Course Curriculum of First 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

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DICC - UG Degree Syllabus Core Committee

Submitted to the

Directors of Instruction Coordination Committee

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

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

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

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

Sr. No.	Course No.	Course Title	Credit Hrs.	Remark
1.	**CAC-111**	*Deeksharambh* (Induction-cum-Foundation Course)	2(0+2)	NG (2 Weeks)
2.	**AEC-111**	National Service Scheme (NSS-I) / National Cadet Corps (NCC-I)	1(0+1)	
3.	**AEC-112**	Communication Skills	2(1+1)	
4.	**MDC-111**	Farming-based Livelihood Systems	3(2+1)	
5.	**MATH-111*/ BOT-111****	Basic Mathematics*/ Basic Botany**	2(2+0)	Need-based
6.	**ABM-111**	Introduction to Agribusiness Management	2(2+0)	
7.	**ECON-111**	Fundamentals of Agricultural Economics	2(2+0)	
8.	**AGRO-111**	Introduction to Agronomy and Crop Production Technology	2(1+1)	
9.	**GPB-111**	Introduction to Genetics and Plant Breeding	2(1+1)	
10.	**PATH-111**	Management of Plant Diseases	2(1+1)	
11.	**SEC-111**	Skill Enhancement Course-I *(To be offered from the bouquet of SEC Courses)*	2(0+2)	
12.	**SEC-112**	Skill Enhancement Course-II *(To be offered from the bouquet of SEC Courses)*	2(0+2)	
		Total Credits Hrs.	**22(12+10) G 2(0+2) NG**	

CAC: Common Academic Course, **AEC**: Ability Enhancement Course,
MDC: Multidisciplinary Course, **SEC**: Skill Enhancement Course,
G: Gradial, **NG**: Non-Gradial

Note: *MATH-111 for **PCB** student/ **BOT-111 for **PCM** student / **PCMB** students should opt any one choice-based course viz., MATH-111 or BOT-111 for completion of the mandatory gradial credits.

B.Sc. (Hons.) A.B.M. : First Semester

Course-wise Syllabus with Teaching Schedules

Semester	**:**	**I**	
Course No.	**:**	**CAC-111**	**Credit Hrs. : 2 (0+2) NG/ 2 Weeks**
Course Title	**:**	***Deeksharambh* (Induction-cum-Foundation Course)**	
Non-Gradial Common Academic Course for the said UG degree with the activities to be conducted during initial two weeks.			

Objectives:

(i) To create a platform for students to help for cultural Integration of students from different backgrounds,

(ii) To know about the operational framework of academic process in university, instilling life and social skills,

(iii) To create Social awareness, Ethics and Values, Team work, Leadership, Creativity,

(iv) To identify the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario.

ACTIVITIES

- Introduction/ Orientation and Discussions on operational framework of academic process in University/ College, as well as interactions with Academic and Research Managers of the University.
- Interaction with Alumni, Business Leaders, Perspective Employers, Outstanding Achievers in related fields and people with inspiring life experiences.
- Group activities to identify the strength and weakness of students and to learn from each other's life experiences.
- Activities to enhance Cultural Integration of students from different backgrounds.
- Field visits to the relevant fields/ establishments.
- Sessions on Personality Development (Instilling Life and Social skills, Social awareness, Ethics and Values, Team work, Leadership etc.) and imbibing the Communication skills.

Note: *The details of the relevant activities will be decided by the parent University in line with the above-mentioned broad activities.*

Semester	**:**	**I**	
Course No.	**:**	**AEC-111**	**Credit Hrs. : 1 (0+1)**
Course Title	**:**	**National Service Scheme (NSS-I) / National Cadet Corps (NCC-I)**	
Gradial Common Course across all UG Degrees			

Course No.: AEC-111	**Course Title: National Service Scheme-I (NSS-I)**	**Credit Hrs: 1(0+1)**

