

Course Curriculum of Third 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



Vasant Rao 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, 2025-26 ~

**Course Curriculum of Third Semester as per the
ICAR-Sixth Deans' Committee Report for Academic Programmes in
AGRI-BUSINESS MANAGEMENT**

Course Layout

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

Semester: III (New)

w.e.f. Academic Year: 2025-26

Sr. No.	Course No.	Course Title	Credit Hrs.	Remark
1.	AEC-235	Physical Education, First Aid, Yoga Practices and Meditation	2(0+2)	--
2.	MDC-232	Agricultural Marketing and Trade	3(2+1)	--
3.	ABM-232	Food Business Management	2(2+0)	--
4.	ABM-233	Introduction to Accountancy	3(2+1)	--
5.	MKT-232	Value Chain and Retail Management in Agribusiness	2(1+1)	--
6.	SSAC-231	Soil and Water Management	2(1+1)	--
7.	HORT-231	General Horticulture	2(1+1)	--
8.	ENGG-231	Protected Cultivation and Secondary Agriculture	2(1+1)	--
9.	SEC-235	Skill Enhancement Course-V [#] (To be offered from the bouquet of SECs)	2(0+2)	--
10.	OC-1/ OC-2/ ...	Online Course(s)/ MOOCs [†]	As opted by student	NG
Total Credits Hrs.			20(10+10)	G
AEC: Ability Enhancement Course, MDC: Multidisciplinary Course, OC: Online Course, SEC: Skill Enhancement Course, G: Gradual, NG: Non-gradual				
[†] Note: It is mandatory for each Student to complete total 10 credits (Non-gradual) of Online Courses from available resources across III to VIII semesters under the guidance of assigned Faculty/Advisor.				

Course-wise Syllabus with Teaching Schedules

Semester	: III		
Course No.	: AEC-235	Credit Hrs.	: 2(0+2)
Course Title	: Physical Education, First Aid, Yoga Practices and Meditation		
Gradual Common Course across all UG Degrees			

SYLLABUS

- Objectives** :
- (i) To make the students aware about Physical Education, First Aid and Yoga Practices,
 - (ii) To disseminate the knowledge and skill how to perform physical training, perform first aid and increase stamina and general wellbeing through Yoga.

PRACTICAL

Physical Education; Training and Coaching- Meaning and concept; Aerobic and Aerobic exercises; Calisthenics, Weight Training, Circuit Training, Interval Training, Fartlek Training; Effect of Exercise on Muscular, Respiratory, Circulatory and Digestive systems; Balanced Diet and Nutrition- Effect of Diet on Performance; Physiological Changes due to ageing and Role of exercise on ageing process; Personality, its dimensions and types, Role of Sports in Personality Development; Motivation and Achievements in Sports; Learning and Theories of Learning; Adolescent Problems and its Management; Posture; Postural Deformities, Exercises for Good Posture.

Yoga: History of Yoga, Types of Yoga, Introduction to Yoga.

- Asanas (Definitions and Importance)- Padmasan, Gaumukhasan, Bhadrasan, Vajrasan, Shashakasan, Pashchimothasan, Ushtrasan, Tadasan, Padhastasan, Ardhechandrasan, Bhujangasan, Utanpadasan, Sarvangasan, Parvatasan, Patangasan, Shishupalanasan- left & right leg, Pavanmuktasan, Halasan, Sarpasan, Ardhadhanurasan, Shawasan.
- Suryanamaskar, Pranayama (Definitions and Importance)- Omkar, Suryabhedan, Chandrabhedan, Anulom, Vilom, Shitali, Shitkari, Bhastrika, Bhramari.
- Meditation (Definitions and Importance)- Yogic Kriyas (Kapalbhati), Tratak, Jalneti and Tribandh
- Mudras (Definitions and Importance)- Gyanmudra, Dhyamudra, Vayumudra, Akashmudra, Prutvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanmudra.
- Role of Yoga in Sports.
- Teaching of Asanas- Demonstration, Practice, Correction and Practice.

History of Sports and Ancient games, Governance of Sports in India; Important Sporting events- Awards in sports, History, Latest rules, Measurement of playfield, Specifications of equipment, Skill, Technique, Style and Coaching of major games (Cricket, Football, Table tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho and Athletics).

Need and Requirement of First Aid: First Aid techniques, Equipment and Upkeep First Aid techniques; First aid-related with respiratory system; First aid-related with Heart, Blood and Circulation; First Aid-related with wounds and injuries; First Aid-related with Bones, Joints muscles related injuries; First Aid-related with Nervous system and Unconsciousness; First Aid-related with Gastrointestinal Tract, Skin Burns; First Aid-related with Bites and stings, poisoning; First Aid-related with Sense organs; Handling and transport of injured traumatized persons- Sports injuries and their Treatments.

TEACHING SCHEDULE

PRACTICAL [AEC-235]

Exercise No.	Topic	Exercise Title / Sub-topics
1	Physical Education	To study the training and coaching- Meaning and concept of Physical Education
2 - 7	Methods of Training	To study the method of training- Aerobic and Aerobic exercises
		To study the method of training- Calisthenics
		To study the method of training- Weight Training
		To study the method of training- Circuit Training
		To study the method of training- Interval Training
		To study the method of training- Fartlek Training
8	Effect of Exercise	To study the effect of exercise on Muscular, Respiratory, Circulatory and Digestive systems
9	Balanced Diet and Nutrition	To study the Balanced Diet and Nutrition- Effect of diet on performance
10	Physiological Changes	To study the physiological changes due to ageing and role of exercise on ageing process
11	Personality Development	To study the dimensions and types -Role of sports in personality development
12	Motivation and Achievements in Sports	To study the Motivation and Achievements in Sports

Continued...

13	Learning and Theories of Learning	To study the Learning and Theories of Learning
14	Adolescent Problems and its Management	To study the Adolescent Problems and its Management
15	Posture	To study the Postural Deformities, Exercises for Good Posture
16 - 22	Yoga	To study the Introduction, History and Types of Yoga
		To study the Asanas: Padmasan, Gaumukhasan, Bhadrasan, Vajrasan Shashakasan, Pashchimotasan, Ushtrasan, Tadasan, Padhastasan, Ardhchandrasan, Bhujangasan, Utanpadasan, Sarvangasan, Parvatasan, Patangasan, Shishupalanasan- left leg- right leg, Pavanmuktasan, Halasan, Sarpasan, Ardhhanurasan, Shawasan
		To study the Suryanamaskar, Pranayama, Omkar, Suryabhedan, Chandrabhedan, Anulom, Vilom, Shitali, Shitkari, Bhastrika, Bhramari
		To study the Meditation, Yogic Kriyas (Kapalbhati), Tratak, Jalneti and Tribandh
		To study the Mudras: Gyanmudra, Dhyanmudra, Vayumudra, Akashmudra, Prutvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanmudra
		To study the Role of Yoga in Sports
		To study the Demonstration, Practice, Correction and Practice of Asanas
23 - 26	Sports	To study the History of Sports and Ancient games
		To study the Governance of Sports in India
		To study the Awards in Sports, History, Latest rules, Measurement of playfield, Specifications of equipment in important sporting events
		To study the Skill, Technique, Style and Coaching of major games (Cricket, Football, Table Tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho and Athletics)

Continued...

