Course Curriculum of Second Semester

as per the ICAR - Sixth Deans' Committee Report for the Academic Programmes in

AGRI. BUSINESS MANAGEMENT

- UG-Certificate in Agri. Business Management
- UG-Diploma in Agri. Business Management
- UG-Degree: B.Sc. (Hons.) Agri. Business Management

Mahatma Phule Krishi Vidyapeeth, Rahuri

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli

Maharashtra Agricultural Universities Examination Board, Pune

Compiled & Submitted by

Dr. V.A. Shinde

Professor of Agril. Economics, MPKV, Rahuri.

UG Degree Syllabus State Coordinator

with

UG Degree Syllabus Discipline Coordinators &

DICC - UG Degree Syllabus Core Committee

Submitted to the

Directors of Instruction Coordination Committee

~ w.e.f. AY, 2024-25 ~

Course Layout

B.Sc.(Hons.) Agri. Business Management

Semester: II (New) ***w.e.f.*** **Academic Year: 2024-25**

Sr. No.	Course No.	Course Title	Credit Hrs.	Remark (if any)
1.	**AEC-123**	National Service Scheme-II (NSS-II)/ National Cadet Corps-II (NCC-II)	1(0+1)	--
2.	**AEC-124**	Personality Development	2(1+1)	--
3.	**VAC-121**	Environmental Studies and Disaster Management	3(2+1)	--
4.	**ECON-122**	Farm Management, Production and Resource Economics	3(2+1)	--
5.	**ECON-123**	Agricultural Finance and Insurance	2(1+1)	--
6.	**MKT-121**	Marketing of Agricultural Inputs and Outputs	2(1+1)	--
7.	**ENTO-121**	Management of Insect Pests of Crops and Stored Grains	2(1+1)	--
8.	**SST-121**	Principles and Practices of Seed Science and Technology	2(1+1)	--
9.	**AHDS-121**	Livestock, Poultry and Fish Production Management	2(1+1)	--
10.	**SEC-123**	Skill Enhancement Course-III[#] (*To be offered from the list of SEC Courses*)	2(0+2)	--
11.	**SEC-124**	Skill Enhancement Course-IV[#] (*To be offered from the list of SEC Courses*)	2(0+2)	--
		Total Credits Hrs.	**23(10+13)**	**G**
AEC: Ability Enhancement Course, **MDC**: Multidisciplinary Course, **SEC**: Skill Enhancement Course, **VAC**: Value Added Course, **G**: Gradial				
Post-II Semester (Only for Exit option for award of UG-Certificate)				
12.	**INT-121**	Internship (10Weeks)	10(0+10)	--

Semester	**: II**		
Course No.	**: AEC-123**	**Credit Hrs.**	**: 1(0+1)**
Course Title	**: National Service Scheme-II (NSS-II)/ National Cadet Corps-II (NCC-II)**		
Gradial Common Course across all UG Degrees			

Course No.: AEC-123	**Course Title: National Service Scheme-II (NSS-II)**	**Credit Hrs.:1(0+1)**

SYLLABUS

Objectives :

(i) To evoke social consciousness among students through various activities viz., working together, constructive and creative social work,

(ii) To be skillful in executing democratic leadership, developing skill in program,

(iii) To be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

PRACTICAL

Importance and role of youth leadership. Meaning, types and traits of leadership, qualities of good leaders; Importance and roles of youth leadership, Life competencies. Definition and importance of life competencies, Problem-solving and Decision-making, Interpersonal communication. Youth development programs Development of youth programs and policy at the national level, state level and voluntary sector; Youth-focused and youth-led organizations Health, hygiene and sanitation. Definition Needs and Scope of health education; Role of food, nutrition, safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan) for health; National health programs and reproductive health. Youth health, lifestyle, HIV-AIDS and first aid. Healthy lifestyles, HIV-AIDS, drugs and substance abuse, home nursing and first aid. Youth and yoga. History, philosophy, concept, myths and misconceptions about yoga; Yoga traditions and its impacts, Yoga as a tool for healthy lifestyle, preventive and curative method.

TEACHING SCHEDULE

PRACTICAL [AEC-123/ NSS-II]

Exercise No.	Title	Sub-topics
1	**Orientation on NSS**	Introduction to NSS, its Objectives, History and Role in Community service.
2	**Youth Leadership**	Discuss the importance and role of youth leadership, types and traits of leadership and qualities of Good Leaders.
3	**Life Competencies**	Understanding life competencies, their importance and Practical exercises in problem-solving and decision-making.
4	**Interpersonal Communication**	Practice exercises to improve interpersonal communication skills, Focusing on active listening and effective communication.
5	**Youth Development Programs**	Overview of youth development programs, Policies at national and state levels and Understanding Youth-led Organizations.
6	**Health, Hygiene, and Sanitation**	Practical activities on the importance of hygiene and sanitation, including Swachh Bharat Abhiyan tasks.
7	**Nutrition and Health Education**	Discuss the role of food, nutrition, and safe drinking water in health; Explore the impact of waterborne diseases.
8	**National Health Programs**	Introduction to key national health programs and their roles in promoting public health and awareness on reproductive health.
9	**Youth Health and Lifestyle**	Sessions on healthy lifestyle choices including exercise, balanced diet and stress management.
10	**HIV/AIDS Awareness**	Educational activities on HIV/AIDS, its prevention, and reducing stigma; Awareness on reproductive health.
11	**Substance Abuse Awareness**	Discussing the dangers of drug and substance abuse, its impact on health and practical ways to prevent addiction.
12	**First Aid and Home Nursing**	Hands-on training in first aid techniques including handling injuries, CPR basics and home nursing care.
13	**Introduction to Yoga**	Introduction to the History, Philosophy and various Traditions of Yoga as a Holistic health practice.
14	**Yoga Practice**	Practical Yoga Sessions focusing on Asanas, Pranayama and Meditation for a healthy lifestyle.
15	**Yoga as Preventive and Curative Tool**	Understanding and Practicing Yoga as a preventive and curative approach for physical and mental health.
16	**Reflection on NSS and Youth Development**	Group Discussion and Reflection on the role of NSS in community building and personal growth, Focusing on youth leadership.

Course No.: AEC-123	Course Title: National Cadet Corps-II (NCC-II)	Credit Hrs.: 1(0+1)

SYLLABUS

Objectives : (i) To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizen,

(ii) To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

PRACTICAL

Arms Drill- Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms. Shoulder from the order and vice-versa, present from the order and vice-versa. Saluting at the shoulder at the halt and on the march. Short/long trail from the order and vice- versa. Guard mounting, guard of honor, Platoon/Coy Drill. Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning, and sight setting. Loading, cocking, and unloading. The lying position and holding. Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing. Characteristics of Carbine and LMG. Introduction to map, scales, and conventional signs. Topographical forms and technical terms. The grid system. Relief, contours, and gradients. Cardinal points and finding north. Types of bearings and use of service protractor. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map. Knots and lashings, Camouflage and concealment, Explosives and IEDs. Field defenses obstacles, mines and mine lying. Bridging, waterman ship. Field water supplies, tracks and their construction. Judging distance. Description of ground and indication of landmarks. Recognition and description of target. Observation and concealment. Field signals. Section formations. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill. Types of communication, media, latest trends and developments.

TEACHING SCHEDULE

PRACTICAL (AEC-123/ NCC-II)

Exercise No.	Title	Sub-topics
1	**Basic Arms Drill**	Attention, stand at ease, stand easy, getting on parade, dismissing and falling out.
2	**Advanced Arms Drill**	Ground/take up arms, examine arms, shoulder from the order and vice versa.
3	**Saluting with Arms**	Saluting at the shoulder both at a halt and while on the march.
4	**Rifle Handling Techniques**	Short/long trail from the order and vice versa, guard mounting and guard of honor procedures.
5	**Platoon and Company Drill**	Practice and demonstration of platoon and company drill formations.
6	**Rifle Characteristics and Handling**	Characteristics of rifles (.22/.303/SLR), ammunition, firepower, and basic care, cleaning, and sight setting.
7	**Rifle Operations and Safety**	Loading, cocking, unloading, safety procedures; lying position, trigger control, and firing a shot.
8	**Range Procedures and Target Practice**	Range procedures, aiming, sight alteration, theory of groups, snap shooting, and firing at moving targets.
9	**Map Reading Basics**	Introduction to maps, scales, conventional signs, topographical forms, and the grid system.
10	**Advanced Map Skills**	Relief, contours, gradients, cardinal points, bearings, and use of the service protractor.
11	**Field Navigation with Compass**	Use of prismatic compass, setting a map, finding north, positioning, map-to-ground, and ground-to-map.
12	**Field Engineering Skills**	Knots and lashings, camouflage, handling explosives, IEDs, field defenses, obstacles, and mines.
13	**Watermanship and Field Water Supplies**	Bridging techniques, field water supplies, track construction, and distance judgment.
14	**Target Recognition and Indication**	Identifying and describing targets, observing, concealment, field signals, and indication of landmarks.
15	**Section Battle Drills and Movement**	Section formations, fire control orders, fire and movement, movement with/without arms, section battle drill.
16	**Communication Skills and Modern Trends**	Types of communication, media and latest trends in NCC communication.

Semester	**:**	**II**		
Course No.	**:**	**AEC-124**	**Credit Hrs.**	**: 2(1+1)**
Course Title	**:**	**Personality Development**		
Gradial Common Course across all UG Degrees **except B.Tec. (Agricultural Engineering) and B.Tec. (Food Technology)**				

SYLLABUS

Objective: To make students realize their potential strengths and cultivate their inter-personal skills and improve employability.