SYLLABUS

PRACTICAL

Introduction and Basic Components of NSS

- Orientation: History, Objectives, Principles, Symbol, Badge; Regular Programs under NSS.
- Organizational structure of NSS, Code of conduct for NSS volunteers, Points to be considered by NSS Volunteers' awareness about Health.
- NSS program activities. Concept of regular activities, Special camping, Day camps, Basis of adoption of village/slums, Conducting survey, Analysing Guiding financial patterns of scheme, Youth program/schemes of GOI, Coordination with different agencies and maintenance of diary. Understanding youth. Definition, Profile, Categories, Issues and Challenges of youth; and Opportunities for youth who is agent of the social change.
- Community mobilization. Mapping of community stakeholders, Designing the message as per problems and their culture; Identifying methods of mobilization involving youth-adult partnership. Social harmony and National integration.
- Indian history and culture, role of youth in nation building, Conflict resolution and peace building. Volunteerism and Shramdaan. Indian tradition of volunteerism, its need, importance, motivation and constraints; Shaman as part of volunteerism.
- Citizenship, Constitution, and Human rights. Basic features of constitution of India, Fundamental rights and duties, Human rights, Consumer awareness and rights and Right to information. Family and Society. Concept of family, Community (PRIs and other community-based organizations) and Society.

TEACHING SCHEDULE

PRACTICAL

Exercise No.	Exercise Topic/ Title	Weightage (%)
1	Orientation, History, Objectives, Principles, Symbols, Badge	10
2	Regular Programmes under NSS	10
3	Organizational Structure of NSS	10
4	Code of Conduct of NSS Volunteer	10
5	Points to be considered about NSS Volunteers awareness about Health	5
6	NSS Programme Activities- Concept of Regular activities	5
7	NSS Programme Activities- Special Campaign	5
8	NSS Programme Activities- Day Camps	5
9	NSS Programme Activities- Adoption of village, Conducting survey, Analyzing Guiding financial patterns of scheme	5
10	NSS Programme Activities- Youth programs/schemes of GOI, Coordination with different agencies and maintenance of diary. Understanding youth. Definition, Profile, Categories, Issues and Challenges of youth and Opportunities for youth who is agent of the social change.	5
11	Community Mobilization- Mapping of community stakeholders, Designing the message as per problems and their culture; Identifying methods of mobilization involving youth-adult partnership.	5
12	Community Mobilization-Culture, Social harmony and National integration.	5
13	Indian History and Culture- Role of youth in Nation Building	5
14	Volunteerism and Shramdaan: Indian tradition of volunteerism, its need, importance, motivation and constraints; Shaman as part of volunteerism.	5
15	Citizenship, Constitution and Human Rights: Basic features of constitution of India, Fundamental rights and duties, Human rights, Consumer awareness and rights and Right to information.	5
16	Family and Society: Concept of family, Community (PRIs and other community-based organizations) and Society.	5
	Total =	**100**

Course No.: AEC-111	Course Title: National Cadet Corps-I (NCC-I)	Credit Hrs.: 1(0+1)

SYLLABUS

Objective: To integrate and develop qualities of leadership, discipline, character and patriotism and foster the NCC Motto: **"Unity and Discipline"** among the youth.

PRACTICAL

- Aims, Objectives, Organization of NCC and NCC Song. DG's Cardinals of Discipline.
- Drill- aim, General words of command, Attention, Stands-at-ease, Stand-easy and Turning.
- Sizing, Numbering, Forming in three ranks, Open and Close order march and Dressing.
- Saluting at the halt, Getting on parade, Dismissing and Falling-out.
- Marching, Length of pace and time of marching in quick/slow time and halt. Side pace, Pace forward and to the rear. Turning on the march and wheeling. Saluting on the march.
- Marking time, Forward march and halt. Changing step, Formation of squad and squad drill.
- Command and control, Organization, Badges of rank, Honours and Awards.
- Nation Building- Cultural heritage, Religions, Traditions and Customs of India. National integration. Values and ethics, Perception, Communication, Motivation, Decision making, Discipline and duties of good citizens. Leadership traits, Types of leadership. Character/ Personality development. Civil defence organization, Types of emergencies, Fire-fighting, Protection. Maintenance of essential services, Disaster management, Aid during development projects.
- Basics of Social Service, Weaker sections of society and their needs, NGO's and their contribution, Contribution of youth towards Social welfare and Family planning.
- Structure and Function of human body, Diet and Exercise, Hygiene and Sanitation. Preventable diseases including AIDS, Safe blood donation, First aid, Physical and mental health. Adventure activities. Basic principles of Ecology, Environmental conservation, Pollution and its control.