27 - 32	First Aid	To study the Need and Requirement of First Aid- First Aid techniques, Equipment and Upkeep
		To study the First aid related with Respiratory system, Heart, Blood and Circulation
		To study the First aid related with Wounds and Injuries, Bones, Joints muscles related injuries
		To study the First aid related with Nervous system Unconsciousness, Sense organs.
		To study the First aid related with Gastrointestinal Tract, Skin Burns, Bites and Stings, Poisoning
		To study the Handling and Transport of Injured Traumatized Persons- Sports Injuries and their Treatments.

Semester	: III	
Course No.	: MDC-232	Credit Hrs. : 3(2+1)
Course Title	: Agricultural Marketing and Trade	
Gradual Common Course among 3 UG Degrees (with different Course Nos.) viz., B.Sc. (Hons.) Horti. / B.Tech. (Food Tech.) / B.Sc. (Hons.) ABM		

SYLLABUS

Objectives:

- (i) To understand the fundamentals of Agricultural Marketing and Trade,
- (ii) To analyse the factors influencing supply and demand in agricultural markets,
- (iii) To explore different marketing channels and strategies in Agriculture,
- (iv) To examine the role of Government Policies and Regulations in agricultural markets.

THEORY

Agricultural Marketing: Concepts and Definitions of Market, Marketing, Agricultural Marketing, Market structure, Marketing mix and Market segmentation, Classification and Characteristics of Agricultural markets; Demand, Supply and Producer's surplus of agri-commodities: Nature and Determinants of demand and supply of farm products, Producer's surplus – Meaning and its types, Marketable and Marketed surplus, Factors affecting marketable surplus of agri-commodities; Pricing and promotion strategies: Pricing considerations and approaches – Cost-based and Competition-based pricing; Market promotion – advertising, Personal selling, Sales promotion and Publicity– their meaning and merits and demerits; Marketing process and Functions: Marketing process concentration, dispersion and equalization; Exchange functions – buying and selling; physical functions – storage, transport and processing; Facilitating functions – packaging, branding, grading, quality control and labeling (Agmark); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and Definition of Marketing Channel; Number of channel levels; Marketing channels for different farm products; Integration, Efficiency, Costs and Price spread: Meaning, Definitions and Types of market integration; Marketing efficiency; Marketing costs, margins and price spread; Factors affecting cost of marketing; Reasons for higher marketing costs of farm commodities; Ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- NAFED, TRIFED, NCDC, APEDA, CWC, SWC, FCI, CACP, DMI – their objectives and functions;

Cooperative marketing in India; Risk in marketing: Types of risk in marketing; Speculation and hedging; An overview of futures trading; Agricultural prices and policy: Meaning and functions of price; Administered prices; Need for agricultural price policy; Trade: Concept of International Trade and its need, Theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; WTO; Agreement on Agriculture (AoA) and its implications on Indian Agriculture; IPR. Role of APMC and its relevance in the present-day context.

PRACTICAL [MDC-232]

Plotting and study of demand and supply curves and calculation of elasticities; Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities; Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies, Identification of marketing channels for selected commodity; Collection of data regarding marketing costs, margins and price spread and Presentation of report in the class; Visit to market institutions - NAFED, SWC, CWC, Cooperative Marketing Society etc.- To study their organization and functioning. Application of principles of comparative advantage of International Trade.

TEACHING SCHEDULE

THEORY [MDC-232]

Lecture No.	Topic	Sub-topics / Key Points	Weightage (%)
1	Market and Marketing	Meaning – Definitions – Components of market – Market structure – Meaning – Components – Market conduct – Market performance	4
2	Agricultural Marketing	Meaning – Definition – Scope – Subject matter – Importance of Agricultural Marketing in economic development.	6
3		Market structure, Marketing mix and Market segmentation	
4	Classification and Characteristics of Agricultural Market	Classification of markets – On the basis of Location, Area of coverage, Time span, Volume of transaction, Nature of transaction, Number of commodities, Degree of competition, Nature of commodities, Stage of marketing, Extent of public intervention, Type of population served, Accrual of marketing margins.	4
5	Demand and Supply	Demand, Supply and Producer's surplus of agri-commodities: Nature and Determinants of demand and Supply of farm products,	4
6	Producer's Surplus	Meaning- Marketable surplus- Marketed surplus- Importance- Factors influencing marketable surplus of agri-commodities	4
7 - 8	Pricing and promotion strategies	Pricing and promotion strategies; Pricing Considerations and Approaches – Cost-based and Competition-based pricing	6
9	Market Promotion	Advertising, Personal selling, Sales promotion and Publicity – their Meaning and Merits & Demerits;	4
10	Marketing Process and Functions	Marketing Process Concentration, Dispersion and Equalization	12
11		Marketing functions – Meaning- Exchange functions – Buying and Selling	
12		Physical Functions – Storage, Transport and Processing	
13		Facilitating Functions – Packaging, Branding, Grading, Quality control and Labeling (AGMARK)	
14	Market Functionaries and Marketing Channels	Types and Importance of agencies involved in Agricultural Marketing;	8
15 - 16		Meaning and Definition of Marketing Channel; Number of channel levels; Marketing channels for different farm products;	

Continued...

17	Market Integration	Definition-Types of Market integration- Horizontal, Vertical and Conglomeration-	4
18	Marketing Efficiency	Meaning- Definitions- Technical or Physical or Operational efficiency- Pricing or Allocative efficiency-	4
19	Marketing Cost	Marketing Cost- Margins- Price spread- Factors affecting the costs of marketing- Reasons for higher marketing costs of agricultural commodities- Ways of reducing marketing costs for farm products-	4
20	Role of Govt. in Agricultural Marketing	Govt. in Agricultural Marketing- Remedial measures, Regulated markets- Definition- Important features of Regulated markets, Functions, Progress and Defects-	4
21 - 22	Public Sector Institutions	Objectives and Functions of: ~ National Agricultural Cooperative Marketing Federation (NAFED)- Tribal Cooperative Marketing Development Federation (TRIFED)- National Cooperative Development Corporation (NCDC)- Agricultural and Processed Food Products Export Development Authority (APEDA)- Central Warehousing Corporation (CWC)- State Warehousing Corporations (SWC)- Food Corporation of India (FCI)- Commission for Agricultural Cost and Prices (CACP)- Directorate of Marketing & Inspection (DMI)-	6
23	Cooperative Marketing	Meaning- Structure- Functions of Cooperative Marketing Societies-	2
24	Risk in Marketing	Types of Risk in Marketing-	6
25		Speculation & Hedging-; An overview of Futures trading-	
26	Agricultural Prices and Policy	Meaning and Functions of Price; Administered prices; Need for Agricultural Price Policy-	4
27 - 28	International Trade	Concept of International Trade and its Need, International trade- Definition- International vs. Interregional trade- Free trade vs. Protection-	10
29		Theories of Absolute and Comparative Advantage-	
30		Present status and Prospects of international trade in Agri-commodities-; GATT and WTO-	
31		Agreement on Agriculture (AoA) and its implications on Indian Agriculture-; Intellectual Property Rights (IPR)-	
32	APMC	Role of APMC and its relevance in the present-day context-	4
Total =			100

