FACULTY OF AGRICULTURE

1. RICE

1. Collection, conservation and cataloguing of rice germplasm
2. Breeding for higher yield, quality and resistance to biotic/abiotic stresses
3. Research on hybrid rice, transgenic rice and speciality rice
4. Development of location specific agro techniques for sustainable rice production
5. Management of abiotic stresses
6. Management of biotic stresses
7. Physiological approaches for enhancing crop productivity
8. Mechanisation in rice cultivation
9. Post-harvest technology in rice
10. Socioeconomic dimensions of rice cultivation in Kerala

2. SPICES AND PLANTATION CROPS

1. Germplasm collection, conservation and evaluation
2. Breeding for high yield and quality
3. Breeding for pest and disease resistance / tolerance
4. Propagation and nursery techniques
5. Agrotechniques for yield and quality improvement
6. Integrated nutrient management
7. In situ moisture conservation and irrigation management
8. Integrated pest and disease management
9. Good agricultural practices and organic farming
10. Post-harvest handling and value addition
11. Biotechnology aspects
12. Developing user friendly machines

3. VEGETABLES

1. Development of F1 hybrids in major vegetables
2. Development of vegetable varieties with resistance to major biotic and abiotic stresses
3. Development of packages for protected cultivation / precision farming for high productivity
4. Site specific crop management strategies in vegetables for targeted yields
5. Adaptability, improvement and large scale multiplication of under-exploited and ethnic vegetables, and cool season vegetables
6. Developing technologies for homestead, kitchen garden, grow bag and terrace vegetable cultivation including soil-less production technologies
7. Eco-friendly technologies for plant protection in vegetables with special emphasis on pests, diseases, birds and nutritional and physiological disorders
8. Seed production, processing, storage, testing and quality enhancement in vegetables
9. Collection, characterization and maintenance of germplasm of major vegetables

4. FRUITS

1. Collection, characterisation, documentation, conservation and evaluation of germplasm of major and minor fruits
2. Identification/development of improved varieties for commercial cultivation and utilisation.
3. Refinement of propagation and management methods
4. Development of organic management practices.
5. Management of pest and diseases
6. Domestication, evaluation and management of exotic fruits.
7. Identification of subtropical fruit varieties for plains, development of agro techniques for subtropical and temperate fruits
8. Identification of fruit crops and varieties suitable for homestead cultivation
9. High tech fruit culture (high density planting, fertigation, tree size control, protected cultivation, canopy regulation etc)
10. Biotechnological interventions in fruit crops.
11. Development of pre and post harvest technologies for enhancing shelf life of major fruit crops.
12. Product diversification, by-product utilisation and waste management of fruit crops.
13. Mechanisation in fruit cultivation, harvesting, postharvest handling and processing
14. Influence of climatic variations in the performance of fruit crops

5. FIELD CROPS – CEREALS (OTHER THAN RICE), MILLETS, PULSES, OIL SEEDS, FODDER CROPS AND GREEN MANURE CROPS

Cereals (other than rice) and millets

1. Screening and agro-techniques for millets and cereals other than rice for changing climatic conditions / major cropping systems of Kerala.
2. Development of package of practices for baby corn, sweet corn and sweet sorghum.

Pulses

1. Screening varieties for stress situations and high yield
2. Identification/ development of suitable varieties for rice fallows
3. Agro techniques for yield maximization and quality improvement including mulching, fertigation and weed management
4. Development of photo insensitive varieties in pulses
5. Isolation and formulation of native bio fertilizers for pulse crops
6. Plant protection methods including botanicals and microbial consortium
7. Management of storage pests and diseases

Oil Seeds

1. Collection, conservation and cataloguing of germplasm of oilseed crops
2. Developing high yielding varieties with tolerance to biotic and abiotic stresses suitable for rice based cropping system
3. Weed management in oil seeds
4. Harvesting and processing technology for oil seeds
5. Investigating therapeutic and nutraceutical value of sesamum / ground nut
6. Developing value added products
7. Agrotechniques for under exploited oilseeds

Fodder crops

1. Identifying high quality fodder crops / varieties.
2. Developing varieties suited to biotic and abiotic stresses and for soil conservation.
3. Developing package for plant protection, higher yield and quality.
4. Improving seed setting in cereal and legume fodders.
5. Fodder preservation techniques.