TEACHING SCHEDULE

PRACTICAL [AEC-111]

Exercise No.	Exercise Topic	Exercise Sub-topics/ Titles	Weightage (%)
1-2	**Introduction to NCC**	Aims, Objectives, NCC Organizational structure, NCC Song, DG's Cardinals of Discipline.	4
3-5	**Drill Basics**	Aim of drill, General words of command, Positions of attention, Stand-at-ease and Stand-easy, Turning.	8
6-8	**Formation Drills**	Sizing, Numbering, Forming in three ranks, Open and Close order march and Dressing.	8
9-11	**Saluting Drills and Parade Movements**	Saluting at halt, Getting on parade, Dismissing and Falling-out.	8
12-14	**Marching Techniques**	Length of pace and time of marching in Quick/slow march, Side pace, Forward/rear pace, Turning on the march, Wheeling and Saluting on the march	10
15-17	**Squad Formation and Control**	Marking time, Forward march, Halt, Changing step, Formation of squad and Squad drill.	10
18-19	**Command and Control in NCC**	Organization, Badges of rank, Honours and Awards.	4
20-22	**Nation Building and Citizenship; Leadership**	Cultural heritage, Religions, Traditions, Customs of India, National integration, Values and Ethics, Communication, Leadership traits, Discipline and Motivation, Character/ Personality Development.	12
23-24	**Civil Defence and Emergency Management**	Types of emergencies, Fire fighting techniques, Maintenance of essential services, Disaster management and Aid during development projects, Civil Defence Organizations.	10
25-26	**Social Service and Youth Welfare**	Weaker sections of society, Role of NGOs, Youth participation in Social welfare and Family planning	8
27-29	**Health, Hygiene and First Aid**	Human body structure, Diet, Hygiene, Preventable diseases (including AIDS), Safe blood donation, First aid practices, Mental and Physical health.	10
30-32	**Environment and Ecology**	Basic Principles of Ecology, Environmental conservation, Pollution and its control, Adventure activities.	8
		Total =	**100**

Semester : I		
Course No. : AEC-112	**Credit Hrs. : 2(1+1)**	
Course Title : Communication Skills		
Gradial Common Course across all UG Degrees		

SYLLABUS

Objectives:(i) To acquire competence in oral, written and non-verbal communication,

(ii) To develop strong personal and professional communication and

(iii) To demonstrate positive group communication.

THEORY

Communication Process: The magic of effective communication; Building self-esteem and overcoming fears; Concept, nature and significance of communication process; Meaning, types and models of communication; Verbal and Non-verbal communication; Linguistic and non-linguistic barriers to communication and reasons behind communication gap/ miscommunication. Basic Communication Skills: Listening, Speaking, Reading and Writing Skills; Precis writing/Abstracting/Summarizing; Style of technical communication, Curriculum vitae/resume writing; Innovative methods to enhance vocabulary, analogy questions; Structural and Functional Grammar: Sentence structure, modifiers, connecting words and verbals; Phrases and clauses; Case: subjective case, possessive case, objective case; Correct usage of nouns, pronouns and antecedents, adjectives, adverbs and articles; Agreement of verb with the subject: tense, mood, voice; Writing effective sentences; Basic sentence faults.

PRACTICAL

Listening and note taking; Writing skills: précis writing, summarizing and abstracting; Reading and comprehension (written and oral) of general and technical articles; Micro-presentations and Impromptu Presentations: Feedback on presentations; Stage manners: grooming, body language, voice modulation, speed; Group discussions; Public speaking exercises; Vocabulary building exercises; Interview techniques; Organization of events.