TEACHING SCHEDULE

PRACTICAL [MDC-232]

Exercise No.	Exercise Title
1	Plotting and Study of demand and supply curves.
2	Calculation of price and income elasticity of demand.
3	Study of the relationship between market arrivals and prices of selected commodities.
4	Computation of marketable and marketed surplus of important commodities.
5	Study of price behaviour (seasonal indices) over time for selected commodities.
6	Construction of simple and weighted price index numbers.
7	Visit to the local market to study different marketing functions performed by different Agencies.
8	Study and Identification of marketing channels for selected commodities.
9	Collection of data and estimation of marketing cost, marketing margin and price spread of selected commodities.
10	Introduction to different Public Agricultural Marketing Web Portals- (AgMarkNet, MSAMB).
11	Visit to NAFED –Organisational and Functional Study.
12	Visit to SWC/CWC- Study of Warehousing Operations.
13	Visit to Co-operative Marketing Society –Functional analysis.
14	Visit to Local Processing Unit.
15	Application of Absolute Advantage Theory in International Trade.
16	Application of Comparative Advantage Theory in International Trade.

Suggested Readings [MDC-232]:

1. **Acharya S.S. and Agarwal N.L.** 2006. Agricultural Marketing in India, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. **Chinna S.S.** 2005. Agricultural Economics and Indian Agriculture. Kalyani Pub, New Delhi.
3. **Dominic Salvatore**, Micro Economic Theory.
4. **Kohls Richard L. and Uhl Josheph N.** 2002. Marketing of Agricultural Products, Prentice-Hall of India Private Ltd., New Delhi.
5. **Kotler and Armstrong.** 2005. Principles of Marketing, Pearson Prentice-Hall.
6. **Lekhi R. K. and Joginder Singh.** 2006. Agricultural Economics. Kalyani Publishers, Delhi.
7. **Memoria C.B., Joshi R.L. and Mulla N.I.** 2003. Principles and Practice of Marketing in India, Kitab Mahal, New Delhi.
8. **Pandey Mukesh and Tewari Deepali.** 2004. Rural and Agricultural Marketing, International Book Distributing Co. Ltd, New Delhi.
9. **Sharma R.** 2005. Export Management, Laxmi Narain

Semester	:	III
Course No.	:	ABM-232
Credit Hrs.	:	2(2+0)
Course Title	:	Food Business Management

SYLLABUS

- Objectives :**
- (i) Understand the principles of food business management, including production, distribution and marketing.
 - (ii) Learn about food safety regulations, quality control and supply chain management.
 - (iii) Explore strategies for developing and launching food products, managing operations and meeting consumer demands.
 - (iv) Develop skills to analyse market trends, develop business plans and manage resources effectively in the food industry.

THEORY

Introduction to Food, Food Business and Food Business Management, Types and Classification of Food Products, Food Business, Institutions involved in Food preparation, Marketing and Exporting. Present status of food industry in India - Current market size and Future potential - Key drivers for growth. Recent advances in Food Processing, Quality Management in Food Industry - Food Safety and Standards (ISO and Codex). Food Traceability. Food Preservation Methods - Food Packaging and Labeling - Improved food grain storage structures. Logistics Management at different stages of marketing the food products. Food Business Environment and Policy. IPR in Food Industry, Entrepreneurship opportunities in food business. Food Economics and Policy, Innovation in food business at domestic and international, Food Business Marketing. Successful Business Organizations. Food Business Environment and Policy, Government, Regulations/Guidelines for food sector. Food Waste Management. Food Retailing, Formats of Food Service Industry, Policies related to Food Processing and Markets, Institutions enabling food processing sector, Food Safety and Standards Authority of India.

TEACHING SCHEDULE

THEORY [ABM-232]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Introduction	Introduction to Food, Food Business and Food Business Management	6
2		Types and Classification of Foods and Food Business	
3	Institutions	Institutions involved in Food Preparation (in brief)	2
4	Marketing and Exporting	Marketing and Exporting of Food products- Food Trade Regulations and Compliance (with a focus on India and Global key export markets)	5
5 - 6	Present Status of Food Industry	Present status of Food Industry in India - Current market size and Future potential- Key drivers for growth	5
7	Recent Advances	Recent advances in Food processing (like, Sustainable and Green Food Processing Technologies; Novel Energy & Water-Efficient Technologies; Blockchain; AI-driven; IoTs, etc.)	5
8 - 9	Quality Management	Quality Management in Food Industry- Food Safety and Standards (ISO and Codex).	5
10	Traceability	Food Traceability (Standards, Technological Solutions and their Applications)	5
11 - 13	Preservation	Food Preservation Methods (Applications/ Principles/ Mechanisms, Advantages)	5
	Packaging and Labelling	Food Packaging and Labelling (Regulatory Framework and Labelling Standards; Requirements under FSSAI)	5
14	Storage Structures	Different improved food grain storage structures (<i>in brief</i>)	5
15	Logistics Management	Logistics management at different stages of marketing of the food products	5
16	Intellectual Property Right	IPR in Food Industry (Types & Examples of IPR applicable in the Food Industry with their Management in brief-)	4
17 - 18	Entrepreneurship Opportunities	Entrepreneurship Opportunities in Food Business (Key Aspects like, Significant opportunities by identifying Niche Markets; Government Schemes and Incubation Support; Steps to register FPOs or MSMEs in food processing; Case Studies/ Success Stories)	5

Continued...

19 - 20	Food Economics and Policy	Food Economics: Introduction to Food Economics- Definition, scope and Importance; Demand and Supply in Food Markets; Food Policy: Price Formation/ Government Policy and Market Mechanisms; Trade Regulations.	5
21 - 22	Innovation in Food Business	Innovation in Food Business at Domestic and International levels- (Definition of Innovation in agri-food context; Drivers & Types of innovation; Innovative Startup Models in the Food Sector; Domestic vs. Global)	5
23 - 24	Food Business Marketing	Food Business Marketing: (Introduction, Consumer behaviour and market segmentation 4Ps in Food Business Marketing, etc.)	5
25	Successful Business Organizations	Successful Business Organizations - (Key performance indicators, Types, Characteristics, Case studies of Successful Organizations at Local, National & Global scale)	5
26 - 27	Food Business Environment and Policy	Food Business Environment and Policy - Dimensions of the Food Business Environment (Internal & External/Macro); Analytical Tools for Environment Scanning like, PESTLE, SWOT. Government Role in Agri-Food Sector (Regulations/ Guidelines/ Policy)	5
28 - 29	Food Waste Management	Food Waste Management - (Definitions-Food loss, Food waste; Causes and Types of Food Waste; Strategies & Technologies for Food Waste Management)	5
30 - 31	Food Retail, Formats and Policies	Food Retailing, Formats of Food Service Industry, Policies related to Food Processing and Markets	5
32	Institutions in Food Processing and FSSAI	Objective/ Role/ Functions of Institutions enabling food processing sector; Food Safety and Standards Authority of India.	3
Total =			100