Green manure crops

1. Green manuring in major cropping systems of Kerala for soil health and productivity.
2. Soil carbon sequestration and micro nutrient addition potential of green manure / green leaf manure crops.
3. Exploitation of green manure potential of non-conventional sources like mimosa, mikania, merrimia, wild coccinia etc.

6. FLORICULTURE

1. Protected cultivation and precision farming in commercial flowers and foliage
2. Standardization of production technology and improvement of cut flowers and other ornamentals
3. Evaluation of indigenous flora and introduction of new ornamentals
4. Post-harvest handling, value addition and market studies
5. Interior plant scaping and pollution abatement studies
6. Landscape horticulture

7. AROMATIC &MEDICINAL PLANTS

1. Exploration, conservation and evaluation of germplasm
2. Genetic improvement for yield and quality
3. Nursery and agro techniques in Medicinal & Aromatic Plants
4. Management of pest and diseases in Medicinal & Aromatic Plants
5. Post-harvest technology, value addition and product development
6. Chemical characterization and quality studies in medicinal and aromatic plants and their products
7. Economics and marketing of Medicinal & Aromatic Plants

8. BIOTECHNOLOGY, BIOCHEMISTRY & PLANT PHYSIOLOGY

1. Plant Tissue Culture for
    1. Micro propagation of recalcitrant species and commercially important crops
    2. Crop improvement
    3. Secondary metabolite production
2. Molecular characterization, diversity analysis and Marker Assisted Selection .
3. Genome mapping, gene annotation and genetic transformation
4. Genome, Transcriptome, proteome metabolome and phenome analysis
5. Bioinformatics resources and applications in agriculture.
6. Nano biotechnology and molecular diagnostics
7. Physiology of crops in precision farming/protected cultivation/organic farming/aerobic system and tissue culture
8. Physiological approaches for increasing crop productivity and stress tolerance
9. Physiological basis of crop response and resilience to climate change
10. Biochemical basis and characterization of
    1. Important disorders / diseases in crop plants
    2. Agroproducts / New phytocompounds / Biomolecules
11. Integrated biotechnology- Integration of Plant Biotechnology with industrial, environmental,

animal, medical, food, algal biotechnology and metagenomics

9. SOIL HEALTH AND ORGANIC FARMING

1. Basic Studies on Soils.
2. Soil Fertility evaluation and nutrient management for sustaining soil health and yield maximization.
3. Plant nutrition and nutrient use efficiency.
4. Nutrient management in high tech agriculture and soilless media.
5. Natural Resource management for sustainable development and resource conservation.
6. Characterization and management of constrained/ problem soils.
7. Waste management for improving soil health and productivity.
8. Environmental pollution and remediation measures.
9. Organic farming and good agricultural practices for soil health and safe food production.
10. Soil ecology and ecosystem conservation.

10. FARMING SYSTEM RESEARCH AND CLIMATE STUDIES

1. Cropping systems research
2. Multi-enterprise farming systems/Homestead Farming
3. Urban and peri-urban cropping/ farming systems
4. Conservation agriculture
5. Integrated resource management in cropping/farming systems
6. Component interactions in cropping/farming systems
7. Agroecological characterization and watershed research
8. System based precision farming
9. Crop weather studies, meteorological parameter interactions and forecasting/simulation models
10. Climate resilient agriculture/climate change adaptation studie
11. Ocean – climate interactions and animal response studies

11. CROP PESTS AND BENEFICIAL INSECTS

1. Ecology and Biosystematics
    1. Morphological characterization and documentation of insect pests/ natural enemies and non insect pests of important crops
    2. Molecular systematics for identification of crop pests and natural enemies
    3. Exploration and collection of Insect and non insect biodiversity
2. Climate change and changing pest scenario
    1. Pest surveillance, short term and long term forecasting of pests
    2. Population dynamics of crop pests in relation to weather parameters
    3. Change in pest status and modes of attack
3. Strategy for Pest management
    1. Estimation of crop loss and data base generation
    2. Ecofriendly methods of pest control & Ecological Engineering
    3. Chemical interventions
    4. Screening germplasm of major crops for resistance to pests, identification of resistance mechanisms including biotechnological approaches
    5. Chemical ecology
    6. Pest management under protected cultivation and High Tech Agriculture
    7. Vector plant interaction
    8. Spatial distribution, invasion dynamics and management of newly emerging and alien pests
    9. Post harvest Entomology