THEORY

Personality: Definition, Nature of personality, Theories of personality and its types. The humanistic approach - Maslow's self-actualization theory, Shaping of personality, Determinants of personality, Myers-Briggs Typology Indicator, Locus of control and performance, Type A and Type B Behaviours, Personality and Organizational Behaviour. Foundations of individual behavior and Factors influencing individual behavior, Models of individual behavior, Perception and Attributes; Factors affecting perception, Attribution theory and Case studies on Perception and Attribution. Learning: Meaning and Definition, Theories and Principles of Learning, Learning and Organizational behavior, Learning and Training, Learning feedback. Attitude and Values, Intelligence- Types of Intelligence, Theories of intelligence, Measurements of intelligence, Factors influencing intelligence, Intelligence and Organizational behavior, Emotional intelligence. Motivation- Theories and Principles, Teamwork and Group dynamics.

PRACTICAL

MBTI personality analysis, Learning Styles and Strategies, Motivational needs, Firo-B, Interpersonal Communication, Teamwork and team building, Group Dynamics, Win-win game, Conflict management, Leadership styles, Case studies on Personality and Organizational Behavior.

TEACHING SCHEDULE

THEORY [AEC-124]

Lecture No.	Topic	Sub-topics/Key Points	Weightage (%)
1	**Personality**	Definition, Nature of Personality	5
2	**Theories of Personality and its Types**	The Humanistic Approach- Maslow's self-actualization theory; Types- Extroversion, Introversion, Conscientiousness, Agreeableness	10
3		Shaping of Personality - improving communication skills, stepping out of comfort zone, learning to say no, tapping into creativity, getting curious, giving yourself a daily affirmation, practicing self-care. Determinants of Personality- Physical, Intellectual, Social and Psychological	10
4		Myers- Briggs Typology indicator Four Indicators- Introvert/ Extrovert, Thinking/ Feeling, Sensing/ Intuiting, Judging/ Perception, Locus of Control and Performance	10
5		Type A and Type B Behaviours Theory	5
6	**Personality and Organizational Behaviours**	Difference between Personality and Organizational behaviours	5
7		Foundations of individual behaviours, Factors influencing individual behaviour- Personality, Values, Motivation, Perspectives and Social impacts	5
8		Models of Individual Behaviour- Rational Economic man, Social man, The Self actuating man, Complex man	5
9	**Perception**	Attributes and Factors affecting perception; Attribution theory and Case studies on Perception and Attribution	10
10	**Learning**	Meaning, Definition; Theories and Principles of Learning	10
11		Difference between Learning and Organizational behavior; Difference between Learning and Training; Feedback of Learning	5
12	**Attitude and Values**	Meaning, Definitions, Concept	5
13	**Intelligence**	Types of Intelligence, Theories of intelligence	
14		Measurement of intelligence Factors affecting intelligence Difference between intelligence and organizational behaviour, Emotional intelligence	5
15	**Motivation**	Meaning, Theories and Principles	5
16	**Team and Group Dynamics**	Meaning, Definitions, Concept	5
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [AEC-124]

Exercise No.	Exercise Topic
1	Myers- Briggs Type Indicator (MBTI) analysis- Extroversion/ Introversion
2	Myers- Briggs Type Indicator (MBTI) analysis- Sensing/ Intuition
3	Myers- Briggs Type Indicator (MBTI) analysis- Thinking/ Feeling
4	Myers- Briggs Type Indicator (MBTI) analysis- Judging/ Perception
5	Learning Styles and Strategies
6	Motivational Needs
7	Fundamental Interpersonal Relations Orientation Behaviour (FIRO-B)
8	Interpersonal Communication
9	Team Work
10	Team Building
11	Group Dynamics
12	Win-Win Game
13	Conflict Management
14	Leadership Styles
15	Case studies on Personality
16	Case studies on Organizational Behaviour

Suggested Readings [AEC-124]:

1. Andrews, Sudhir, 1988, How to Succeed at Interviews. 21st(rep.) New Delhi. Tata - McGraw Hill.
2. Heller, Robert, 2002, Effective Leadership. Essential Manager Series. DK Publishing.
3. Hindle, Tim, 2003, Reducing Stress. Essential Manager Series. DK Publishing.
4. Kumar, Pravesh, 2005, All about Self- Motivation. New Delhi. Goodwill Publishing House.
5. Lucas, Stephen, 2001, Art of Public Speaking. New Delhi. Tata - McGraw Hill.
6. Mile, D.J., 2004, Power of Positive Thinking. Delhi. Rohan Book Company.
7. Smith, B., 2004, Body Language. Delhi: Rohan Book Company.
8. Shaffer, D. R., 2009, Social and Personality Development (6thedn). Belmont, CA:Wadswo.

Semester	**:**	**II**	
Course No.	**:**	**VAC-121**	**Credit Hrs. : 3(2+1)**
Course Title	**:**	**Environmental Studies and Disaster Management**	
Gradial Common Course across all UG Degrees			

SYLLABUS

Objectives : (i) To expose and acquire the knowledge on the environment,
(ii) To gain the state-of-the-art skill and expertise on management of disasters.

THEORY

Introduction to Environment - Environmental studies - Definition, scope and importance - Multidisciplinary nature of Environmental Studies - Segments of Environment - Spheres of Earth - Lithosphere - Hydrosphere - Atmosphere - Different layers of atmosphere. Natural Resources: Classification - Forest resources. Water resources. Mineral resources, Food resources. Energy resources. Land resources. Soil resources. Ecosystems - Concept of an ecosystem - Structure and function of an ecosystem - Energy flow in the ecosystem. Types of Ecosystems. Biodiversity and its conservation: Introduction, Definition, Types. Bio geographical Classification of India. Importance and Value of Biodiversity. Biodiversity Hotspots. Threats and Conservation of Biodiversity. Environmental Pollution: Definition, Cause, Effects and Control measures of: (a) Air pollution. (b) Water pollution. (c) Soil pollution. (d) Marine pollution. (e) Noise pollution. (f) Thermal pollution. (g) Light pollution. Solid Waste Management: Classification of solid wastes and management methods, Composting, Incineration, Pyrolysis, Biogas production, Causes, Effects and Control measures of urban and industrial wastes. Social Issues and the Environment: Urban problems related to energy. Water conservation, Rain water harvesting, Watershed management. Environmental Ethics: Issues and possible solutions, Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear accidents and Holocaust. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Human Population and the Environment: Environment and Human Health: Human Rights, Value Education. Women and Child Welfare. Role of Information Technology in Environment and Human health. Disaster Management - Disaster: Definition - Types - Natural Disasters: Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, heat and cold waves. Man-made Disasters - Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, road accidents, rail accidents, air accidents, sea accidents. International and National strategy for disaster reduction. Concept of disaster management, National disaster management framework; Financial arrangements; Role of NGOs, Community-based organizations and media in disaster management. Central, state, district and local administration in disaster control; Armed Forces in disaster response; Police and other organizations in disaster management.

PRACTICAL

Visit to a local area to document environmental assets river/forest/grassland/hill/mountain. Energy: Biogas production from organic wastes. Visit to wind mill/hydro power/solar power generation units. Biodiversity assessment in farming system. Floral and faunal diversity assessment in polluted and un polluted system. Visit to local polluted site-Urban/Rural/Industrial/Agricultural to study of common plants, insects and birds. Environmental sampling and preservation. Water quality analysis: pH, EC and TDS. Estimation of Acidity, Alkalinity. Estimation of water hardness. Estimation of DO and BOD in water samples. Estimation of COD in water samples. Enumeration of *E. coli* in water sample. Assessment of Suspended Particulate Matter (SPM). Study of simple ecosystems – Visit to pond/river/hills. Visit to areas affected by natural disaster.

TEACHING SCHEDULE

THEORY [VAC-121]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Introduction to Environmental Studies	Definition, Scope and Importance; Multidisciplinary nature	4
2	Segments of Environment	Spheres of Earth - Lithosphere, Hydrosphere, Atmosphere and Different Layers of Atmosphere.	4
3-5	Natural Resources	Classification of resources; Forest, water, mineral, food, energy, land, and soil resources	10
6-7	Concept of an Ecosystem	Concept, Structure, Function and Energy flow in ecosystems	5
8-9	Types of Ecosystems	Terrestrial, Aquatic, Agroecosystems, Forest ecosystems and Human-modified ecosystems	5
10-12	Biodiversity and its Conservation	Importance, Value, Types, Biogeographical classification, Hotspots, Threats, Conservation strategies	8
13-16	Environmental Pollution	Definition, Causes, Effects, Control measures: Air, Water, Soil, Marine, Noise, Thermal and Light pollution	12
17-18	Solid Waste Management	Classification of solid wastes; Management methods like, Composting, Incineration, Pyrolysis, Biogas production	6
19	Urban and Industrial waste	Causes, Effects and Control measures of Urban and Industrial waste	4
20	Social Issues Related to the Environment	Urban energy problems, Water conservation, Rainwater harvesting, Watershed management	4
21-22	Environmental Ethics	Issues, Possible solutions, Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear accidents and Holocaust.	6

Continued…

23	Environment Protection Laws	Environment Protection Act, Air and Water (Pollution) Acts, Wildlife Protection Act, Forest Conservation Act	4
24 - 25	Human Population and Environment	Environment and human health, Human rights, Value education, Women and child welfare, Role of IT in environment and health	5
26 - 28	Introduction to Disaster Management	Definition, Types of natural and man-made disasters; Floods, Droughts, Cyclones, Earthquakes, Landslides, Fires	10
29 - 30	Disaster Management Framework	National and International strategies, disaster response framework, Financial arrangements, Role of NGOs and media	5
31	Central and Local Administration in Disasters	Role of Central, State, District and Local Administrations; Coordination in disaster response	4
32	Disaster Response Organizations	Central, State, District and Local Administrations in Disaster Control; Role of Armed Forces, Police and Other organizations in disaster response &control	4
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [VAC-121]

Exercise No.	Exercise Title
1	Visit to a local area to document environmental assets: River/ Forest/ Grassland/ Hill/ Mountain.
2	Visit to Biogas production, Windmill, Hydro/Solar power generation units
3	To assess floral and faunal diversity in farming systems.
4	Assessment of biodiversity in farming system.
5	Floral and faunal diversity assessment in polluted and unpolluted system.
6	Visit to Local Polluted Site - Urban/Rural/Industrial/Agricultural to study the common plants, insects and birds. Environmental sampling and preservation.
7	Water quality analysis: pH and electrical conductivity (EC) in water samples.
8	Estimation of total dissolved solids (TDS) in water samples
9	Estimation of acidity and alkalinity in water samples.
10	Estimation of water hardness in water samples.
11	Determination of dissolved oxygen (DO) and biological oxygen demand (BOD) in water samples.
12	Performing COD estimation on water samples.
13	Enumeration of *E. coli* in water samples to check for contamination.
14	Assessment of Suspended Particulate Matter (SPM) in an environmental sample.
15	Study of simple ecosystem – Visit to Pond/ River/ Hills.
16	Visit to areas affected by natural disaster.