Suggested Readings [ABM-232]:

1. **Swaminathan. M, (1997)** An Advanced Text Book on Food and Nutrition, Volume I, The Bangalore Printing and Publishing Co. Ltd., Bangalore.
2. **Swaminathan. M, (1997)** An Advanced Text Book on Food and Nutrition, Volume II, The Bangalore Printing and Publishing Co. Ltd., Bangalore.
3. **Srilakshmi. B, (2006)** Food Science, New Age International (Ltd.) Publishers, New Delhi.
4. **Srilakshmi. B, (2007)** Nutrition Science, New Age International (Ltd.) Publishers, New Delhi.
5. **Mahtab. S, (1996)** Text Book of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Semester	: III	
Course No.	: ABM-233	Credit Hrs. : 3(2+1)
Course Title	: Introduction to Accountancy	

SYLLABUS

- Objectives** :
- (i) To understand the basic principles and concepts of accountancy,
 - (ii) To learn the fundamentals of financial statements preparation and analysis,
 - (iii) To explore the role of accounting in business decision-making and financial management,
 - (iv) To develop skills to record, classify and interpret financial transactions accurately and effectively.

THEORY

Introduction to Accountancy: Meaning and Importance of Accounting. Meaning and Definition of Book keeping. Accountancy objectives of book keeping: Branches of Accounting. Accounting cycle. Generally Accepted Accounting Principles (GAAP) - Concepts and Conventions. System of book keeping: Single entry and Double entry system of keeping, Classification of accounts. Golden rules of accounting; Books of accounts: Journal and Ledger-Journalizing, Ledger posting and preparation of ledger accounts. Subsidiary Books-Kinds of subsidiary books - Day books: Purchase book, Sales book, Returns book, Bill books, Journal proper, Cash books - Nature and Objectives of cash book, Types of cash book, Petty cash book; Bank Reconciliation Statement; Preparation of Trial Balance-Methods of Trial Balance; Final Accounts - Trading Account, Profit & Loss Account and Balance Sheet; Single entry system of accounts - preparation of statement of affairs, profit or loss statement, advantages and disadvantages. Non - trading organizations. Preparation of accounts relating to non-trading organization. Concepts of revenue and Capital expenditure and income, Receipts and Payment account, Income and Expenditure account and Balance sheet.

PRACTICAL

Preparation of journal and Recording the business transactions in journal, Preparation of ledger and ledger posting, Preparation and Solving of problems relating to subsidiary books, Preparation of cash book with single column, Preparation of cash book with double column, Preparation of cash book with triple column and contra entries, Preparation petty cash book in imprest system, Preparation of bank reconciliation statement, Preparation of trial balance, Preparation of final accounts - Trading, Profit and Loss Accounts and Balance Sheet, Preparation of Profit and Loss Account and Balance Sheet under single entry system. Preparation of non-trading accounts receipts and payment accounts. Preparation of non-trading accounts-Income and Expenditure Accounts and Balance Sheet.

TEACHING SCHEDULE

THEORY [ABM-233]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1 - 2	Introduction to Accountancy	Meaning and Importance of Accounting; Meaning and Definition of Book keeping, Objectives of Book keeping; Branches of Accounting, Accounting cycle	10
3 - 4	Generally Accepted Counting Principles (GAAP)	Concepts and Conventions of Accounting, Basic Accounting Terminologies -	8
5 - 7	System of Book Keeping	Single entry and Double entry system of book keeping, Classification of accounts. Golden rules of accounting	8
8 - 10	Books of Accounts	Journal and Ledger- Journalizing, Ledger posting and preparation of ledger accounts.	8
11 - 12	Subsidiary Books	Kinds of Subsidiary books- Purchase book, Sales book, Returns book, Bill books, Journal proper	8
13 - 14	Cash Books	Cash books, Nature and Objectives of Cash book, Types of cash book and Petty cash book	8
15 - 17	Bank Reconciliation Statement	Meaning, Characteristics, Importance, Proforma and Preparation of Bank Reconciliation Statement	8
18 - 20	Trial Balance	Proforma, Meaning, Purpose and Preparation of Trial Balance	8
21 - 23	Final Accounts	Trading account, Profit and Loss account and Balance sheet	8
24 - 26	Single Entry System of Accounts	Preparation of Statement of affairs, Profit or Loss statement, Advantages and Disadvantages	8
27 - 28	Non-trading Organizations	Preparation of accounts relating to non-trading organization	6
29 - 30	Concepts of Revenue and Capital Expenditure and Income	Concepts of revenue and capital expenditure and income (Nature, Benefit, Treatment; Revenue vs. Capital Expd., e.g.)	6
31 - 32	Receipts and Payment Account	Receipts and Payment Account, Income and Expenditure Account and Balance Sheet	6
Total =			100

TEACHING SCHEDULE

PRACTICAL [ABM-233]

Exercise No.	Exercise Title
1 - 2	Preparation of Journal
3	Preparation of Ledger and Ledger posting
4 - 5	Preparation of Subsidiary books
6	Preparation of Cash book with single column
7	Preparation of Cash book with double column
8	Preparation of Cash book with triple column and contra entries
9	Preparation Petty cash book in imprest system
10	Preparation of Bank reconciliation statement
11	Preparation of Trial balance
12 - 13	Preparation of Final Accounts- Trading, Profit and Loss accounts and Balance sheet
14	Preparation of Profit and Loss account and Balance sheet under Single entry system
15	Preparation of Non-trading accounts Receipts and Payment accounts
16	Preparation of Non-trading accounts- Income and Expenditure accounts and Balance sheet

Suggested Readings [ABM-233]:

1. **Jain, S.P.**, Advanced Accountancy (Vol I & II); Latest Revised Edition; Kalyani Publishers, New Delhi.
2. **Kadakol, M.B.**, Accountancy for PUC-I and II; Latest Revised Edition.
3. **Raman, B.S.**, Accountancy; (2021: United Publishers).

Semester	:	III
Course No.	:	MKT-232
Credit Hrs.	:	2(1+1)
Course Title	:	Value Chain and Retail Management in Agribusiness

SYLLABUS

- Objectives :**
- (i) To understand dynamics of value chains in agribusiness from production to retail,
 - (ii) To learn about supply chain management, distribution and logistics in agricultural products,
 - (iii) To explore retail management strategies including branding, marketing and customer relationship management,
 - (iv) To develop skills to optimize value chain efficiency, reduce costs and meet consumer preferences in agribusiness retail.

