Multi-Disciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	Marks			Pre-requisite
							CIE	SEE	Total	
2501AE02	Crop Production and Protection Technologies	FC	3	0	1	4	50	50	100	-
2501AE09	Farming Based Livelihood Systems	FC	2	0	1	3	50	50	100	-
2501AE24	Entrepreneurship Development and Business Management	IC	2	0	1	3	50	50	100	-
	Total		7	0	3	10				

Crop Production and Protection Technologies

Semester: I	L	T	P	C
Course Code: 2501AE02	3	0	1	4

Course Outcomes:
At the end of the Course, Student will be able to:

- **CO1:** Apply agronomic principles, crop management techniques, and sustainable farming practices.
- **CO2:** Explain soil-water-plant relationships, crop water requirements, weed management, and various cropping systems.
- **CO3:** Demonstrate soil formation, classification, physical and chemical properties, nutrient availability, soil fertility, and irrigation water quality.
- **CO4:** Explain essential plant nutrients, deficiency symptoms, inorganic fertilizers, soil reactions, sodic soil reclamation, and liquid fertilizer properties.
- **CO5:** Demonstrate horticultural crop types, propagation methods, planting techniques, orchard management, and pest and disease control.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	3	2	1	-	-	-	-	-	1	-	-
CO2	2	3	2	-	-	-	-	-	1	-	-
CO3	3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	2	3	-	-	-	-	-	-	-
CO5	3	2	3	2	-	2	-	-	1	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2	PSO3
CO1	-	-	3
CO2	-	-	3
CO3	-	-	3
CO4	-	-	3
CO5	-	-	3

UNIT - I

Introduction to Agronomy
Introduction and scope of agronomy; Classification of crops; Effect of different weather parameters on crop growth and development; Principles of tillage, tilth and its characteristics; Crop seasons; Time and method of sowing of major field crops, seed rate for important crops; Methods and time of application of manures and fertilizers, fertigation; Basic principles of natural farming, organic farming and sustainable agriculture.

Practice:
1. Identification of crops and their varieties of seeds.
2. Study of different fertilizer application methods.

UNIT - II

Agricultural Practices and Soil Management
Soil-water-plant relationship, crop coefficients, water requirement of crops and critical stages for irrigation; Weeds and their management in crops; Crop rotation, cropping systems, cropping scheme, relay cropping, mixed cropping and intercropping. Quality of irrigation water.

Practice:
1. Determination of bulk density, particle density and porosity of soil.
2. Study of weed control methods.

UNIT - III

Soil Science and Fertility
Soil forming processes; Classification and composition of soil, soil taxonomy orders; Important soil physical properties and their importance; soil particle distribution; soil inorganic colloids- their composition, properties and origin of charge; ion exchange in soil and nutrient availability; soil organic matter- its composition and decomposition, effect on soil fertility; Soil reaction - acidic, saline and sodic soils.

Practice:
1. Identification of rocks and minerals.
2. Study of soil profile in the field.

UNIT – IV

Plant Nutrition
Essential plants nutrients- their functions and deficiency symptoms in plants; Important inorganic fertilizers and their reactions in soils; Gypsum requirement for reclamation of sodic soils and neutralizing RSC; Liquid fertilizers and their solubility and compatibility.

Practice:
1. Identification of nutrient deficiency symptoms of crops in the field.
2. Determination of gypsum requirement of sodic soils.

UNIT – V

Horticultural Practices
Types of horticultural crops; Sowing and planting times and methods; Seed rate and seed treatment for vegetable crops; Macro and micropropagation methods; Types of plant growing structures; Pruning and training; Water requirements and critical stages; Management of orchard; Major pests and diseases of horticultural crops and their management.

Practice:
1. Study of different garden tools.
2. Preparation of nursery bed.
3. Practices of pruning and training in some important fruit crops.

4. Study of cultural operations for vegetable crops (sowing, fertilizer application, mulching, irrigation and weed control).

Text Books:

1. Reddy S R. 2020. Principles of Agronomy. Kalyani Publisher. ISBN: 978-9327297942.
2. Biswas T. D., and Mukharjee S. K. A text book of soil science. Tata McGraw-Hill publishing Co. Ltd. ISBN: 9780074517855.
3. Ahamad S, Anwar Ali and Sharma P K (Eds.). 2018. Plant disease management in Horticultural crops. Daya Publishing House, Delhi. ISBN: 9789388173229.