Suggested Readings (VAC-121):

1. **De, A.K. 2010.** Environmental Chemistry. Published by New Age International Publishers, New Delhi. ISBN:139788122426175. 384 pp.
2. **Dhar Chakrabarti, P.G. 2011.** Disaster Management - India's Risk Management Policy Frameworks and Key Challenges. Published by Centre for Social Markets (India), Bangaluru. 36 pp.
3. **Erach Bharucha,** Text Book for Environmental Studies. University Grants Commission, New Delhi.
4. **Parthiban, K.T., Vennila, S., Prasanthrajan, M. and Umesh Kanna, S. 2023.** Forest, Environment, Biodiversity and Sustainable development. Narendra Publishing House, New Delhi, India.
5. **Prasanthrajan, M. and Mahendran, P.P. 2008.** A Text Book on Ecology and Environmental Science. 1st Edn. ISBN 8183211046. Agrotech Publishing Academy, Udaipur - 313 002.
6. **Prasanthrajan, M. 2018.** Objective Environmental Studies and Disaster Management, ISBN 9789387893825. Scientific Publishers, Jodhpur, India. 146 pp.
7. **Sharma, P.D. 2009**. Ecology and Environment, Rastogi Publications, Meerut, India.
8. **Tyler Miller and Scot Spoolman. 2009.** Living in the Environment (Concepts, Connections, and Solutions). Brooks/Cole, Cengage Learning Publication, Belmont, USA.

Semester	**:**	**II**	
Course No.	**:**	**ECON-122**	**Credit Hrs. : 3(2+1)**
Course Title	**:**	**Farm Management, Production and Resource Economics**	

SYLLABUS

Objectives: (i) To understand the principles of farm management and resource allocation in Agriculture,

(ii) To analyze production economics to optimize resource use and maximize profitability on farms,

(iii) To learn about farm-level decision-making processes, including crop selection, input use and technology adoption,

(iv) To explore the economic aspects of resource management including land, labor, capital and risk in agricultural enterprises.

THEORY

Farm Management: Meaning, Definitions and Concepts of Farm management: Nature and Scope, Objectives and Relationship with other Sciences, Decisions making process; Meaning and Definition of Farms sizes based on holding and ownership, Types of farming and their characteristics, Factors determining types and size of farms.

Production Economics and Farm Management Principles: Meaning, Definition of Production Economics, Concept of production function and its types, Use of production function in decision making on a farm, Factor-product, Factor-factor and Product-product relationship. Law of equi-marginal returns or Principles of opportunity cost and Law of comparative advantage; Cost principle: Meaning and Concept of costs, Types of costs- seven costs and applied cost concepts, and their interrelationship, Importance of cost in managing farm business; Farm records: Types and importance of farm records and accounts in managing a farm; Farm planning and Budgeting: Meaning and Importance of farm planning and budgeting, Partial and complete budgeting, Steps in farm planning and budgeting, Risk and uncertainty: Concept of risk and uncertainty in agriculture production, types/sources of risks and their management strategies.

Resource Economics: Meaning of Resource Economics, Difference between NRE and Agricultural Economics, Unique properties of natural resources, Positive and negative externalities in Agriculture, Inefficiency and welfare loss, Solutions, Management of common property resources of land, water, pasture, fishery and forest resource.

PRACTICAL

Basic concepts in Production Economics and Farm Management; Study and visit to different farm layouts and appraisals of farm resources; Computation of depreciation cost of farm assets; Determination of most profitable level of input use in a farm production process; Determination of least cost combination of inputs; Selection of most profitable enterprise combination; Application of equi-marginal returns/ Opportunity cost principle in allocation of farm resources; Application of the Principle of comparative advantage; Estimation of cost and returns using CACP cost concepts for crop, horticulture and livestock enterprises; Farm inventory analysis; Preparation of optimum farm plan using budgeting technique, using partial and complete budgeting; Visit to farms to study farm records and accounts; Preparation of profit and loss accounts compensation for crop loss; Collection and analysis of data on various resources in India; Review towards Practical Examination.

TEACHING SCHEDULE

THEORY [ECON-122]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1-2	Farm Management	Meaning, Definition, Nature, Scope and Concepts of Farm Management	5
3-4		Objectives and Relationship with other Sciences, Decision making process	5
5	Types and Size of Farms	Meaning and Definition of Farms sizes- based on holding and ownership,	4
6-7		Types of Farming and their characteristics; Factors determining types and size of farms	6
8-9	Production Economics	Production Economics and Farm Management Principles: Meaning, Definition of Production Economics	4
10-11	Production Function	Concept of production function and its types, Use of production function in decision making on a farm	6
12		Factor-Product relationship	5
13		Factor- Factor relationship	5
14		Product- Product relationship	5
15-16	Laws; Principles and Concepts in Production Economics	Law of Equi-marginal Returns and Principles of Opportunity Cost	6
17		Law of Comparative Advantage	4
18-19		Cost Principle: Meaning and Concept of costs, Types of costs- Seven costs	6
20-21		Applied Cost Concepts and their interrelationship, Importance of cost in managing farm business	6

Continued….

22-23	Farm Records	Types and importance of farm records and accounts in managing a farm	6
24-25	Farm Planning and Budgeting	Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting	6
26-27	Risk and Uncertainty	Concept of risk and uncertainty in agriculture production, types/ sources of risks and their management strategies	6
28	Resource Economics	Meaning of resource economics, difference between NRE and agricultural economics,	5
29-30		Unique properties of natural resources, positive and negative externalities in agriculture, inefficiency and welfare loss, solutions	5
31-32		Management of common property resources of land, water, pasture, fishery and forest resource.	5
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [ECON-122]

Exercise No.	Exercise Title
1	Study and visit to different farm layouts and appraisals of farm resources.
2	Computation of depreciation cost of farm assets.
3	Determination of most profitable level of input use in a farm production process.
4	Determination of least cost combination of inputs.
5	Selection of most profitable enterprise combination.
6	Application of law of equi-marginal returns.
7	Application of opportunity cost principle in allocation of farm resources.
8	Application of the principle of comparative advantage.
9-10	Estimation of cost and returns using CACP cost concepts for crop, horticulture and livestock enterprises.
11	Farm inventory analysis.
12-13	Preparation of optimum farm plan using budgeting technique, using partial and complete budgeting.
14	Visit to farms to study farm records and accounts.
15	Preparation of profit and loss accounts compensation for crop loss.
16	Collection and analysis of data on various resources in India.

Suggested Readings [ECON-122]:

1. **Chinna, S.S. 2017.** Agricultural Economics and Indian Agriculture, Kalyani Publishers.
2. **Heady, E.O. and Dhillon, J.L. 1961.** Agricultural Production Functions, Ames: Iowa State University Press.
3. **Jhon, P. Doll and Frank Orezen, 1992.** Production Economics: Theory with Applications, Krieger Publishing Company.
4. **Johl, S.S. and Kapoor, T.R.,** Fundamentals of Farm Business Management, Kalyani Publishers.
5. **Memoria, C.B. 1972.** Agricultural Problems of India, Publisher, Kitab Mahal
6. **Raju, V.T. and D.V.S. Rao, 2017.** Economics of Farm Production and Management, CBS Publishers and Distributors.
7. **Sadhu and Singh, 2022.** Fundamentals of Agricultural Economics, Himalaya Pub.
8. **Sankhyan, P.L. 1988.** Introduction to Economics of Agricultural Production, Prentice-Hall of India.
9. **Subba Reddy *et. al.,* 2006.** Agricultural Economics, Oxford and IBH Publishing.
10. **Spinger.,** Natural Resource Management and Policy.

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Semester	**:**	**II**	
Course No.	**:**	**ECON-123**	**Credit Hrs. : 2(1+1)**
Course Title	**:**	**Agricultural Finance and Insurance**	

SYLLABUS

Objectives :

(i) To understand the principles of agricultural finance including credit, investment and risk management,

(ii) To learn about financial tools and services available to farmers, including loans, grants and insurance,

(iii) To explore the role of insurance in mitigating agricultural risks such as, crop failure, weather events and market fluctuations,

(iv) To develop skills to analyze financial statements, assess investment opportunities and make informed financial decisions in Agriculture.