THEORY

Meaning of Value and Value Chain. Concept of Value Chain. Difference between Supply Chain and Value Chain. Components of Value Chain. Value Chain Governance. Value Chain Methodology. Economics of Value chain. Financing of Agricultural chain. Market linkages in Value Chain. Mapping of Value Chain. Potters Value Chain. Introduction to Retail Management. Retailing in India. Types of retailers. Retail formats. Online and Offline retailing. Organized and Unorganized retailing. Retail location and layout. Retail strategies. Store management. Merchandise and Inventory management. Retail marketing mix, Role of IT in retail management. E-tailing.

PRACTICAL

Presentation and Discussion on above topics.
 Visit to Retail formats.
 Visit to Processing units.
 Visit to Logistics, Godowns, Warehouses etc.

TEACHING SCHEDULE

THEORY [MKT-232]

Lecture No.	Topic	Sub-topics/Key Points	Weightage (%)
1	Value and Value Chain Concepts	Definition, Importance, Scope, Comparison with Supply Chain	7
2	Components and Governance of Value Chain	Elements, Governance Types, Determinants, Good Practices, Global Agri Value Chains	5
3	Value Chain Methodology and Analysis	SWOT, SCOR, Cost-Benefit, Value Chain Economics, Theory	7
4	Financing and Market Linkages	Instruments, Financing Models, Institutional Support, FPOs	7
5	Value Chain Mapping and Porter's Framework	Mapping steps, Porter's Model Structure and Applications	6
6	Introduction to Retail Management	Retail Evolution, Importance, Functions	6
7	Retailing in India	Types of Retailing, FDI, Sector Analysis, Players, Opportunities and Challenges	6
8	Retail Formats	Organized vs. Unorganized, Classification of Retail formats, Franchise, E-tailing	7
9	Retail Location and Layout	Location Decisions, Site Evaluation, Layout Patterns, Factors affecting Location and Layout	7
10	Retail Strategies	Introduction, Components, Business Models, Vision, Mission, Differentiation	6
11	Store Management	Operations, Design, Customer Experience	6
12	Merchandise and Inventory Management	Planning, Procurement, Stock Control, SKUs	6
13	Retail Marketing Mix	7Ps, Customer Relationship, Promotions	6
14	Role of IT in Retail Management	POS, ERP, AI, CRM tools	7
15	E-tailing and Omni channel Trends	E-tailing (Def'n)- e-Commerce Platforms, Integration, Case Studies	6
16	Case Study Review and Interactive Discussion	Retail Chain Analysis, Strategy Application, Assessment	5
Total =			100

TEACHING SCHEDULE

PRACTICAL [MKT-232]

Exercise No.	Practical Topic	Mode	Expected Outcome
1	Introduction to Value and Supply Chain Concepts	Group Discussion	Concept clarity
2	Value Chain Governance Models	Role play/ Simulation	Decision-making skills
3	Value Chain Analysis (SWOT, SCOR)	Hands-on Analysis	Analytical ability
4	Value Chain Mapping	Chart/ Diagram development	Visual skills
5	Porter's Value Chain-real-life agribusiness case	Presentation	Strategic thinking
6	Comparative Study: Organized vs. Unorganized Retail	Debate + Field Survey	Practical insight
7	Study of Retail Layouts	Observational Study	Store layout knowledge
8	Merchandise Management using MS Excel / Software	Lab Exercise	Tech exposure
9	Visit to Retail Chain/ Outlet	Field Visit	Industry exposure
10	Visit to Agri-processing Unit	Field Visit	Tech + Process insight
11	Visit to Logistics/Distribution Centre	Field Visit	Operational knowledge
12	Visit to Warehouse/Cold Storage	Field Visit	Supply Chain exposure
13	E-retailing Platform Analysis	Online Analysis + Report	E-commerce knowledge
14	Seminar on Future of Retail in Agribusiness	Student Presentation	Communication skills
15	Retail Strategy Formulation	Group Project	Strategic application
16	Assessment and Feedback on Practical Learning	Quiz/ Reflection	Learning evaluation

Suggested Readings [MKT-232]:

1. Retail Supply Chain Management: Quantitative Models and Empirical Studies
By Narendra Agrawal and Stephen A. Smith (International Series in Operations Research and Management Science, Vol. 122, 2009).
2. Retail Supply Chain Management, By James B. Ayers and Mary Ann Odegaard (2017).
3. The Retail Value Chain: How to Gain Competitive Advantage through Efficient Consumer Response (ECR) Strategies. By Sami Finne and Hanna Sivonen (Kogan Page Publishers, 2008).

Additional Readings [MKT-232]:

1. Agribusiness Supply Chain Management, By N. Chandrasekaran.
 2. Essentials of Supply Chain Management, By Michael H. Hugos.
 3. Retail Management, By Barry Berman and Joel Evans.
 4. Supply Chain Management: Strategy, Planning, and Operation, By Sunil Chopra.
 5. Agricultural Marketing in India By S.S. Acharya and N.L. Agarwal – For Indian Agribusiness Context.
 6. Journals and Articles:
 - *International Journal of Retail and Distribution Management,*
 - *Agribusiness: An International Journal.*
-

Semester	:	III
Course No.	:	SSAC-231
	Credits Hrs.	: 2(1+1)
Course Title	:	Soil and Water Management

SYLLABUS

- Objectives :**
- (i) To understand the principles of soil and water management in Agriculture.
 - (ii) To learn technique for soil conservation, erosion control and fertility management.
 - (iii) To explore strategies for efficient water use, irrigation and drainage system in crop production.
 - (iv) To develop skills to sustainably manage soil and water resources to enhance agricultural productivity and environmental sustainability.

THEORY

Concept of Soil, Meaning and Definition; Soil components and Important soil physical (Soil texture, Structure density, Porosity, Soil water, Soil air, Soil temperature and Soil colour) and Chemical (pH, EC, CEC and Base saturation) properties in brief, Organic matter, Land Capability Classification and Suitability. Soils of India and Maharashtra, Soil quality and Soil health, Distribution of waste land/degraded lands and problem soils in India, Problems associated and Management of salt affected soils, Calcareous soils, Acid soils, Acid sulphate soils, Eroded and Compacted soils, Flooded/Water logged soils, Physically constrained soils, Polluted soils. Alternate land use strategies for management of problematic soils including bioremediation/phytoremediation. Irrigation water-quality and standards, Utilization of poor-quality water in Agriculture.

PRACTICAL

Soil sample collection and it's preparation for analysis. Determination of soil color, density, porosity and moisture content. Determination of soil texture by feel method. Determination of infiltration rate. Determination of aggregate stability. Determination of soil reaction (pH) and Total Soluble Salts Content (EC) in soil. Determination of organic matter in soil. Determination of lime requirement of acid soils. Determination of water-soluble cations. Determination of water-soluble anions. Determination of exchangeable cations (Ca, Mg, Na and K) and computation of ESP. Determination of gypsum requirement of sodic soils. Determination of quality of irrigation water (pH, EC, SAR, RSC, Boron, Chlorides etc.)