TEACHING SCHEDULE

THEORY [AEC-112]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	**Communication Process: The Magic of Effective Communication**	Elements of Communication process such as Communicator, Message, Channel treatment of message, Audience and Audience response.	5
2	**Building Self-esteem and Overcoming Fears**	Points to build Self-esteem, Build social connections, Encourage yourself, Focus on solutions and Set realistic goals, Strategies to overcome fears, Practice, Visualise Success, Preparation, Know your audience, Seek feedback and Active listening.	5
3	**Communication**	Concept, Nature and Significance of Communication process	10
4		Meaning, Types and Models of communication	10
5		Verbal and Non-verbal communication, Linguistic and Non-linguistic communication	10
6		Barriers to communication and Reasons behind communication gap/ miscommunication	5
7	**Basic Communication Skills**	Listening, Speaking, Reading, Writing skills	5
8		Précis writing/ Abstracting/ summarizing- Styles of technical communication, Curriculum Vitae/resume writing	10
9		Innovative methods to enhance vocabulary, analogy questions	5
10	**Structural and Functional Grammar**	Sentence structure, modifiers, connecting words and verbal; Phrases and Clauses	5
11		Case: Subjective case, Possessive case, Objective case	5
12		Correct usage of nouns, Pronouns and Antecedents	5
13		Adjectives, Adverbs and Articles	5
14		Agreement of verbs with the subject: Tense, Mood, Voice	5
15		Writing effective sentences	5
16		Basic sentence faults	5
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [AEC-112]

Exercise No.	Exercise Topic/ Title
1	Listening and Note taking
2	Writing skills- Précis writing
3	Writing skills- Abstracting
4	Writing skills- Summarizing
5	Reading and Comprehension (written and oral) of general and technical articles
6	Micro-presentations
7	Impromptu presentations
8	Feedback on presentations
9	Stage manners- Grooming
10	Stage manners- Body language
11	Stage manners- Voice modulations, Speed
12	Group discussions
13	Public speaking exercise
14	Vocabulary building exercises
15	Interview techniques
16	Organisation of events

Suggested Readings:

1. Allport, G W, 1937. Personality: A Psychological Interpretation. Holt, New York.
2. Brown Michele & Gyles Brandreth, 1994, How to Interview and be Interviewed. Sheldon Press, London.
3. Carnegie Dale, 1997. The Quick and Easy Way to Effective Speaking. Pocket Books, New York.
4. Francis Peter S J, 2012. Soft Skills and Professional Communication. Tata McGraw Hill, New Delhi.
5. Kumar S and Pushpa Lata, 2011. Communication Skills. Oxford University Press.
6. Neuliep James W, 2003. Intercultural Communication- A Contextual Approach. Houghton Mifflin Co Boston.
7. Pease, Allan, 1998, Body Language. Sudha Publications, Delhi.
8. Raman M and Singh P, 2000. Business Communication. Oxford University Press.
9. Ray G L, 2008. Extension, Communication and Management. Kalyani Publishers, Ludhiana
10. Ray G. Land Mondal Sagar, 2012. Textbook on Rural Development Entrepreneurship and Communication Skills. Kalyani Publishers, Ludhiana.
11. Seely J, 2013, Oxford Guide to Effective Writing and Speaking. Oxford University Press.
12. Thomson A J and Martinet A V, 1977, A Practical English Grammar. Oxford University.

Semester	**:**	**I**			
Course No.	**:**	**MDC-111**	**Credit Hrs.**	**:**	**3(2+1)**
Course Title	**:**	**Farming-based Livelihood Systems**			
Gradial Common Course across all UG Degrees					

SYLLABUS

Objectives: (i) To make the students aware about farming-based livelihood systems in Agriculture,

(ii) To disseminate the knowledge and skills that how farming-based systems can be a source of livelihood.

