EXTENDED LECTURE OUTLINE

AGR 321 Farming Systems, Organic Farming and Precision Agriculture (2+1)

Theory:

1. **Farming System:** Definition, meaning,scope and importance, classification of farming systems, factors affecting types and systems of farming system,components of farming system,Integrated farming system: Definitions, principles, objectives, components and allied enterprises in farming system,advantages of IFS, IFS Models for dry, wet, wastelands, coastal and hilly areas and other agro climatic zones. Resource use efficiency, recycling, optimization techniques and flow of energy in different systems.
2. **Cropping system;**Cropping system and cropping pattern,types of cropping systems, sole cropping, mono cropping, sequential cropping, relay and ratoon cropping, multi-storied cropping, filler and inter planting in orchards; Multiple cropping, inter cropping; principles of intercropping, types of intercropping; row, mixed, strip, parallel intercropping. Additive and replacement series of intercropping, advantages and disadvantages of intercropping. Crop rotation, principles and advantages of crop rotation. Allelopathy, annidation in space and time dimension, legume effect, sorghum effect, cotton effect. Assessment of multiple cropping advantages; LER, RCC, CI, Aggressivity, competition index, multiple cropping index, cropping intensity index, diversity, ATER, rotational intensity, crop equivalent yield, Gross returns, Net returns and B:C ratio. Delineation of efficient cropping zones based on relative yield index (RYI) and relative spread index (RSI).
3. **Organic Farming:** definitions (USDA, Limpkin), objectives, characteristics, concepts, principles, components, scope, relevance of organic farming in the present day context; Organic production requirement, permitted, restricted and prohibited inputs in organic farming. Advantages and disadvantages of organic farming. Initiatives taken by State and Central Government, NGO and other organizations for promotion of organic Agriculture. Steps involved in conversion of conventional to organic farming, Sources of Organic manure, traditional and non-traditional additives in organic farming, bulky organic manures, Green manures and concentrated organic manure. Non chemical management of weeds: cultural, biological and Allelo chemicals in weed management. Biological management of pests and diseases in organic farming.Quality considerations, certificate, accreditation, labeling, marketing and export potential of organic products. Operational structure of NPOP.

4. **Sustainable agriculture:** definitions, objectives concepts, assessments of SVI, SYI, Sustainable agriculture practices –natural farming, Alternative farming, re-generative farming, biological farming, Integrated farming, Zero chemical farming, biodynamic farming humus farming sewage and sludge farming, permaculture, difference between organic farming and natural farming, conservation agriculture: definition and principles, LEISA, LEIA, HEIA, GAP (Good agronomic practices) and their techniques for sustainability.
5. **Precision Agriculture:** Definition, scope and advantages of precision agriculture,components of Precision agriculture - Global Positioning Systems (GPS), Geographic Information System (GIS), Site specific nutrient management (SSNM) for nutrient and irrigation management practices. Comparative yield, quality and farm profits under SSNM/VRT (variable rate technology) practices.

Practical:

1. Visit to organic farms and outlets to study the various components and their utilization
2. Visit to IFS models in different agro-climatic zones of near by institutes and farmers field
3. Methods of compost preparation and its quality analysis
4. Vermicompost preparation and its quality analysis
5. Preparation of enriched compost and its quality analysis
6. Bio-fertilizers and their utilization
7. Study of green manures and their quality analysis
8. Indigenous technology knowledge (ITK) for nutrient management
9. Indigenous technology knowledge (ITK) for insect, pest and disease management
10. Indigenous technology knowledge (ITK) for weed management
11. Cost of organic production system
12. Post-harvest management
13. Processing, Certification And Accreditation In Organic Farming
14. Farm Records And Book Keeping