TEACHING SCHEDULE

THEORY [SSAC-231]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Concept of Soil	Concept, Meaning and Definition; Soil components	6
2 - 4	Physical Properties of Soil	Important Soil Physical Properties – Soil Texture, Soil Structure, Density, Porosity, Soil water, Soil air, Soil temperature and Soil colour	20
5 - 6	Chemical Properties of Soil	Important soil chemical properties (in brief) - pH, EC, CEC and Base saturation	10
7	Soil Organic Matter	Soil organic matter- (Definition, Composition, Role/ Functions, Source, Factors affecting SOM and Management)	6
8	Land Capability	Land Capability Classification and Suitability (Purpose, Classes & Factors)	8
9 - 10	Soils of India and Maharashtra	Soils of India and Maharashtra- (Overview, Types, Characteristics and Agricultural Relevance)	6
11	Soil Quality and Soil Health	Soil quality and Soil health- Definitions, Differences, Concepts, Key Indicators and Implications	6
12	Distribution of Wastelands/ Degraded Lands and Problem Soils in India	Definitions, Classification and Distribution of Wastelands, Degraded Lands and Problem Soils in India	6
13	Problems Associated and Management of Soils	Problems associated and Management of Salt affected soils, Calcareous soils, Acid soils, Acid sulphate soils	10
14		Problems associated and Management of Eroded and Compacted soils, Flooded/ Waterlogged soils, Physically constrained soils and Polluted soils	10
15	Alternate Land Use Strategies	Alternate land use strategies for management of problematic soils including Bioremediation/ Phytoremediation	6
16	Irrigation Water-Quality	Irrigation Water-quality and Standards, Utilization of poor-quality water in Agriculture	6
Total =			100

TEACHING SCHEDULE

PRACTICAL [SSAC-231]

Exercise No.	Exercise Title
1	Collection of soil sample and its preparation for analysis.
2	Determination of soil colour by Munsell soil colour chart in field.
3	Determination of Bulk density by Core cutter method.
4	Determination of Particle density by Pycnometer method.
5	Determination of moisture content in soil by Gravimetric method.
6	Determination of soil texture by Feel method.
7	Determination of infiltration rate of soil by Double ring infiltrometer method.
8	Determination of aggregate stability of soil by Wet sieving/ Yoder's method.
9	Determination of soil reaction (pH) and Total Soluble Salts Content (EC) in soil.
10	Determination of soil organic matter by Loss on Ignition method.
11	Determination of lime requirement of acid soils.
12	Determination of water-soluble cations.
13	Determination of water-soluble anions.
14	Determination of exchangeable cations (Ca, Mg, Na and K) and computation of ESP.
15	Determination of gypsum requirement of sodic soil.
16	Determination of quality of irrigation water (pH, EC, SAR, RSC, Boron, Chlorides etc.

Suggested Readings [SSAC-231]:

1. **B.C. Mal**, Introduction to Soil and Water Conservation Engineering - Kalyani Publishers, New Delhi.
2. **A.M. Michael and T.P. Ojha**, Principles of Agricultural Engineering (Vol-II)- Tata McGraw Hill Publishing Co Ltd, New Delhi.
3. **VVN Murthy**, Land and Water Management Engineering- Kalyani Publishers, New Delhi
4. Surveying and Leveling-(Part-I)-T.P. Kanitkar and Kulkarni Pune Vidyarthi Griha Prakashan, Pune
5. **O.P. Singhal**. Elements of Agricultural Engineering – Aman Public House, Meerut.
6. **ISSS**, 2009. Fundamentals of Soil Science. 2nd Ed. Indian Society of Soil Science, New Delhi- 110 012. pp. 728.
7. **Das, D.K.** 2011. Introductory Soil Science, 3rd revised and Enlarged Ed, Kalyani Publisher, Ludhiana. pp. 645.

8. **Brady, N.C. 2016.** The Nature and Properties of Soils. 15th Edition Publisher: Pearson Education, ISBN: 978-0133254488.
 9. **J.A.; Kadam, J.R; Patil, N.D. 1996.** Textbook of Soil Science Bombay Media Promoters and Publishers Pvt. Ltd.
 10. **Biswas, T.D.; Mukherjee, S.K. 1995.** Text Book of Soil Science 2nd Edn. Tata McGraw Hill Publisher, Delhi. pp 433.
 11. **Somawanshi, et al. 2012.** Laboratory Methods for Analysis of Soil, Irrigation Water and Plants, Department of Soil Science and Agricultural Chemistry, MPKV, Rahuri. Revised Ed. pp. 307.
 12. **Jakson, M.L. 1973.** Soil Chemical Analysis. Printice Hall, India, Pvt. Ltd. New Delhi. pp 498.
 13. **Page et. al. 1982.** Methods of Soil Analysis, Part 1 and 2. Chemical and Microbiological Properties. 2nd Ed. Soil Science Soc. of America Am. Soc. Agron., Madison, Wisconsin, USA.
 14. **Klute, A. 1986.** Methods of Chemical Analysis, 2nd Edn. American Soc. Agron., Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
 15. **Piper, C.S. 1966.** Soil and Plant Analysis. Inters Science. Hans Publisher, Mumbai.
 16. **Black, C.A. 1965.** Soil Chemical Analysis, Part I and II. American Soc. Agron. Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
 17. **Hesse, P.R. 1971.** A Text Book of Soil Chemical Analysis. John Murray, London.
 18. **Richards, L.A. 1968.** Diagnosis and Improvement of Saline Alkali Soils. Oxford and IBH Publication Co. Calcutta.
 19. **Chora, S.L. and Kanwar, J.S. 1991.** Analytical Agricultural Chemistry, Kalyani Publisher New Delhi.
 20. **Chapman, H.D., and P.F. Pratt. 1961.** Methods of analysis for soils, plants and waters. Division of Agricultural Sciences, University of California.
 21. **Mehara, R.K. 2004.** Text Book of Soil Science., ICAR, New Delhi.
 22. **Patil, V.D. and C.V. Mali. 2007.** Fundamentals of Soil Science, Aman Publication, Meerut.
 23. **Nirankari Lal Singh. 2000.** Text Book of Soil Science. Aman Publication, Meerut.
 24. **Dahama, A.K.** Organic Farming for Sustainable Agriculture. 19, Agro-botanica Bikaner. Pp 53-98 and 210-255.
 25. **Tandon H.L.S. 1994.** Recycling of Waste in Agriculture. Fertilizer Development and Consultation Organization.
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Semester	:	III
Course No.	:	HORT-231
Credit Hrs.	:	2(1+1)
Course Title	:	General Horticulture

SYLLABUS

- Objectives :**
- (i) To understand the basic Principles of Horticulture including Plant Biology, propagation and cultivation,
 - (ii) To learn about the cultivation techniques and management practices for various horticultural crops,
 - (iii) To explore the importance of pest and disease management as well as environmental factors affecting horticultural production,
 - (iv) To develop skills to apply horticultural knowledge in the production of fruits, vegetables, ornamental plants and herbs for both commercial and personal use.