THEORY

Status of Agriculture in India and different States, Income of farmers and rural people in India, Livelihood- Definition, Concept and Livelihood patterns in urban and rural areas, Different indicators to study livelihood systems. Agricultural Livelihood Systems (ALS): Meaning, approach, approaches and framework, Definition of farming systems and farming-based livelihood systems, Prevalent Farming systems in India contributing to livelihood. Types of traditional and modern farming systems. Components of farming system/ farming-based livelihood systems: Crops and cropping systems, Livestock, (Dairy, Piggery, Goatry, Poultry, Duckry etc.), Horticultural crops, Agroforestry systems, Aquaculture, Duck/Poultry-cum-Fish, Dairy-cum-Fish, Piggery-cum-Fish etc.; Small, medium and large enterprises including value chains and secondary enterprises as livelihood components for farmers, Factors affecting integration of various enterprises of farming for livelihood. Feasibility of different farming systems for different agro-climatic zones, Commercial farming-based livelihood models by NABARD, ICAR and other organizations across the country; Case studies on different livelihood enterprises associated with the farming. Risk and success factors in farming-based livelihood systems, Schemes and programs by Central and State Governments; Public and Private organizations involved in promotion of farming-based livelihood opportunities. Role of farming-based livelihood enterprises in 21st Century in view of circular economy, green economy, climate change, digitalization and changing lifestyle.

PRACTICAL

Survey of farming systems and agriculture-based livelihood enterprises, Study of components of important farming-based livelihood models/systems in different agro-climatic zones, Study of production and profitability of crop based, livestock based, processing-based and integrated farming-based livelihood models, Field Visit of innovative farming system models. Visit of Agri-based enterprises and their functional aspects for integration of production, processing and distribution sectors and Study of agri-enterprises involved in industry and service sectors (Value Chain Models), Learning about concept of project formulation on farming-based livelihood systems along with cost and profit analysis, Case study of Start-Ups in agri-sectors.

TEACHING SCHEDULE

THEORY [MDC-111]

Lecture No.	Topic	Sub-topics/Key Points	Weightage (%)
1	Status of Agriculture in India	Historical background, Current status, Role of Agriculture in Indian Economy	4
2	Status of Agriculture in Different States	State-wise scenario, Major crops, Regional diversity	4
3	Income of Farmers and Rural People in India	Factors affecting income, Rural-urban income gap, Government initiatives	4
4	Livelihood: Definition, Concept, and livelihood Patterns in urban and rural areas	Livelihood-Definition and its Concept, Urban vs Rural livelihood patterns, Sources of income	4
5	Different Indicators to Study Livelihood Systems	Economic, Social and Environmental indicators, Measuring livelihood resilience	4
6	Agricultural Livelihood Systems (ALS): Meaning and Approaches	Definition, Significance of ALS, Integrated farming systems, Approaches	4
7	ALS Framework and Case studies	Framework for ALS, Case studies in India	4
8	Definition of Farming Systems and farming based Livelihood Systems	Definition and Role of farming systems in rural livelihoods, Examples of systems	4
9	Prevalent Farming Systems in India contributing to livelihood	Traditional vs. Modern farming systems, Regional differences	4
10	Types of Traditional and Modern Farming Systems	Types; Differences; Strengths, Limitations, Case studies	4
11	Components of farming system/farming-based livelihood systems - Crops and Cropping Systems	Components, Crop diversification, Cropping pattern, Mixed cropping, Importance for rural livelihoods	4
12	Livestock-based Farming Systems	Importance and Management of dairy, piggery, poultry, goatry, duckry, etc.	4
13	Horticultural Crops and Livelihoods	Role of fruits, vegetables and spices in rural income generation	4
14	Agroforestry Systems	Agroforestry- Definition, Combining trees and crops, Agroforestry models in India	2
15	Aquaculture as a Livelihood System	Importance of Aquaculture, Integrated systems (e.g. Duck/Poultry-cum-Fish, Dairy-cum-Fish, Piggery-cum-Fish etc.)	4
16	Challenges in Aquaculture-based Systems	Feasibility, Government support and Market access	2