THEORY

Agriculture Finance: Meaning, Definition, Nature and Scope. Agriculture Credit: Meaning, Definition, Importance and Classification based on various criteria. Credit Analysis: 3 R's, 5 C's and 7 P's of credit, Repayment Plan, Financial Statements: Meaning, Types and Uses, Time Value of Money/ Principle of Time Comparison: Meaning and Importance. History of Financing Agriculture in India. Nationalization of Banks: Meaning and Objectives, Village Adoption Scheme: Origin and Objectives, Lead Bank Scheme: Origin and Functions, Regional Rural Banks: Origin, Objectives and Features, Micro Financial Institutions: Meaning and Features, Self Help Group (SHGs): Meaning and Features. Scale of Finance and Security for Loan, Banking Schemes for Agricultural Finance: Differential Rate of Interest (DIR) Scheme: Origin and Features, Kisan Credit Card Scheme: Origin, Objectives and Features, Financial Inclusion: Jan Dhan Yojana, Financial literacy and business correspondent model. NPAs in Agricultural lending, Applicability of the SARFESI Act in agricultural lending. Financial Agencies: RBI - Activities and Functions, NABARD - Genesis, Objectives and Functions, AFC - Functions, ADB and World Bank - Origin and Functions, IMF, IFC, and IDA. Deposit Insurance and Credit Guarantee Corporation of India (DICGC) - Origin and Functions. e-Payment systems - The Banking Ombudsman Scheme - Non-Banking Financial Institutions (NBFI) - Meaning and Structure, Types of activities of NBFIs - Merchant banking in India - Functions - Mutual Funds - Features and Structure - Credit rating agencies in India, Process - Factoring mechanism - Forfeiting services. Insurance: Meaning and Definition, Crop Insurance Scheme - Origin, Meaning, Importance and advantage of crop insurance, Comprehensive Crop Insurance Scheme (CCIS), National Agricultural Insurance Scheme (NAIS), Modified National Agricultural Insurance Scheme (MNAIS), and Weather-based Crop Insurance and *Fasal Bhima Yojana* and Unified Package Insurance Scheme (UPIS). Assessment of crop losses, determination of compensation, limitation in application and estimation of crop yields, Livestock insurance - Origin, meaning and importance.

PRACTICAL

Exercise on Time Value of Money - Compounding and Discounting. Estimation of credit needs for crop and livestock enterprises. Determination of scale of financial for farm enterprises, Repayment plans for long term-loans. Estimation of risk in crop and livestock enterprises. Estimation of premium amount for insurance. Visits to financial inclusion branch of Commercial Bank and Regional Rural Bank and Insurance Agency in Public and Private sectors. Visits to Weather Station.

TEACHING SCHEDULE

THEORY [ECON-123]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Agriculture Finance	Meaning, Definition, Nature and Scope	4
	Agriculture Credit	Meaning, Definition, Importance and Classification based on various criteria.	6
2	Credit Analysis and Repayment Plan	3 Rs, 5 Cs and 7 Ps of Credit	6
		Different types of Repayment Plan	4
3	Financial Statements	Meaning, Types and Uses	6
4	Time Value of Money	Meaning and Importance	3
5	History of Financing Agriculture in India	Agriculture credit system in India	4
	Nationalization of Banks	Meaning and Objectives	4
6	Village Adoption Scheme	Origin and Objectives	2
	Lead Bank Scheme	Origin and Functions	3
7	Regional Rural Banks	Origin, Objectives and Features	4
8	Micro Financial Institutions	Meaning and Features	2
	Self Help Groups (SHGs)	Meaning and Features	4
	Scale of Finance and Security for Loan	Meaning, Security for loan, Factors influencing scale of finance, How scale of finance is fixed.	4
9	Banking Schemes for Agricultural Finance	Differential Rate of Interest (DIR) Scheme: Origin and Features	2
10	Kisan Credit Card Scheme	Origin, Objectives and Features	4

Continued…

11	Financial Inclusion	Jan Dhan Yojana, Financial Literacy and Business Correspondent Model	4
	NPAs in Agricultural Lending	Applicability of the SARFESI Act in Agricultural Lending.	2
12	Financial Agencies	RBI - Activities and Functions, NABARD - Genesis, Objectives and Functions, AFC - Functions, ADB and World Bank - Origin and functions, IMF, IFC, and IDA, Deposit Insurance and Credit Guarantee Corporation of India (DICGC) - Origin and functions	10
13	e-Payment Systems	The Banking Ombudsman Scheme - Non-Banking Financial Institutions (NBFI) - Meaning and Structure, Types of activities of NBFIs -Merchant Banking in India - Functions	6
	Mutual Funds and Credit Rating	Mutual Funds – Features and Structure Credit Rating Agencies in India, Process - Factoring Mechanism - Forfeiting Services.	4
14	Insurance and Crop Insurance Scheme	Insurance: Meaning and Definition, Crop Insurance Scheme: Meaning and Definition, Origin, Importance and Advantage of Crop Insurance, Comprehensive Crop Insurance Scheme (CCIS), National Agricultural Insurance Scheme (NAIS), Modified National Agricultural Insurance Scheme (MNAIS) and Weather-based Crop Insurance and *Fasal Bhima Yojana* and Unified Package Insurance Scheme (UPIS)	8
15	Assessment of Crop Losses	Determination of Compensation, Limitation in application and estimation of crop yields	2
16	Livestock Insurance	Origin, Meaning and Importance	2
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [ECON-123]

Exercise No.	Exercise Title
1	Exercise on Time Value of money – Compounding.
2	Exercise on Time Value of money – Discounting.
3	Estimation of credit need for crop enterprise.
4	Estimation of credit need for livestock enterprise.
5	Determination of scale of finance for farm enterprises.
6	Repayment plan for long-term loans.
7	Estimation of risk in crop enterprises.
8	Estimation of risk in livestock enterprises.
9	Estimation of premium amount for insurance.
10	To study e-Payment systems.
11-12	Visit to Financial Inclusion Branch of Commercial Bank and Regional Rural Bank.
13-14	Visit to Insurance Agency in public and private sectors.
15-16	Visit to Weather Station.

Suggested Readings [ECON-123]:

1. **Agarwal, R.N. 1996.** Financial Liberalization in India- A Study of Banking System and Stock Markets.
2. **Bagchi, A.K. 1987.** The Evolution of the State Bank of India (Part I and II).
3. **Bhasin, Niti, 2007.** Banking and Financial Markets in India 1947 to 2007.
4. **Desai, D.K. and Tambad, S.B. 1973.** Farm Finance by a Commercial Bank.
5. **Gulati, Ashok and Seema, Bathla, 2002.** Institutional Credit to Indian Agriculture: Defaults and Policy Options. NABARD Occasional Paper-23.
6. **Karthykeyan, T.K. 1990.** Long-term Financing of Agriculture Land Development Banks in a Multi-Agency System.
7. **Vaishali Gholap *et al.*** Agriculture Finance and Insurance, Universal Prakashan, Pune.
8. **Mathur, B.L. 1989.** Indian Banking- Performance, Problems and Challenges.
9. **Mishra, R.K. 2005.** Banking Sector Reforms and Agricultural Finance.
10. **Murray, William, G., 1947.** Agricultural Finance- Principles and Practices of Farm Credit.
11. **Nakkiran, S. 1980.** Agricultural Financing and Rural Banking in India- An Evaluation.
12. **Pandey, U.K. 1990.** An Introduction to Agricultural Finance.
13. **Subba Reddy, S. and Raghuram P. 2005.** Agricultural Finance and Management.

Semester	**:**	**II**		
Course No.	**:**	**MKT-121**	**Credit Hrs.**	**: 2(1+1)**
Course Title	**:**	**Marketing of Agricultural Inputs and Outputs**		

SYLLABUS

Objectives :

(i) To understand the principles of Agricultural Marketing, including input and output markets,

(ii) To learn about marketing strategies and techniques for Agricultural inputs and products,

(iii) To explore pricing mechanisms, market structures and distribution channels in the Agricultural sector,

(iv) To develop skills to effectively market Agricultural inputs and outputs, maximizing profitability for farmers and stakeholders.

THEORY

Agricultural Marketing- Definition, Scope and Classification of Agricultural Marketing; Agricultural Input Marketing - Meaning and Importance; Agricultural Inputs and their types - Farm and non-farm, Role of cooperative, public and private sectors in Agri-input marketing. Seed Marketing: Importance, Types of seeds, Demand and Supply of seeds; Agencies involved in Seed Marketing; distribution, export-import of seeds; Role of NSC and State Seed Corporation. Government policy on Seed Marketing. Fertilizer Marketing: Production, export-import, supply of chemical fertilizers. Demand/ consumption, regional disparity in consumption, pricing policy; subsidy on fertilizers; marketing system - marketing channels, Agencies involved in fertilizer marketing- Public, Private, Co-operative sectors. Problems in distribution. Plant Protection Chemicals: Production, export-import, consumption, marketing channels. Electricity/ Diesel Oil distribution, pricing of electricity for agriculture use; subsidy on electricity. Farm Machinery and Implement: Production, supply, demand, distribution channels of farm machines; Agencies involved in distribution of agro-machineries and implements. Meaning and importance of Land reforms and tenancy in agriculture, ceiling, elasticity, pricing. Labour markets - Productivity, heterogeneity, wage differentials - Skill differentials. Credit: importance, types and sources. IT applications in Agri-input marketing.