4. Pesticide toxicology
    1. Monitoring pesticide residues in crops and environment and its management
    2. Impact of pesticides on non target organisms
    3. Bio efficacy and chemo dynamics of pesticides
    4. Nanotechnology in pesticide formulations
    5. Insecticide resistance and its management
5. Biological Control of Insects, Non insect pests and weeds
    1. Potential indigenous natural enemies
    2. Formulation technologies of bio pesticides and bio herbicides
    3. Conservation techniques of bio control agents under field conditions
    4. Studies on in-vitro production for obligate entomopathogens using cell line culture and molecular tools
    5. Studies on multiple tolerant bio control agents and entomopathogens
    6. Tritrophic interactions
6. Apiculture
    1. Honey bees for pollination of different crops in field and polyhouses
    2. Location specific research on bee management
    3. Quality control and value addition of honey
    4. Cataloguing of floral calendar
    5. Meliponiculture
7. Non-insect pests (mites, nematodes, rodents, birds, snail and slugs)
    1. Population dynamics of depredatory birds and its conservation management
    2. Beneficial birds
    3. Rodents and other Vertebrate pest management
8. Insects as Bioresources
    1. Medicinal and edible insects
    2. Insects as indicators of water pollution
9. Molecular approaches in Entomological Research
    1. DNA fingerprinting to study population structure, biotype studies and monitoring genetic changes in insect pest population
    2. Mapping of insecticide resistant genes in insects

12. PLANT PATHOGENS AND BENEFICIAL MICROBES

1. Detection, identification, characterization, molecular and Nano technological studies of plant pathogens and beneficial micro-organisms for crop nutrition, crop protection and microbial biotechnology.
2. Development of novel strategies, beneficial microbes, their improved strains and biomolecules for ecofriendly management of crop diseases, crop nutrition, crop growth enhancement and biocontrol of weeds.
3. Development of efficient microbial formulations and delivery systems for enhanced crop production and protection.
4. Post harvest and seed borne diseases, mycotoxins and their management.
5. Crop loss assessment, disease mapping, epidemiological aspects and integrated management of major and emerging diseases of crop plants of Kerala.
6. Mushroom production technology and its application in biodegradation, nutraceuticals and pharmaceuticals
7. Molecular basis of beneficial microbial associations and host- pathogen interaction.
8. Role of plant nutrition and climate change in the development and management of plant diseases.
9. New generation fungicides, development of fungicidal resistance, non -target effects,

compatibility and role of residues with respect to food safety and environmental concerns.
10. Exploitation of microbes for bioremediation, biological waste management and waste water recycling.

13. POST HARVEST TECHNOLOGY

A. Postharvest management

1. Postharvest management in major and minor crops
2. Pre- harvest factors affecting post harvest quality
3. Utilisation of microbial agents in post harvest management
4. Application of biotechnology in post harvest management
5. Post harvest management in organic crops

B. Processing and value addition

1. Processing and value addition
2. Packaging and storage of processed commodities
3. Bioactive compounds and development of functional foods
4. Waste utilisation
5. Development of novel , organic and convenient food products
6. Quality control studies

14. FOOD SCIENCE AND NUTRITION

1. Food security, food consumption pattern and nutritional status
2. Nutritional problems of the community
3. Quality evaluation of foods & Food products
4. Food Processing, Value addition and product diversification in foods.
5. Diet in Health and Diseases
6. Bio active components in foods – Antioxidants and phytochemicals
7. Food hygiene and safety
8. Bio waste utilization.
9. Traditional foods - in changing food habits.
10. Toxicological studies in foods and food products.
11. Wellness foods /Functional Foods/Nutraceuticals/Probiotics
12. Application soft wares/apps for nutrition education and dietary package
13. Developing regional standards for anthropometric indices

15. AGRICULTURAL ECONOMICS, AGRICULTURAL STATISTICS AND AGRIBUSINESS MANAGEMENT

Agricultural Economics

1. Impact assessment of KAU technologies/other programmes
2. Analyzing International/National/State policies and sensitizing its impact on farm sector
3. Cost of production and marketing of major crops/inputs/technologies
4. Natural resources and environmental economics

Agricultural statistics

1. Developing innovative methods for analyzing scientific data Agricultural statistics of Kerala and India

2. Theoretical and applied studies

Agribusiness Management

1. Agribusiness Management Studies
2. Evaluation of rural financing scenario and financial institutions
3. Management of co-operatives and group initiatives
4. Value analysis of Agribusiness
5. Evaluation of Agricultural and rural development programmes