THEORY

Horticulture- Definition, Branches, Importance and Scope. Methods of plant propagation- Sexual and Asexual. General principles and Practices of cultivation of important fruits: Mango, Banana, Citrus, Grape, Guava, Sapota. Importance of vegetables, kitchen garden, etc. General principles and practices involved in cultivation of important vegetables: Solanaceous crops, Cole crops, Cucurbits, Peas and Beans. Importance of Floriculture and different components of Ornamental Garden and cultivation of important flower crops. Medicinal and Aromatic plants: Active principle, Medicinal properties and Aromatic principles.

PRACTICAL

Visit to Orchards and Gardens; Plant propagation methods; Study of varieties, Cultural practices, Plant protection of important fruits; Study of varieties, Cultural practices, Plant protection of important vegetables; Study of culture of medicinal plants; Study of culture of aromatic plants; Study of different components of ornamental garden - Annuals, Shrubs, Trees, Climbers, Hedges and Edges; Study of culture of Flower crops.

TEACHING SCHEDULE

THEORY [HORT-231]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Horticulture - Introduction	Horticulture- Definition, Branches of Horticulture, Importance and Scope- Income/ Employment generation, Industrial/religious value, Export value, Nutritional value, Aesthetic value etc.	10
2	Methods of Plant Propagation- Sexual and Asexual, Asexual Propagation, Cutting, Layering	Definition of Propagation, Methods of propagation-Sexual and Asexual, Advantages and Disadvantages of Sexual and Asexual propagation: Definition of Cutting, Types of Cutting: Stem cuttings- (Herbaceous, Softwood, Semi-hard wood, Hardwood); Root cutting, Leaf cutting, Leaf bud cutting. Definition of Layering, Types of Layering: Simple or Tongue layering, Serpentine or Compound layering, Trench or Continuous layering, Mount or Stool layering, Air layering.	6
3	Methods of Plant Propagation- Budding and Grafting	Methods of Budding: T-budding (Shield budding), Patch budding, Chip budding, Flute budding, I-budding, Forkert budding. Definition of Grafting, Types of Grafting: Splice or Whip grafting, Whip and Tongue grafting, Cleft or Wedge grafting, Side grafting, Veneer grafting, Approach grafting.	3
4	Mango, Banana	General Principles and Practices of cultivation of important fruits: Botanical name, Family, Origin, Area, Production, Soil and Climate, Improved varieties, Propagation and Planting, After care, Irrigation, Weed Management, Nutritional Management, Training and Pruning, Use of plant growth regulators, Physiological disorders and their remedies, Special Horticultural Practices, Pest and Disease control, Harvesting and Yield	8
5	Citrus, Grape		8
6	Guava, Sapota		6
7	Importance of Vegetables; Kitchen Garden		6

Continued...

8	Solanaceous crops- Tomato, Brinjal	General Principles and Practices involved in cultivation of important vegetables: Botanical name, Family, Origin, Distribution, Area and Production, Soil and Climatic requirements, Improved varieties, Sowing and Transplanting, Seed rate, Planting distance, Nutrition, Irrigation, Weed management, Training and Pruning, Inter and Mixed cropping, Use of growth regulators, Physiological disorders, Pest and Disease control, Harvesting and Yield	8
9	Solanaceous crops- Chilli, Potato		6
10	Cole crops, Cabbage, Cauliflower		6
11	Cucurbits, Cucumber, Ridge gourd, Bottle gourd		6
12	Peas and Beans		4
13	Importance of Floriculture, Different Components of Ornamental Garden	Importance of Floriculture in India; Lawn, Shrubbery, Flower beds and Borders, Rockery, Carpet bed, Topiary, Trophy, Climbers and Creeper Hedges and Edges; Arches, Pergolas, Trellises, Garden wall, Garden fences, Foot paths, Roads, Arbours, Bridge	6
14	Rose, Chrysanthemum	Cultivation of important Flower crops: Botanical name, Family, Origin, Distribution, area and Production, Soil, Climate, Improved varieties, Propagation, Special intercultural operations, Training and Pruning, Fertilizers requirement, Irrigation, Use of growth regulators, Weed management, Plant protection measures, Harvesting and Yield.	6
15	Gladiolus, Marigold		6
16	Medicinal and Aromatic Plants	Definition of Medicinal and Aromatic plants: Active principle, Medicinal properties and Aromatic principles.	5
Total =			100

TEACHING SCHEDULE

PRACTICAL [HORT-231]

Exercise No.	Exercise Title
1	Study of plant propagation methods- Propagation by sexual method
2	Study of asexual method- Propagation cuttings and layering
3	Study of asexual method- Propagation budding and grafting
4	Study asexual method- Propagation by specialized plant organs: Bulbs, Corns, Tuber, Runner, Suckers, Offset, Rhizomes etc.
5	Study of varieties of important fruits: Mango and Banana
6	Study of cultural practices of important fruits: Citrus and Grape
7	Study of plant protection of important fruits: Guava and Sapota
8	Study of varieties of important Solanaceous crops
9	Study of cultural practices of important Cole crops and Cucurbits
10	Study of plant protection of important Peas and Beans
11	Study of culture of Medicinal plants
12	Study of culture of Aromatic plants
13 - 14	Study of different components of Ornamental garden - Annuals, Shrubs, Trees, Climbers, Hedges and Edges
15	Study of culture of Flower crops
16	Visit to Orchards and Gardens

Suggested Readings [HORT-231]:

1. **Chadha, K.L. (Ed.) 2002.** Hand Book of Horticulture, ICAR.
2. **Peter, K.V. 2008. (Ed.)** Basics of Horticulture. New India Publ. Agency.
3. **Rajan, S. and Baby, L.M. 2007.** Propagation of Horticultural Crops. New India Publ. Agency.
4. **Pradeepkumar, T., Suma, B., Jyothibhaskar and Satheesan, K.N. 2008.** Management of Horticultural Crops. New India Publ. Agency.

Semester	: III	
Course No.	: ENGG-231	Credits Hrs. : 2(1+1)
Course Title	: Protected Cultivation and Secondary Agriculture	

SYLLABUS

- Objectives:**
- (i) To understand the principles and techniques of protected cultivation, such as a Greenhouse and Polyhouse Farming,
 - (ii) To learn about Secondary Agriculture practices, like Value addition, Processing and Post Harvest Management,
 - (iii) To explore methods to optimize production, quality and profitability in controlled environments,
 - (iv) To develop skills to integrate protected cultivation and secondary agriculture techniques to enhance yield, quality and market value of agricultural products.

THEORY

Greenhouse technology: Introduction, Types of greenhouses; Plant response to Greenhouse environment, Planning and Design of greenhouses, Design criteria of greenhouse for cooling and heating purposes. Greenhouse equipments, Materials of construction for traditional and low-cost greenhouses. Irrigation systems used in greenhouses, Passive solar greenhouse, Hot air greenhouse heating systems, greenhouse drying. Cost estimation and economic analysis. Important Engineering properties such as physical, thermal, aero and hydrodynamic properties of cereals, pulses and oilseeds. Drying and Dehydration; Moisture measurement, EMC, Drying theory, Various drying methods, Commercial grain dryer (Deep bed dryer, Flat bed dryer, Tray dryer, Fluidized bed dryer, Re-circulatory dryer and Solar dryer). Material handling equipment; Conveyer and Elevators, their principle, working and selection.