PRACTICAL

Input Market Analysis, Primary and Secondary Survey of input use, Exercise on Market Segmentation, Case Study on Product Management, Channel Management in Agri-input, Case Study on Brand Management. Designing Communication and Promotion Measures - Seed, Designing Communication and Promotion Measures – Fertilizer, Designing Communication and Promotion Measures - Plant Protection Chemicals, Designing Communication and Promotion Measures - Agricultural Machinery and Implements. Market Research - Seed, Market Research - Fertilizer, Market Research - Plant Protection Chemicals, Market Research - Agricultural Machinery and Implements. Formulation of Marketing Strategy, Report Presentations.

TEACHING SCHEDULE

THEORY [MKT-121]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	**Agricultural Marketing**	Definition, Scope and Classification of Agricultural Marketing.	5
2	**Agricultural Input Marketing**	Meaning and Importance, Agricultural Inputs and their types - Farm and Non-farm, Role of Co-operative, Public and Private sectors in Agri-input marketing. E-commerce in Agri-inputs, Integration of AI & Big Data in Market Intelligence for Input Distribution	10
3-4	**Seed Marketing**	Seed Marketing: Importance, Role of quality seeds in Agricultural productivity & Food security; Seed marketing as a critical agribusiness component Impact of hybrid, GMOs & bio-fortified seeds on Indian agriculture. Types of seeds, Demand and supply of seeds; Major Seed-Producing Regions, factors influencing demand: Climate, Government schemes, cropping patterns Seed supply challenges: Poor storage, counterfeit seeds, price fluctuations, Agencies involved in Seed marketing; distribution, Export-import of seeds; Role of NSC and State Seed Corporation. Government policy on seed marketing. Regulations: ISTA (International Seed Testing Association), PPV&FRA (Protection of Plant Varieties and Farmers' Rights Act), National Seed Policy; 2002, Seed Bill, 2020; Government Schemes: Rashtriya Krishi Vikas Yojana (RKVY), Seed Village Program.	15
5-6	**Fertilizer Marketing**	Production, Export-Import, Major Fertilizer-Consuming States, Crop-Based Consumption Patterns, Shift towards Customized Fertilizers (Nano-Urea, Liquid Biofertilizers), Supply of chemical fertilizers. Demand/ Consumption, Regional disparity in consumption, Pricing policy; Subsidy on fertilizers; Marketing system - Marketing channels, Agencies involved in fertilizer marketing - Public, Private, Co-operative sectors. Problems in distribution.	15

Continued…

7-8	**Plant Protection Chemicals**	Plant Protection Chemicals: Production, Export-import, consumption, Marketing Channels for Pesticides, Herbicides, and Bio-Pesticides, Role of Agrochemical Companies, Dealers, and Retailers, Regulations and Issues: Counterfeit Pesticides, Environmental & Health Concerns, Recent Trends and Future Scope: Shift towards Organic and Bio-Pesticides due to Sustainable Agriculture Initiatives, Bans on Certain Chemical Pesticides and Impact on Farmers	15
9-10	**Electricity/ Agricultural Power Supply**	Electricity/ Diesel Oil distribution, pricing of electricity for agriculture use; subsidy on electricity. Subsidies on Agricultural Power Supply and Impact on Farmer Productivity, Government Reforms and Policy Changes in Energy Use for Agriculture Recent Trends and Future Scope: Adoption of Solar-Powered Irrigation Pumps, Energy Efficiency and Smart Grid Solutions for Rural Agriculture	10
11-12	**Farm Machinery and Implement**	Farm Machinery and Implement: Production, supply, demand, distribution channels of farm machines; Role of Dealers, Cooperatives, and Government Schemes, Agencies involved in distribution of agro-machineries and implements. Growth of Custom Hiring Centres (CHCs) & Mechanization Startups in Farm Mechanization	10
13-14	**Land Reforms**	Meaning and Importance of Land Reforms and Tenancy in Agriculture, Ceiling, Ceiling on Landholding and its Impact on Farm Size and Efficiency, elasticity, pricing.	10
15	**Labour Markets**	Labour Markets - Productivity, Heterogeneity, Wage differentials - Skill differentials. Agricultural Labour Market: Productivity Issues, Future of Farm Labour: Mechanization Vs. Rural Employment, Recent Trends and Future Scope: Rise of Agri-Contracting and Farm Labour Agencies, Impact of MGNREGA and Other Employment Schemes on Agricultural Labour	5
16	**Credit**	Credit: Importance, Types and Sources. IT applications in Agri-input marketing; Fintech innovations in Agri-Financing (Examples: Pay Agri, Samunnati, Jai Kisan, Agri-Bazaar Credit), Digital Credit & Blockchain-based Agri-Loans.	5
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [MKT-121]

Exercise No.	Exercise Title
1	Input Market Analysis - Conduct a Comparative Study on Input Market Trends Visit to Local Input Dealers, Cooperatives or Agri-business firms and analyze: a) Market demand and supply trends b) Price fluctuations over the past 3 years c) Major players and their market share d) Challenges faced by input suppliers
2	Primary and Secondary Survey of input use - Field Survey on Farmer Input Use Patterns: Conduct a survey with 10-15 farmers on: a) Types of inputs used (seed varieties, fertilizers, pesticides, machinery) b) Decision-making factors (brand loyalty, pricing, availability) c) Challenges faced in procurement
3	Exercise on Market Segmentation - Identify Market Segments for a Specific Agri-Input Products: a) Choose an Agri-input product (hybrid seeds/bio-fertilizers/organic pesticides), b) Segment the market based on: (i) Geographic segmentation (rural vs. urban, irrigated vs. dry-land areas) (ii) Demographic segmentation (smallholder vs. commercial farmers) (iii) Behavioural segmentation (brand-loyal vs. price-sensitive buyers)
4	Case Study on Product Management- Analyze the Success of a Popular Agri-Input Products: a) Select a successful Agri-product (Examples: Pioneer Hybrid Seeds, Tata Rallis Pesticides, IFFCO Fertilizers). b) Study about: (i) Product development process. (ii) Unique features and differentiation. (iii) Marketing and distribution strategy. (iv) Challenges and future scope. (v) SWOT Analysis
5	Channel Management in Agri input- Map the Distribution Channels for an Agri-Input Company: a) Select a company (Example: UPL, Syngenta, Mahindra Agri Solutions, etc.). b) Study its distribution network: (i) Direct sales vs. Distributor network. (ii) Role of retailers and cooperatives. (iii) Challenges in logistics and supply chain.

Continued…

6	Case Study on Brand Management- Analyze the Branding Strategy of an Agri-Input Company: a) Choose a well-branded Agri-input products (Examples: Mahindra Tractors, Kribhco Fertilizers, Advanta Seeds etc.) b) Evaluate: (i) Brand positioning and messaging (ii) Advertising and promotional campaigns (iii) Consumer perception and loyalty
7	Designing Communication and Promotion Measures – Create a Promotional Campaign for Seed: • Develop a promotion strategy including- (i) Target audience and messaging (ii) Advertisement (social media, print, TV, farmers' fairs) (iii) Sales promotions (discounts, demo trials, farmer training) (iv) Role of digital marketing in rural markets
8	Designing Communication and Promotion Measures – Fertilizer: Create a Promotional Campaign for Fertilizer- • Develop a promotion strategy including: (i) Target audience and messaging (ii) Advertisement (social media, print, TV, farmers' fairs) (iii) Sales promotions (discounts, demo trials, farmer training) (iv) Role of digital marketing in rural markets
9	Designing Communication and Promotion Measures - Plant Protection Chemicals: Create a Promotional Campaign for Plant Protection Chemicals - • Develop a promotion strategy including: (i) Target audience and messaging (ii) Advertisement (social media, print, TV, farmers' fairs) (iii) Sales promotions (discounts, demo trials, farmer training) (iv) Role of digital marketing in rural markets
10	Designing Communication and Promotion Measures - Agricultural Machinery and Implements: Create a Promotional Campaign for Agricultural Machinery and Implements. • Develop a promotion strategy including: (i) Target audience and messaging (ii) Advertisement (social media, print, TV, farmers' fairs) (iii) Sales promotions (discounts, demo trials, farmer training) (iv) Role of digital marketing in rural markets
11	Market Research- Seed: Conduct a Market Research Survey on Seed- • Collect data from: (i) Farmers (usage patterns, preferences) (ii) Retailers (sales trends, brand popularity) (iii) Competitors (market share, pricing strategies)

Continued…

12	Market Research- Fertilizer: Conduct a Market Research Survey on Fertilizer- • Collect data from: (i) Farmers (usage patterns, preferences) (ii) Retailers (sales trends, brand popularity) (iii) Competitors (market share, pricing strategies)
13	Market Research- Plant Protection Chemicals: Conduct a Market Research Survey on Plant Protection Chemicals- • Collect data from: (i) Farmers (usage patterns, preferences) (ii) Retailers (sales trends, brand popularity) (iii) Competitors (market share, pricing strategies)
14	Market Research- Agricultural Machinery and Implements: Conduct a Market Research Survey on Agricultural Machinery and Implements- • Collect data from: (i) Farmers (usage patterns, preferences) (ii) Retailers (sales trends, brand popularity) (iii) Competitors (market share, pricing strategies)
15	Formulation of Marketing Strategy: Develop a Marketing Strategy for a New Agri-input Product • Imagine launching a new product (e.g. Organic fertilizer, Smart irrigation system) • Prepare a detailed strategy covering: (i) Market segmentation and positioning (ii) Branding and packaging (iii) Pricing and distribution (iv) Promotional campaigns
16	Report Presentations: Final Report and Group Presentation: • Prepare and present findings from all assignments

Suggested Readings [MKT-121]:

1. **Acharya, S.S. and Agarwal, N.L. 2004.** Agricultural Marketing in India, Oxford and IBH Agricultural Economics, Kalyani Publications.
2. **Ruddra Dutt and Sundharam K.P.M.,** Indian Economics, S. Chand and Company Ltd.
3. **Memoria, C.B. and Joshi, R.L. 1975.** Principles and Practice of Marketing in India. Publisher, Kitab Mahal.
4. Relevant e-Books.

