

M.SC. AGRONOMY

KCU 800: Biometry

Importance of biostatistics; hypotheses; comparison of populations and samples; variables, graphs and frequency distribution, measures of central tendency, and dispersion, commonly used distributions, statistical estimation and decision theory; computer applications and analysis of experimental data; completely randomized designs, lattice designs, latin square designs and split plot experiments; factorial experiments; variation in factor and level number. Correlation and regression theory; distribution: chi-square and binomial; non-parametric tests; tests of significance.

KCU 801: Research Methods and Scientific Writing

Overview; types of research; social and scientific, observation, experimental and survey. Main steps of research projects; identification of research problems, formulation of research questions, hypotheses, and objectives, planning, literature review. Sampling strategies; sampling designs; methods of data collection. Data cleaning and management; analysis; interpretation; report writing. Writing technical reports, styles of writing and referencing. Dissemination: publication, seminars, information packaging. Research ethics. IPR.

KST 800: Plant Physiology and Ecology

The environment; crop production and physiological processes; energy flux and exchange; canopy and leaf responses to radiant energy: wind, temperature and water vapour; transpiration; potential evapotranspiration; soil-water-plant relations; measurements of environmental factors; crop-site interaction and response to variations in environmental factors; adaptation to biotic and abiotic factors; photosynthesis, bio-productivity and growth analysis; internal factors of crop development and senescence.

KST 808: Advanced Crop Production

The diversity of crops; propagation methods; nursery and field production systems; plant nutrition management; crop growth indices; ecological requirements; crop-water relations; crops responses to stress (moisture, salt, heat); cultural practices; yield formation: photosynthesis and carbon regulation, biological basis of crop productivity, harvest index, concepts of Leaf area index, interception of PAR, dry matter partitioning; plant population management, yield/density response curves; cropping systems: organic farming, crop production in agroforestry systems; weed management.

KST 809: Integrated Pest Management Strategies

Principles of Integrated Pest Management (IPM); components of IPM strategies: process of IPM, pesticides, IPM triangle, Types of control strategies; quarantine and regulatory measures, agronomic practices; mechanical and physical strategies, biological control, botanicals, pesticide and bio-pesticide control measures, attributes of an effective natural enemy (Predators and parasitoids), advantages and disadvantages of IPM, pest forecasting; early warning systems; victim protection and avoidance techniques; current issues: sanitary and phytosanitary measures; good agricultural practices (GAPs). Case studies on success and failures of IPM in developing countries.

KST 811: Weed biology, Ecology and Management

Origin, evolution and classification; characteristics of weeds; weeds and crop yields; eco-physiology of weed seeds; weed management; ecological genetics of weeds; effect of weeds

on production, management and quality of crops; dissemination, survival of weeds under various environmental conditions; competition between weeds and crops; weeds as alternative hosts to pests and diseases; parasitic higher plants; weed control and management; safe use of herbicides.

KST 814: Advanced Seed Science and Technology

Seed production and multiplication systems; propagation techniques: clones, sexual crops; anatomy and identification of seeds; seed physiology: developmental stages, maturation patterns, dormancy and viability, environmental and hormonal regulation; seed quality testing protocols and equipments; equipments specific to seeds; seed legislation; certification and quality; maintenance of genetic purity; application of biotechnology to seed health and trade; seed storage and longevity; commercial aspects: regulation, phytosanitation, marketing and trade; regulatory framework; seed security; gene banking.

KST 821: Horticultural, Food and Industrial Crop Management

The diversity and location of crops; propagation methods of the crops; role of field crops in economic development of Eastern Africa with emphasis on Kenya; current research, field production systems and methods in crops; case studies of ecology, cultural practices, crop improvement, harvesting, processing, storage and utilization of horticultural, food, industrial crops; pests and disease: control methods: cultural, chemical, biological, mechanical, genetic.

KST 829: Crop-Pest/Pathogen Interactions

Plant pests and pathogen impacts; overview of the biology of insect and nematode pests, viruses, bacteria and fungi; symptomology, etiology,; genetic aspects and mechanisms of interactions, pathogenicity and disease resistance; basic ecological and epidemiological principles: establishment, spread and survival of plant pests and diseases; insects as pathogen vectors; pest and disease management, post harvest pests and diseases; yield and yield loss assessment.

KST 846: Advanced Plant Nutrition

Introduction; definitions and principles; deficiencies, toxicities, availability, macro and micro-nutrients, beneficial elements; transport: ion channels, proton pumps, ion transporters, use of Radionuclides; application techniques: hydroponics, non-nutrition fertigation and soil-less cultures; mineral physiology, phenology and plant yields; climate change and plant nutrition; plant strategies for: low P, Al, and Fe, extreme soil pH values; floods and minerals; mineral supply and plant health in respect to heavy metals and pesticides dynamics; mineral analysis: tissue vs. soil, extraction, rapid *insitu* and *exsitu* methods.

LEVEL 880

KST 880 Research and thesis- 8 Units

Selection of research topic will be done by the student in consultation with supervisors. Research and thesis writing will be done in year two of the study culminating with thesis submission. The thesis will be examined according to the university regulation that is written and oral presentations.