PRACTICAL

Study of different types of Greenhouses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of Agricultural products inside Greenhouse. Study of greenhouse equipments. Visit to various Post-Harvest Laboratories. Determination of Moisture content of various grains by Oven drying and Infrared moisture methods. Determination of engineering properties (Shape and Size, Bulk density and Porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to Seed processing plant.

TEACHING SCHEDULE**THEORY [ENGG-231]**

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Greenhouse Technology	Introduction, History of Greenhouse, Advantages of Greenhouse, Greenhouse effect	10
2	Types of Greenhouses	Types of Greenhouse based on Shape, Utility, Construction and Covering materials	
3	Plant response to Greenhouse Environment	Light control, Factors affecting Temperature, Relative Humidity, Ventilation and Carbon di-oxide	10
	Planning and Design of Greenhouses	Site selection and Orientation, Structural design and covering / glazing materials, Properties of glazing material, Layout of greenhouse, Types of loads considered for design	
4	Design criteria of Greenhouse for cooling and heating purposes	Cooling - Natural Ventilation, Forced ventilation - Fan and pad, High pressure and Low pressure mist system, Heating - Heating system, Solar heating system, Water and Rock Storage. Passive solar green house, Hot air green house heating systems, Greenhouse drying	8
5	Materials of Construction for Traditional and Low-cost Greenhouses; Greenhouse Equipments	Wood, G.I., Aluminium, steel, R.C.C. and Glass; Greenhouse equipments-	7
6	Irrigation Systems used in Greenhouses	Hand watering, Perimeter watering, Overhead sprinklers, Boom watering, Drip irrigation	5
7	Cost Estimation and Economic Analysis	Capital requirement, Economics of production, Conditions influencing returns	5
8 - 9	Important Engineering Properties such as Physical, Thermal and Aero and Hydrodynamic Properties of Cereals, Pulses and Oilseeds	Physical, Thermal and Aero and Hydrodynamic properties of Cereals, Pulses and Oilseed, their application in PHT equipment design and operation: Physical properties- Size and Shape (Roundness and Sphericity), Porosity, Coefficient of friction and Angle of repose. Thermal properties- Definition of specific heat and Thermal conductivity. Aero and Hydrodynamic properties - Definition of Terminal velocity	10

Continued...

10	Drying and Dehydration	Definitions of Drying and Dehydration, Utilities/ Importance of drying, Grain drying theory – EMC, Thin layer drying and Deep bed drying (<i>Only Definitions</i>)	5
11 - 12	Moisture measurements	Moisture contents and its measurement, Moisture content representation, Dry basis and Wet basis moisture content. Determination Methods: Direct methods - Oven methods, Brown-Duvel fractional distillation method, Infra-red method. Indirect methods - Electrical resistance method, Di-electric method, Chemical method	9
13	Numerical on Moisture Content and its Representation	Conversion of wet basis into dry basis and dry basis into wet basis moisture content. Numerical on moisture content determinations	6
14	Various Drying Methods	Sun drying, Mechanical drying. Mechanical drying methods – Contact drying, Convection drying, Radiation drying, Super- Heated steam drying, Fluidized bed drying, Desiccated drying	9
15	Commercial Grain Dryers	Deep bed dryer, Flat bed dryer, Tray dryer, Fluidized bed dryer, Recirculating dryer (LSU dryer, Baffle dryer, RPEC dryer), Solar dryer	9
16	Material Handling Equipments	Belt conveyor, Screw conveyor, Bucket elevator, their principles, Working and selection.	7
Total =			100

TEACHING SCHEDULE

PRACTICAL [ENGG-231]

Exercise No.	Exercise Title
1	Study of different types of greenhouses
2	Study of cooling and heating systems used in greenhouse
3	Determine the rate of air exchange in an active summer winter cooling system
4	Determination of drying rate of agricultural products inside greenhouse
5	Study of instruments and equipments used in greenhouse
6	Study of irrigation systems used in greenhouse
7	Cost analysis of polyhouse/ greenhouse/ shed net
8	Visit to Commercial Greenhouse
9	Visit to various Post-Harvest Laboratories
10	Determination of moisture content of various grains by oven drying methods
11	Determination of moisture content of various grains by infra-red moisture methods
12	Determination of moisture content of various grains by moisture meter.
13	Determination of engineering properties (Shape and size, Bulk density and Porosity of biomaterials)
14	Study of cleaning, grading and sorting equipments
15	Study of modern rice milling machineries
16	Field Visit to Seed processing plant/ Food-grains processing industries/ Post-harvest Laboratories.

Suggested Readings [ENGG-231]:

1. Greenhouse Technology and Management by K. Radha Manohar, C. Igathinathane, Second Edition (2007), B.S. Publications 4-4-309, Sultan Bazar, Hyderabad- 500 095.
2. Unit Operations of Agricultural Processing by K.M. Sahay and K.K. Singh, Second Revised Edition (2001), Reprint-2017, Vikas Publishing House Pvt. Ltd., New Delhi -110 007.
3. Post-Harvest Technology of Cereals, Pulses and Oilseeds by A. Chakravarty, Third Edition (1995). Reprint-2005, Oxford & IBH Publishing Co. Pvt. Ltd., 66 Janpath, New Delhi -1.
4. A Text Book of Greenhouse and Post-Harvest Technology by B.P. Sawant, J.M. Potekar, H.W. Awari (2008), Nikita Publication, Latur.
5. Green House Technology by G.N. Tiwari and R.K. Goyal (1998), Narosa Publishing House, 6 Community Centre, Panchsheel Park, New Delhi-110017.
6. Greenhouse Operation and Management by Nelson and Paul V. (1994) Prentice Hall, USA.
7. Post-Harvest Technology and Quality Management of Fruits and Vegetables by P. Suresh Kumar, V.R. Sagar and M. Kanwat (2009), Agrotech Publishing Academy, Udaipur.

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

List/ Bouquet of Skill Enhancement Courses (SECs)

[in continuation of the SECs' Syllabi prescribed under I and II semesters]

Sr. No.	CourseNo.	Course Title	Sem.	Credit Hrs.
1.	SEC-111	Computer Applications in Agriculture	I	2(0+2)
2.	SEC-112	Production Technology for Bioagents and Biofertilizers	I	2(0+2)
3.	SEC-123	Seed Production and Seed Testing	II	2(0+2)
4.	SEC-124	Livestock Production and Management	II	2(0+2)
5.	SEC-235	Poultry Production Technology	III	2(0+2)
6.	SEC-246	Development of Agri-business Proposal	IV	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. **However, for the B.Sc. (Hons.) ABM, the above-mentioned SECs at Sr. No. 1 to 6 are already distributed across the given Semesters as per the ICAR-Sixth Deans' Committee Report.**

- (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 current the academic year. However, the same can be obtained from the respective UG Degree Coordinator/ Discipline Coordinators and can be followed w.e.f. AY, 2025-26.
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