Semester	**:**	**II**		
Course No.	**:**	**ENTO-121**	**Credit Hrs.** **:**	**2(1+1)**
Course Title	**:**	**Management of Insect Pests of Crops and Stored Grains**		

SYLLABUS

Objectives :

(i) To understand the Biology, Ecology and Behaviour of insect pests affecting crops and stored grains,

(ii) To learn the effective strategies for monitoring, prevention and control of insect pests in agricultural settings,

(iii) To explore Integrated Pest Management (IPM) approaches, including biological, cultural and chemical control methods,

(iv) To develop skills to assess and minimize economic losses caused by insect pests while promoting sustainable agriculture practices.

THEORY

General account on nature and types of damage by different arthropods pests i.e. Scientific name, distribution, biology, nature of damage and management of insect pests of: ~

Cereals: Rice - Paddy stem borer, Green leaf hopper, Brown plant hopper, Gall midge, Paddy grasshopper, Blue beetle, Caseworm, Armyworm, Gundhi bug, Hispa, Leaf folder; Sorghum - Shoot fly, Stem borer, Aphids, Earhead midge; Maize - Shoot fly, Stem borer, Armyworm.; Bajra - Shoot fly, Blister beetle; Wheat - Stem borer, Aphids, Termites.

Pulses: Pigeon pea, Chickpea, Pea, Pigeon pea - Pod borer, Plume moth, Pod fly, Spotted pod borer, Leaf Webber, Mites; Chickpea - Gram pod borer; Pea - Aphids, Blue butterfly, Pod borer.

Oilseeds: Groundnut - Leaf miner, Hairy caterpillar, Aphids, Thrips, White grub; Sunflower - Capitulum borer, Hairy caterpillar, Jassids, Thrips, Whitefly, Stem borer; Mustard - Aphids, Sawfly; Soybean -Stem fly, Girdle beetle, Leaf miner, Tobacco leaf eating caterpillar, Whitefly, Semilooper, Gram pod borer; Sesamum - Til hawk moth, Gall fly.

Fiber and Cash crops: Cotton - Aphids, Jassids, Thrips, Whitefly, Mealybugs, Spotted bollworm, American bollworm, Pink bollworm, Tobacco leaf eating caterpillar, Red cotton bug, Dusky cotton bug

Sugarcane - Early shoot borer, Internode borer, Top shoot borer, Whitefly, Pyrilla, Woolly aphids, Mealybug, Scale insect, Termites, White grub.

Horticultural crops: Citrus- Lemon butterfly, Blackfly, Leaf miner, Fruit sucking moth, (*Eudocima fullonica* C, *E. maternal* L. *Achoeajanata* L.), Citrus psylla, Citrus aphids, Scale insects; Mango - Mango stemborer, Mango stone weevil, Mango fruit fly, Mealybugs, Mango hoppers, Shoot borer, Thrips; Grapevine – Flea beetle/ Udadya beetle, Thrips, Stem Girdler, Mealy bug; Guava - Fruit fly, Spiraling white fly, Bark eating caterpillar, Fruit Borers - (*Congethes (Dichocrocis) punctiferalis)*, Mealybug; Banana - Rootstock weevil/ Rhizome weevil, Pseudo stem borer, Aphids, Tingid or Lacewing bug; Sapota-Chiku moth/ Sapota Leaf Webber, Sapota seed borer, Fruit fly, Bud borer; Pomegranate- Anar caterpillar, Fruit sucking moth *(Eudocima fullonica, Eudocima materna*, *Achoea janata L.*,) Thrips, Shot hole borer, Bark eating caterpillar, Mealy bug; Brinjal – Brinjal shoot and fruit borer, Jassids/ leaf hopper,

Aphids, White fly, Red Spider Mites, Hadda Beetle; Okra – Shoot and fruit borer, Leafhoppers, Aphids, White fly, Red Spider Mite; Tomato – Fruit borer, Leaf miner - *Liriomyza* and *Tutaabsoluta*, Aphids, Thrips, White fly, Mites; Chilli - Thrips, Fruit borer (*Helicoverpa*), Mites; Cruciferous crops: Cauliflower, Cabbage: Diamond back moth, Aphids, Cabbage butterfly, Leaf eating caterpillar, Head borer.

Non-insect pests of above crops - Mites, Rats and Birds.

Stored Grain Pests: Biology and damage of Primary and Secondary pests.

Primary stored grain pests - Internal feeders - Rice weevil, lesser grain borer, pulse beetle and Angoumois grain moth. External feeders – Khapra beetle, Indian meal moth.

Secondary stored grain pests - Rust red flour beetle, Saw toothed grain beetle, Long headed beetle. Primary and Secondary stored grain pests - Rice moth.

Non insect pests, mites, rodents, birds and their management. Preventive and curative methods of stored grain pests. Fundamental principles of grain store management.

PRACTICAL

Identification of different types of damage. Identification and study of lifecycle and seasonal history of various insect pests attacking crops and their produce in following crops:

Field crops: Cereals - Rice, Sorghum, Maize, Bajra, Wheat.

Pulses-Pigeon pea, Chickpea, Pea.

Oilseeds: Groundnut, Sunflower, Mustard, Soybean, Sesamum.

Fibre: Cotton,

Sugar crop: Sugarcane.

Horticultural pests - Crops like, Citrus, Mango, Grapevine, Pomegranate, Guava, Sapota, Banana, Brinjal, Okra, Tomato, Chilli;

Cruciferous crops: Cauliflower, Cabbage;

Non-insect pests of field crops.

Stored grain pests. Non-insect pests: mites, rodents, birds and their management.

Preventive and curative methods of stored grain pests. Fundamental principles of grain store management. Visit to the nearest FCI Godowns and Warehouses.

TEACHING SCHEDULE

THEORY [ENTO-121]

Lecture No.	Topic with Subtopics/ Key Points	Weightage (%)
Scientific name, Distribution, Biology, Nature of damage and Management of following Crop-Insect Pests:		
Cereals:		15
1	Rice - Paddy stem borer, Green leaf hopper, Brown plant hopper, Gall midge, Paddy grasshopper, Blue beetle, Caseworm, Armyworm, Gundhi bug, Hispa, Leaf folder	
2	Sorghum - Shoot fly, Stem borer, Aphids, Earhead midge Bajra - Shoot fly, Blister beetle	
3	Maize - Shoot fly, Stem borer, Armyworm	
	Wheat - Stem borer, Aphids, Termites,	
Pulses:		10
4	Pigeon pea - Pod borer, Plume moth, Pod fly, Spotted pod borer, Leaf webber, Mites	
5	Chickpea - Gram pod borer	
	Pea - Aphids, Blue butterfly, Pod borer	
Oilseeds:		10
6-7	Groundnut - Leaf miner, Hairy caterpillar, Aphids, Thrips, White grub Sunflower - Capitulum borer, Hairy caterpillar, Jassids, Thrips, Whitefly, Stem borer	
8	Mustard - Aphids, Sawfly	
	Soybean – Stem fly, Girdle beetle, Leaf miner, Tobacco leaf eating caterpillar, Whitefly, Semilooper, Gram pod borer	
	Sesamum - Til hawk moth, Gall fly	
9-11	**Fiber and Cash crops**:	15
	Cotton - Aphids, Jassids, Thrips, Whitefly, Mealy bugs, Spotted bollworm, American bollworm, Pink bollworm, Tobacco leaf eating caterpillar, Red cotton bug, Dusky cotton bug	
	Sugar crops:	
	Sugarcane - Early shoot borer, Internode borer, Top shoot borer, Whitefly, Pyrilla, Woolly aphids, Mealy bug, Scale insect, Termites, White grub.	
Horticultural crops:		20
12	Citrus: - Lemon butterfly, Black fly, Leaf miner, Fruit sucking moth (*Eudocima fullonica*, *E. maternal, Achoea janata* L.), Citrus psylla, Citrus aphids, Scale insects	
13	Mango: - Mango stem borer, Mango stone weevil, Mango fruit fly, Mealy bugs, Mango hoppers, Shoot borer, Thrips,	
14	Grapevine: - Flea beetle/ Udadya beetle, Thrips, Stem girdler, Mealy bug	
	Guava: - Fruit fly, Spiraling white fly, Bark eating caterpillar, Fruit borers-[*Congethes (Dichocrocis) punctiferalis*], Mealy bug.	