Reference Books:

1. Brady N C and Ray R Weill. The nature and properties of soil. Pearson Education Inc. New Delhi. ISBN: 9780130167637.
2. Chadha K L. Hand Book of Horticulture. ICAR Publication, New Delhi. ISBN No: 9788171640614.

Web Links:

1. http://ecoursesonline.iasri.res.in/Courses/Introduction%20to%20Soil%20Science/SSAC121/Start%20to%20read%20the%20Course.html
2. http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Agronomy%20&%20agrcltrl%20Meteorology/AGRO101/Start%20to%20read%20the%20Course.html

Farming Based Livelihood Systems

Semester: II	L	T	P	C
Course Code: 2501AE09	2	0	1	3

Course Outcomes:
At the end of the Course, Student will be able to:

- **CO1:** Outline the status of agriculture in India, income patterns of farmers and rural people, and livelihood concepts and indicators in urban and rural areas.
- **CO2:** Comprehend agricultural livelihood systems, farming systems, and prevalent farming systems in India that contribute to livelihood.
- **CO3:** Analyze different traditional and modern farming systems, their components, and the integration of various enterprises for livelihood.
- **CO4:** Evaluate the feasibility of different farming systems for various agro-climatic zones, and study commercial farming-based livelihood models and case studies.
- **CO5:** Assess the risk and success factors in farming-based livelihood systems, government schemes and programs

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	-	-	-	-	-	3	-	-	3	-	3
CO2	-	-	-	-	-	2	-	-	2	-	2
CO3	-	-	-	-	-	2	-	-	2	-	2
CO4	-	-	-	-	-	2	-	-	-	-	-
CO5	-	-	-	-	-	2	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2	PSO3
CO1	-	1	2
CO2	-	1	2
CO3	-	1	2
CO4	-	1	2
CO5	-	1	2

UNIT – I

Agriculture and Livelihoods in India: Status, Income, and Patterns
Status of agriculture in India and different states, Income of farmers and rural people in India, Livelihood-Definition, concept and livelihood pattern in urban & rural areas, Different indicators to study livelihood systems.

Practice:
1. Analysis of Agricultural Productivity
2. Survey on Farmer Income.

UNIT – II

Agricultural Livelihood Systems: Framework and Farming Systems in India
Agricultural livelihood systems (ALS): Meaning, approach, approaches and framework, Definition of farming systems and farming based livelihood systems Prevalent Farming systems in India contributing to livelihood.

Practice:
1. Survey of farming systems and agricultural based livelihood enterprises.

UNIT – III

Traditional and Modern Farming Systems: Components and Livelihood Integration
Types of traditional & modern farming systems. Components of farming system/ farming-based livelihood systems- Crops and cropping systems, Livestock, (Dairy, Piggery, Goatry, Poultry, Duckry etc.), Horticultural crops, Agro -forestry systems, Aqua culture Duck/Poultry cum Fish, Dairy cum Fish, Piggery cum Fish etc., small, medium and large enterprises including value chains and secondary enterprises as livelihood components for farmers, Factors affecting integration of various enterprises of farming for livelihood.

Practice:
1. Study of components of important farming based livelihood models/ systems in different agro-climatic zones.
2. Study of production and profitability of crop based, livestock based, processing based and integrated farming based livelihood models.
3. Field visit of innovative farming system models.
4. Visit of Agri-based enterprises & their functional aspects for integration of production, processing & distribution sectors.

UNIT – IV

Agro-climatic Feasibility and Commercial Farming Models for Livelihoods
Feasibility of different farming systems for different agro-climatic zones, Commercial farming-based livelihood models by NABARD, ICAR and other organizations across the country, Case studies on different livelihood enterprises associated with the farming.

Practice:
1. Study of agri-enterprises involved in industry and service sectors(Value Chain Models),
2. Learning about concept of project formulation on farmingbased livelihood systems along with cost & profit analysis,
3. Case study of Start-Ups in agri-sectors.

UNIT – V

Risk and Success Factors in Farming-Based Livelihood Systems: Government Schemes, Circular Economy, and Digitalization
Risk & success factors in farming-based livelihood systems, schemes & programmes by Central & State Government, Public & Private organizations involved in promotion of farming-based livelihood opportunities. Role of farming-based livelihood enterprises in 21st

Century in view of circular economy, green economy, climate change, digitalization & changing life style.

Practice:

1. Study of schemes & programmes by central & state government.
2. Study the impact of Climate Change on Farming Livelihoods.

