * The circulatory system of insects
* Muscular systems and locomotion
 | Lectures (2 hrs) | LCD projectorBB/chalkPaper for printing handouts |
| 8. Reproduction and development | * Reproductive system: Female reproductive system
* Male reproductive system
* Metamorphosis; Types of Insect life cycles
 | Lectures (2 hrs) | LCD projectorBB/chalkPaper for printing handouts |
| 9. Perception of the environment | * Central nervous system
* Sense organs and associated behavioral patterns
 | Lectures (2 hrs) | LCD projectorBB/chalkPaper for printing handouts |
| 10. Perception of the environment | * Modes of communication of insects
* Response of insects to different factors in the environment
 | Lectures (2 hrs) | LCD projectorBB/chalkPaper for printing handouts |
| 11. Insect classification | * Grouping of insect into distinct orders based on metamorphosis, and wing formation
 | Interactive lectures (2hrs)Field excursions to collect, preserve and group insects into orders (6 hrs) | LCD projectorBB/chalkPaper for printing handoutsInsect trapsSpecimen bottlesEthanolPetri dishesMicroscopesTwo 50 Seater buses |
| 12. Introduction to Nematology | Introduction to nematodes and their status* Nematodes physical structures
 | Interactive lectures (2hrs)Practical sessions on morphology of nematodes (3 hrs) | LCD projectorBB/chalkPaper for printing handoutsElectronic blender, SievesMicroscopes, pansSpecimen bottlesEthanol, Petri dishes |
| 13. Nematodes life systems | * Digestion
* Blood circulation
 | Lectures (2 hrs) | LCD projectorBB/chalkPaper for printing handouts |
| 14. Nematodes life systems | Reproduction and Life cycles* Locomotion and Coordination
 | Lectures (2 hrs) | LCD projectorBB/chalkPaper for printing handouts |
| 15. Nematode classification | * Principles of nematode classification
* Important nematode orders/families
 | Interactive lectures (2hrs)Field excursions to sample and classify nematodes from crop fields (6 hrs) | LCD projectorBB/chalkPaper for printing handoutsElectronic blenderSievesMicroscopespansSpecimen bottlesEthanolPetri dishesTwo 50 Seater buses |
| 15-16 |  |  |  |

9. SUMMARY OF TIME NEEDED

Interactive lectures covering theory 30 hrs

Class and station-based practicals 18 hrs

Field visits/excursions 12 hrs

10. OVERALL COURSE EVALUATION

Continuous Assessment Test 20%

Class practicals, Field work, Write-ups 20%

Final examination 60%