Continued…

15	Banana:- Root stock weevil/ Rhizome weevil, Pseudo stem borer, Aphids, Tingid or Lacewing bug.	
	Sapota:- Chiku moth/ Sapota leaf webber, Sapota seed borer, Fruit fly, Bud borer.	
	Pomegranate:- Anar caterpillar, Fruit sucking moth *(Eudocima fullonica, Eudocima materna*, *Achoea janata* L.,) Thrips, Shot hole borer, Bark eating caterpillar, Mealy bug.	
16	Brinjal:- Brinjal shoot and fruit borer, Jassids/ leaf hopper, Aphids, White fly, Red spider mites, Hadda beetle; Okra:- Shoot and fruit borer, Leaf hoppers, Aphids, White fly, Red Spider Mite.	20
17	Tomato:- Fruit borer, Leaf miner- *Lirio myza* and *Tuta absoluta,* Aphids, Thrips, White Fly, Mites; Chilli:- Thrips, Fruit borer (*Helicoverpa*), Mites.	
18	**Cruciferous crops (Cauliflower, Cabbage):-** Diamond back moth, Aphids, Cabbage butterfly, Leaf eating caterpillar, Head borer	
	Non-insect pests of above crops - Crabs, Birds, Snails and Slugs, Millepedes, Mites, Rats and Squirrels	
19	**Stored grain pests- Biology & damage of Primary and Secondary pests:** • Primary stored grain pests: Internal feeders - Rice weevil, Lesser grain borer, Pulse beetle and Angoumois grain moth External feeders - Khapra beetle, Indian meal moth • Secondary store grain pests: Rust red flour beetle, Saw-toothed grain beetle, Long headed beetle • Primary and Secondary stored grain pest – Rice moth	10
20	Preventive and curative methods of stored grain pests; Fundamental principles of grain store management.	
	Total =	**100**

TEACHING SCHEDULE

PRACTICAL [ENTO-121]

Exercise No.	Exercise Title
Identification of different types of damage. Identification and study of lifecycle and seasonal history of various insect and other pests and their produce in following crops:	
1	Major insect pests of Rice
2	Sorghum
3	Maize, Bajra and Wheat
4	Pigeon pea, Chickpea and Pea
5	Groundnut, Sunflower and Mustard
6	Soybean and Sesamum
7	Cotton and Sugarcane
8	Citrus and Mango
9	Grapevine, Guava and Banana
10	Sapota and Pomegranate
11	Brinjal, Okra, Tomato and Chilli
12	Cauliflower and Cabbage
13	Non-insect pests of field crops and their management
14	Stored grain pests
15	Preventive and curative methods of stored grain pests and Fundamental principles of grain store management
16	Visit to nearest FCI Godowns and Warehouses/ Assignment/ Case study.

Suggested Readings [ENTO-121]:

1. **A.S. Atwal and G.S. Dhaliwal,** Agricultural Pests of South Asia and their Management.
2. **B.V. David and V.V. Rammurthy,** Elements of Economic Entomology.
3. **Manishekharan and Sudarrajan,** Pest Management in Field Crops.
4. **Pedigo L.P.,** Entomology and Pest Management.
5. **Venu Gopal Rao,** Insect Pest Management.
6. **B.P. Khare,** Storage Entomology.

Semester	**:**	**II**		
Course No.	**:**	**SST-121**	**Credit Hrs. :**	**2(1+1)**
Course Title	**:**	**Principles and Practices of Seed Science and Technology**		

SYLLABUS

Objectives :

(i) To understand the principles of Seed Science, including Seed development, Physiology and Quality,

(ii) To learn about seed processing, storage and testing techniques used to maintain seed viability and vigour,

(iii) To explore the role of Seed Technology in ensuring the availability of high-quality seeds for sustainable crop production,

(iv) To develop skills to manage seed resources effectively ensuring the successful establishment and productivity of crops.

THEORY

Introduction: Importance of improved seed in Indian Agriculture, quality seeds and its characteristics. History: Development of seed industry in India. Seed Program: Types of seed program, Development of seed program, Basic strategy for organizing seed production, Different classes of seeds, Generation system of seed multiplication, Seed Replacement Rate (SRR), Varietal Replacement Rate (VRR), Agencies involved in seed program. Principles of Seed Production: Factors affecting genetic purity and varietal deterioration, Methods/ Safeguards to maintain genetic purity during seed production, Study of improved production practices for higher seed yield and quality. Economic Principles: Study of SMR, importance of SMR, SMR in different crops. Hybrid Seed Production: Requirements of hybrid seed production, Methods of hybrid seed production and types of hybrids. Varietal and hybrid seed production (Foundation and Certified seed classes) in maize, rice, sorghum, bajra, sunflower, red gram, cotton, castor, chilli, tomato and okra. Varietal seed production in wheat, soybean, chickpea, black gram. Seed Processing and Packaging: Seed processing-its importance and methods seed packaging and seed branding. Seed Testing: Seed testing procedures in different crops, minimum seed standards for certification. Seed storage, Different types of storage conditions. Seed legislation: Seeds Act 1966, Seed Rules 1968, Seed (Control) Order 1983, New policy on Seed Development 1988, PPVFRA 2001, Seeds Bill 2004, OECD Seed Certification and its importance. Seed Marketing: Seed demand forecasting, Factors affecting seed marketing, Seed supply systems, Sale promotional activities for seed marketing, Seed marketing organizational structures. International seed trade, Developing seed entrepreneurship. Importance of account keeping in seed business. Cost estimation and pricing of seed.

PRACTICAL

Identification of seeds of Field and Horticultural crops, Study of seed structure in monocot and dicot seeds. Study of Floral Biology of important self, cross and often cross-pollinated Agriculture and Horticulture crops. Working of SRR, VRR and SMR Types of isolation, Determination of isolation distance, Requirements, Study of isolation requirements in different crops for foundation and certified seeds. Study of hand emasculation, hand pollination and detasseling techniques. Study of distinguishing morphological characters in varieties and parents of hybrids. Study of synchronization techniques for hybrid seed production, planting ratio. Supplementary pollination techniques, Border rows for hybrids seed production. Study of seed cleaning and grading technique and equipment. Seed packing and seed treatment techniques. Practicing seed testing in different crops seeds. Vigour tests in different crop seed lots. Studying of safe seed storage techniques. Working out cost of seed production, seed pricing. Account keeping books. Visit to seed production plots of public and private sector companies. Visit to seed production organization to understand account keeping and working of seed prices in seed business.

TEACHING SCHEDULE

THEORY [SST-121]

Lecture No.	Topic	Sub-topics/ Key points	Weightage (%)
1	**Introduction and History**	Importance of improved seed in Indian Agriculture, Quality seeds and its characteristics. Development of Seed Industry in India.	8
2	**Seed Programme**	Types of seed programme, Development of seed programme, Basic strategy for organizing seed production,	6
3	**Classes of Seed and its Multiplication**	Different classes of seeds, Generation system of seed multiplication, Seed replacement rate (SRR), Varietal replacement rate (VRR), Agencies involved in seed programme.	6
4	**Principles of Seed Production**	Genetic Principles/ Agronomic Principles; Factors affecting genetic purity and varietal deterioration; Methods/ Safeguards to maintain genetic purity during seed production	6
5	**Improved Production Practices**	Study of improved production practices for higher seed yield and quality	5
6	**Economic Principles**	Study of Seed Multiplication Ratio (SMR), Importance of SMR, SMR in different crops	6
7	**Hybrid Seed Production**	Requirements of Hybrid seed production, Methods of hybrid seed production and types of hybrids	6
8	**Varietal and Hybrid Seed Production (Foundation and Certified Seed Classes)**	Varietal and Hybrid seed production in Maize, Rice, Sorghum, Pearl millet, Sunflower, Red gram, Cotton, Castor, Chilli, Tomato and Okra	8
9	**Varietal Seed Production**	Varietal seed production in Wheat, Soybean, Chickpea and Black gram.	6
10	**Seed Processing and Packaging**	Importance and methods in Seed packaging and Seed branding.	8
11	**Seed Testing**	Seed testing procedures in different crops; Minimum seed standards for certification.	6
12	**Seed Storage**	Seed storage, Different types of storage conditions.	6
13	**Seed Legislation**	Seeds Act 1966, Seed Rules 1968, Seed (Control) Order 1983, New policy on seed development 1988, PPVFRA 2001, Seeds Bill 2004, OECD Seed certification and its importance.	6

Continued…

14	**Seed Marketing**	Seed demand forecasting, Factors affecting seed marketing, Seed supply systems, Sale promotional activities for seed marketing, Seed marketing organizational structures	6
15	**International Seed Trade**	International Seed Trade and Developing Seed Entrepreneurship	5
16	**Account Keeping**	Importance of account keeping in seed business. Cost estimation and pricing of seed	6
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [SST-121]

Exercise No.	Exercise Title
1	Identification of seeds of field and horticultural crops
2	Study of seed structure in monocot and dicot seeds
3	Study of floral biology of important self-, cross-, often cross-pollinated, agriculture and horticulture crops
4	Working-out the SRR, VRR and SMR
5	Study of types of isolation, determination of isolation distance, requirements; Study of isolation requirements in different crops for Foundation and Certified seeds
6	Study of hand emasculation, hand pollination and detasseling techniques
7	Study of distinguishing morphological characters in varieties and parents of hybrids
8	Study of synchronization techniques for hybrid seed production and planting ratio
9	Study of supplementary pollination techniques and border rows for hybrids seed production
10	Study of seed cleaning, grading technique and equipments
11	Seed packing and seed treatment techniques
12	Practicing seed testing in different crop seeds
13	Vigour tests in different crop seed lots
14	Studying of safe seed storage techniques
15	Working-out cost of seed production, seed pricing and account keeping books.
16	Visit to seed production organization to understand account keeping and working of seed prices in seed business.

Suggested Readings [SST-121]

1. **Agarwal, P.K. and M., Dadlani, 1987.** Techniques in Seed Science and Technology. South Asian Publishers, New Delhi.
2. **Agarwal, V.K. 2003.** Seed Health. International Book Distributing Co.
3. **Agrawal, R.L. 1996.** Seed Technology. Oxford and IBH Publicity Company, New Delhi.
4. **Bhale, M.S. 2013.** A Handbook of Seed Certification. Vardhman Books and Periodicals.
5. **Joshi, A.K. and Singh, B.D. 2003.** Seed Science and Technology. Kalyani Publishers. Ludhiana.
6. **Khare, D.P. 1994.** Stored Grain Pests and their Management. Kalyani Publishers. Ludhiana.
7. **Kulkarni, G.N. 2002.** Principles of Seed Technology. Kalyani Publishers. Ludhiana.
8. **Nema, N.P. 1986.** Principles of Seed Certification and Seed Testing. Pub. Allied Publishers Private limited, New Delhi.
9. **Paul, Neergaard, 1977.** Seed Pathology, Vol. I and II. McMillan Press, London.
10. **Sen, Subip and Ghosh, Nabinanda, 2002.** Seed Science and Technology. Kalyani Publishers, Ludhiana.
11. **Singhal, N.C. 2002.** Hybrid Seed Production. Kalyani Publishers, Ludhiana.
12. **Tunwar, N.S. and Singh, S.V. 1988.** Indian Minimum Seed Certification Standards. Central Seed Certification Board, New Delhi.