Text Books:

2. Towards Green Villages: A Strategy for Environmentally Sound and Participatory Rural Development, Agarwal A. and Narain S., 1st Edition, Centre for Science and Environment, New Delhi, India, ISBN: 9788185040480.
3. Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World, Dixon J., Gulliver A., and Gibbon D., 1st Edition, FAO & World Bank, Rome, ISBN: 9789251046277.

Reference Books:

1. Farming System and Sustainable Agriculture, Reddy S. R., 2nd Edition, Kalyani Publishers, New Delhi, ISBN: 9789327223524.
2. Farming System and Sustainable Agriculture, Walia S. S. and Walia U. S., 1st Edition, Scientific Publishers, Jodhpur, Rajasthan, ISBN: 9788194312033

Web Links:

1. https://www.slideshare.net/slideshow/farming-based-livelihood-systems-2-1-theory-note/274649851
2. http://www.fmtcndl.iari.res.in/Division/UGcourse/124.pdf

Entrepreneurship Development and Business Management

Semester: IV	L	T	P	C
Course Code: 2501AE24	2	0	1	3

Course Outcomes: At the end of the Course, Student will be able to:

CO1: Identify and explain the motivational, social, and environmental factors influencing the development of entrepreneurship.

CO2: Explain the concept and need for environmental scanning in entrepreneurship and its role in opportunity identification.

CO3: Analyse the sequential steps involved in the functioning and establishment of an enterprise.

CO4: Prepare a viable project report by applying enterprise planning and production management principles.

CO5: Apply personal, financial, marketing, and crisis management techniques for effective entrepreneurial venture management.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	2	2				2		2			
CO2	2	3		2			2				
CO3	2	3	2								2
CO4	2	3	3		2				2	2	3
CO5		2	3		2	2		2	3	3	3

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2	PSO3
CO1	1	-	1
CO2	1	-	1
CO3	1	-	1
CO4	1	-	1
CO5	1	-	1

UNIT – I

Development of Entrepreneurship

Development of entrepreneurship, motivational factors, social factors, environmental factors, characteristics of entrepreneurs, entrepreneurial attributes/competencies. Concept, need for and importance of entrepreneurial development. Evolution of entrepreneurship, objectives of entrepreneurial activities, types of entrepreneurs, functions of entrepreneurs, importance of entrepreneurial development, and process of entrepreneurship development.

Practice:

1. Initiation and Preparation of project proposal for funding by different agencies.

UNIT – II

Environment scanning and opportunity

Environment scanning and opportunity identification need for scanning-spotting of opportunity-scanning of environment- identification of product / service - starting a project; factors influencing sensing the opportunities. Infrastructure and support systems- good policies, schemes for entrepreneurship development.

Practice:

1. Visit to small scale industries/agro-industries

UNIT – III

Role of financial institutions

Role of financial institutions, and other agencies in entrepreneurship development. Steps involved in functioning of an enterprise. Selection of the product / services, selection of form of ownership; registration, selection of site, capital sources, acquisition of manufacturing know how, packaging and distribution.

Practice:

1. Interaction with successful entrepreneurs/ Agric- entrepreneurs.

UNIT – IV

Planning of an Enterprise

Planning of an enterprise, project identification, selection, and formulation of project; project report preparation, Enterprise Management. Production management - product, levels of products, product mix, quality control, cost of production, production controls, Material management. Production management - raw material costing, inventory control.

Practice:

1. Visit to financial institutions and support agencies

UNIT – V

Personal Management

Personal management - manpower planning, labour turn over, wages / salaries. Financial management /accounting - funds, fixed capital and working capital, costing and pricing, long term planning and short-term planning, bookkeeping, journal, ledger, subsidiary books, annual financial statement, taxation. Marketing management, market types, marketing assistance, market strategies. Crisis management- raw material, production, leadership, market, finance, natural etc.

Practice:

1. Project report submission

Text Books:

1. Charantimath P.M. Entrepreneurship Development and Small Business Enterprises. Pearson Publications, New Delhi. ISBN: 978-9353066260.
2. Desai V. Entrepreneurship: Development and Management, Himalaya Publishing House. ISBN: 978-93-5299-133-4.

Reference Books:

1. Singhal R.K. Entrepreneurship Development & Management, Katson Books. ISBN: 978-81-89757-00-7.
2. Tripathi P C & Reddy P N. Principles of Management. Tata McGraw Hill. ISBN-13. 978-9354600630.

Web Links:

1. https://archive.nptel.ac.in/courses/110/106/110106141/
2. https://ocw.mit.edu/courses/15-351-managing-innovation-and-entrepreneurship-spring-2008/resources/03_lec/