16. AGRICULTURAL EXTENSION AND DEVELOPMENT STUDIES

1. Agricultural crisis and policy research
2. ICT in Agriculture and media studies
3. Participatory approaches
4. Innovations and technology management
5. Subaltern and Gender studies
6. NRM and sustainable development
7. Entrepreneurship and skill development
8. Extension management and development studies

17. SUGAR CANE AND TUBER CROPS

Sugarcane

1. Developing varieties suitable for different agro climatic situations of Kerala
2. Cost effective and input efficient technologies for high yield and quality in sugarcane
3. Developing technologies for processing, product diversification and byproducts utilisation of sugarcane
4. Management of biotic and abiotic stresses in sugarcane
5. Mechanization in sugarcane cultivation and harvesting

Tuber crops

1. Development of high yielding, location specific and pest and disease resistant varieties in tuber crops
2. Development of package of practices including organic package of practices in tuber crops
3. Eco-friendly technologies for plant protection with special emphasis on vertebrate pests and virus diseases
4. Development of technologies for large scale production of planting materials of tuber crops
5. Utilisation of underexploited tuber crops

AGRICULTURE ENGINEERING FACULTY

1. FARM POWER MACHINERY & ENERGY (FPME)

I. Farm machinery

1. Soil manipulation
2. Inter-cultural operations
3. Sowing and planting

4. Harvesting and post harvesting operations
5. Ergonomics and safety

II. Farm Power and Energy Studies

1. Solar energy
2. Bio-energy
3. Wind energy

2. SOIL AND WATER ENGINEERING(SWE)

1. Soil and water conservation
2. Irrigation & drainage
3. Precision farming & protected cultivation
4. Vertical farming and Soil less cultivation
5. Rain water harvesting and conservation
6. Land and water resource development and management
7. Environmental Engineering and management
8. Climate change and natural resource management
9. Watershed management

3. FOOD AND AGRICULTURAL PROCESS ENGINEERING (FAPE)

1. Design and development of equipment suitable for small/ medium scale processing units
2. Development of ready to eat foods using advanced engineering principles
3. Application of advanced drying principles in food processing
4. New techniques in packaging and storage
5. Innovative extraction methods for bio-active compounds and its encapsulation
6. Application of nonthermal processing for food preservation
7. Nondestructive quality evaluation of foods
8. Application of nanotechnology in processing and preservation
9. Entrepreneurship development in food processing sector
10. Food safety and quality management
11. By-product utilization of agricultural/food industry

FORESTRY FACULTY

1. NATURAL FORESTS AND BIODIVERSITY (NFB)

1. Forest ecosystems assessment

1. Vegetation analysis
2. Ecosystem services
3. Forest soils
4. Environmental Management
5. Ecophysiology of Forests

2. Biology, ecology and conservation of wildlife

1. Taxonomy of vertebrates and invertebrates
2. Ecology of vertebrates and invertebrates

3. Ecology of the wetlands and marine ecosystems
4. Captive wildlife management
5. Wildlife forensics

3. Forest health

1. Ecology of Pests and Diseases
2. Forest Fire
3. Invasive Alien Species

4. Forests and Climate Change

1. Carbon Sequestration
2. Climate Change Impacts

5. Socio-economic and cultural dimensions of forests

1. Indigenous technical knowledge
2. Intellectual Property Rights
3. Forest certification
4. Human-wildlife interaction
5. Ecotourism
6. Joint Forest Management
7. Forestry Extension
8. Policy and legal dimensions

6. Non Timber Forest Products

2. PLANTED FORESTS AND UTILIZATION (PFU)

1. Silviculture and management of trees and forest plantations

1. Tree husbandry and stand management protocols for diverse land management regimes
2. Site quality and stand density management
3. Seed and Nursery technology of trees

2. Agroforestry systems and practices

1. Functional and structural dynamics, socio-economic attributes of tropical home gardens, other agroforestry systems and practices

3. Genetic improvement of commercial forest species

1. Genetic and biotechnological tools and testing
2. Tree improvement trials
3. Tree Genetic Resources

4. Wood technology

1. Wood structure, variation and identification
2. Wood quality assessment
3. Wood preservation and seasoning
4. Wood composites and improved wood

5. Utilization of timber and NTFP

1. Extraction, processing, value addition, storage and marketing of timber and NTFP