Semester	**:**	**II**	
Course No.	**:**	**AHDS-121**	**Credit Hrs. : 2(1+1)**
Course Title	**:**	**Livestock, Poultry and Fish Production Management**	

SYLLABUS

Objectives:

(i) To understand the principles of livestock, poultry and fish production management,

(ii) To learn about breeding, nutrition, health and housing practices for optimizing animal productivity and welfare,

(iii) To explore sustainable management strategies to improve efficiency, profitability and environmental sustainability in animal production systems,

(iv) To develop skills to address challenges related to disease prevention, feed efficiency and market demands in livestock, poultry and fish production.

THEORY

Role of livestock, poultry and fisheries in the National Economy. Classification of breeds of cattle, buffalo, sheep, goat and poultry. Principles of housing system for different species of livestock and poultry. Classification of feeds and fodder for livestock and poultry. Preparation of concentrate mixture. Conservation and enrichment of fodder. Signs of Estrus. Artificial insemination and its importance Feeding and Management of calves, heifers, pregnant, milch animals and bullocks. Brooding management in poultry. Management of broilers, growers, layers and backyard birds. Management of sheep and goats. Prevention and control of important diseases of livestock and poultry. Marketing and economics of livestock and poultry. Introduction to fish and fisheries in India. Fisheries resources of India and importance of inland aquaculture. Important cultivable fishes and their production.

PRACTICAL

Introduction to University Livestock Farms and Common Terminologies of Animal Sciences. Study of external body parts of livestock. Study of different breeds of Indian and Exotic Livestock. Study of housing for Livestock. Estimation of age of animals. Methods of identification of animals. Judging and culling of animals and poultry. Physical and chemical properties of milk, Clean milk production. Estimation of specific gravity of milk. Estimation of fat of milk. Estimation of total solids and SNF of milk. Detection of milk adulterants and Preservatives. Egg structure, chemical composition and grading. Study of common feeds and fodder. Conservation of Fodder and computation of ration for livestock. Common equipment used in livestock farms. Economics of Livestock Units. Visit to aquaculture and seed production fish ponds.

TEACHING SCHEDULE

THEORY [AHDS-121]

Lecture No.	Topic	Subtopics/ Key Points	Weightage (%)
1	**Importance**	Role of livestock, poultry and fisheries in the National Economy	4
2	**Classification of Breeds**	Classification of breeds of cattle, buffalo, sheep, goat and poultry	6
3	**Principles of Housing**	Principles of housing system for different species of livestock and poultry	8
4	**Classification of Feed and Fodder**	Classification of feeds and fodder for livestock and poultry	8
5	**Concentrate Mixture**	Preparation of concentrate mixture	4
6	**Conservation and Enrichment of Fodder**	Conservation and Enrichment of fodder	6
7	**Estrus and AI**	Signs of Estrus. Artificial Insemination and its importance	8
8	**Feeding Management**	Feeding and Management of calves, heifers, pregnant, milch animals and bullocks	8
9	**Brooding Management**	Brooding management in poultry	6
10	**Management of Poultry birds**	Management of broilers, growers, layers and backyard birds	6
11	**Management of Sheep and Goat**	Management of sheep and goats	6
12	**Diseases of Livestock and Poultry**	Prevention and Control of important diseases of livestock and poultry	6
13	**Marketing and Economics**	Marketing and Economics of livestock and poultry	8
14	**Introduction to Fish and Fisheries**	Introduction to fish and fisheries in India	4
15	**Fisheries Resources and of Inland Aquaculture**	Fisheries resources of India and Importance of Inland Aquaculture	6
16	**Important Cultivable Fishes Production**	Important cultivable fishes and their production	6
		Total	**100**

PRACTICAL [AHDS-121]

Exercise No.	Exercise Topic
1	Introduction to University Livestock Farms and Common Terminologies of Animal Sciences.
2	Study of external body parts of livestock.
3	Study of different breeds of Indian and Exotic Livestock.
4	Study of housing for livestock.
5	Estimation of age of animals.
6	Studying methods of identification of animals.
7	Judging and culling of animals and poultry.
8	Physical and chemical properties of milk and Clean milk production.
9	Estimation of specific gravity of milk and Estimation of fat of milk.
10	Estimation of total solids and SNF of milk. Detection of milk adulterants and Preservatives.
11	Study of Egg structure, chemical composition and grading.
12	Study of common feeds and fodder.
13	Conservation of fodder and Computation of ration for livestock.
14	Common equipments used in Livestock Farms.
15	Economics of Livestock Units.
16	Visit to Aquaculture and Seed producing fish ponds

Suggested Readings [AHDS-121]:

1. **Banarjee, G.C.**, Textbook of Animal Husbandry.
2. **Felix, S., T.V. Anna Mercy and S.K. Sawain**, Ornamental Aquaculture Technology and Trade in India.
3. Handbook of Animal Husbandry, ICAR.
4. **Jadhav, N.V. and M.F.** Siddiqui, Handbook of Poultry Production and Management.
5. **Jagadish, Prasad,** Animal Husbandry and Dairy Science.
6. **Jagadish, Prasad,** Principles and Practices of Dairy Farm Management.
7. **Jagadish, Prasad,** Sheep, Goat and Swine Production.
8. **Jagadish, Prasad,** Poultry and Rabbit Production.
9. **Shreenivashaiah, P.V.**, Scientific Poultry Production.
10. **Sastry, N.S.R. and C.K., Thomas,** Livestock Production Management.
11. **Satiyadas, R., Narayankumar, R., and Aswathy, N.,** Marine Fish Marketing in India.
12. **Srivastava, U.K.,** Inland Fish Marketing in India.
13. **Sukumar, De,** Outline of Dairy Technology. Environmental Studies and Disaster Management

B.Sc. (Hons.) Agri. Business Management

List/ Bouquet of Skill Enhancement Courses (SECs)

Sr. No.	Course No.	Course Title	Credit Hrs.
1.	**SEC-xxx**	Computer Applications in Agriculture	2(0+2)
2.	**SEC-xxx**	Production Technology for Bioagents and Biofertilizers	2(0+2)
3.	**SEC-xxx**	Seed Production and Seed Testing	2(0+2)
4.	**SEC-xxx**	Livestock Production and Management	2(0+2)
5.	**SEC-xxx**	Poultry Production Technology	2(0+2)
6.	**SEC-xxx**	Development of Agri-business Proposal	2(0+2)
7.	**SEC-xxx**	Mushroom Production Technology	2(0+2)
8.	**SEC-xxx**	Beneficial Insect Farming	2(0+2)
9.	**SEC-xxx**	Post-harvest Processing Technology	2(0+2)
10.	**SEC-xxx**	Horticulture Nursery Management	2(0+2)
11.	**SEC-xxx**	Plantation Crops Production and Management	2(0+2)
12.	**SEC-xxx**	Practices in Plant Tissue Culture	2(0+2)
13.	**SEC-xxx**	Production of Milk and Milk Products	2(0+2)
14.	**SEC-xxx**	Introduction to Drying Technology and Dryers	2(0+2)
15.	**SEC-xxx**	Introduction to Milling	2(0+2)
16.	**SEC-xxx**	Introduction to Manufacturing of Bakery Products	2(0+2)
17.	**SEC-xxx**	Introduction to Bottling and Canning Line	2(0+2)
18.	**SEC-xxx**	Print and Electronic Journalism	2(0+2)
19.	**SEC-xxx**	Audio Visual Aids for Communication	2(0+2)
20.	**SEC-xxx**	Apiculture	2(0+2)
21.	**SEC-xxx**	Landscape Gardening	2(0+2)
22.	**SEC-xxx**	Packing and Packaging of Horticultural Crops	2(0+2)
23.	**SEC-xxx**	Seed Production techniques in Vegetable crops	2(0+2)
24.	**SEC-xxx**	Sericulture	2(0+2)
25.	**SEC-xxx**	Post-Harvest Management of Horticultural Produce	2(0+2)
26.	**SEC-xxx**	Vermicomposting production	2(0+2)
27.	**SEC-xxx**	Soil and Water Testing	2(0+2)
28.	**SEC-xxx**	Management of Fish Rearing	2(0+2)
29.	**SEC-xxx**	Hydroponics	2(0+2)
30.	**SEC-xxx**	Aquaponics	2(0+2)

Note: (i) **Skill Enhancement Courses can be added/offered as per the facilities and resources available at the respective universities/colleges based on the relevance to the region and the UG degree subject.**

(ii) **The host University/ College may also choose suitable SEC courses from those listed under other UG degree programs.**

(iii) **Above list/ bouquet/ basket of SEC courses is an indicative list and subject to modification as applicable therein.**

(iv) **In case of unavailability of the detailed course-wise syllabus/ teaching schedules of any of above SEC courses, the same can be primarily developed and followed at College/ University level in the academic year, 2024-25. However, the same can be obtained from the respective UG Degree Coordinator/ Discipline Coordinators and can be followed w.e.f. AY, 2025-26.**