Continued…

17	Small Enterprises in Farming	Role of small enterprises, Value addition, Local processing	2
18	Medium and Large Enterprises in Farming	Value chains, Secondary enterprises as livelihood components for farmers, Agri-processing.	2
19	Factors affecting Integration of various enterprises of farming for livelihood	Technology, Market access, Credit and infrastructure challenges etc.	4
20	Strategies for Enterprise Integration	Successful integration, Government policies, Examples.	2
21	Overview of Agro-Climatic Zones in India	Characteristics of different zones and their agricultural potential.	2
22	Feasibility of different Farming Systems for different Agro-Climatic Zones	Suitable farming systems for different zones, Climate adaptation.	2
23	Commercial Farming Based Livelihood Models by NABARD, ICAR and other organizations across the country	Role of NABARD, ICAR and other Organizations in promoting commercial models, Successful cases.	4
24	Case studies on different Livelihood Enterprises associated with farming	Analysis of successful enterprises, Dairy Cooperatives etc.	4
25	Risk Factors in Farming-based Livelihood Systems	Climate, Market fluctuations, Input costs; Mitigation strategies etc.	4
26	Success Factors in Farming-based Livelihood Systems	Innovation, Market access, Government support, Social capital etc.	2
27	Schemes and Programmes by the Central Government	Overview of schemes like, PM-KISAN, National Rural Livelihood Mission.	2
28	Schemes and programmes by State Governments	State-specific programs promoting rural livelihoods, Case examples.	2
29	Role of Private Sector in Livelihood Promotion	Public-Private Partnerships, Role of private agribusiness.	2
30	Public-Private Partnerships in Agriculture	Successful collaborations in rural development and farming systems	2
31	Farming-based Livelihoods in the 21st Century	Circular economy, Green economy, Climate change, Sustainability.	2
32	Impact of Digitalization and Changing Lifestyles	Technology in Agriculture, Future prospects for rural livelihoods.	2
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [MDC-111]

Exercise No.	Exercise Topic	Exercise Sub-topics/ Titles
1	Survey of Farming Systems and Agriculture-based Livelihood Enterprises	Methods of data collection; Field survey techniques; Preparing reports on surveyed farms.
2	Study of Components of Farming-based Livelihood Models in Different Agro-Climatic Zones	Components: Crop, Livestock, Fishery, Agroforestry; Identifying models suited to specific zones.
3	Study of Production and Profitability of Crop-based Models	Analysis of input-output relations; Identifying profitable crops
4	Study of Livestock-based Models	Livestock systems: Dairy, poultry, goat farming; Profitability and market access
5	Study of Processing-based Models	Value addition in agriculture; Studying small-scale food processing units
6	Study of Integrated Farming-based Models	Study of crop-livestock-aquaculture integration; Synergies and challenges
7	Field Visit to Innovative Farming System Models	Visit to farms using modern technologies; Documenting practices
8	Visit to Agri-based Enterprises	Enterprises involved in input supply or value addition
9	Study of Functional Aspects: Integration of Production, Processing and Distribution	Backward and forward linkages; Assessing supply chain models
10	Agri-Enterprises in Industry and Service Sectors (Value Chain Models)	Studying value chain enterprises; Evaluating sustainability models
11	Concept of Project Formulation on Farming-based Livelihood Systems	Identifying project objectives; Structuring budgets and timelines
12	Cost and Profit Analysis of Farming-based Livelihood Projects	Developing Cost-Benefit analysis; Identifying Break-Even points
13	Case Study of Start-ups in Agri-sectors	Analysing real-world Start-ups; Identifying success factors
14	Group Project: Develop a Farming-based Livelihood Model	Formulating a working model; Feasibility and sustainability analysis
15	Preparation of Report on Farming Systems Survey and Livelihood Models	Compiling field data; Preparing reports with recommendations
16	Presentation and Evaluation of Practical Project Reports	Group presentations; Internal assessment of reports and participation

Suggested Readings [MDC-111]:

1. **Ashley, C., & Carney, D. (1999)**. *Sustainable Livelihoods: Lessons from Early Experience.* Department for International Development, London, UK.
    - **Relevance**: This book explores sustainable livelihood frameworks, which are key to understanding livelihood patterns and rural income systems.
2. **Agarwal, A., & Narain, S. (1989)**. *Towards Green Villages: A Strategy for Environmentally Sound and Participatory Rural Development.* Centre for Science and Environment, New Delhi, India.
    - **Relevance**: Provides strategies for participatory rural development, focusing on environmental sustainability—a core concept in farming systems.
3. **Carloni, A. (2001)**. *Global Farming Systems Study: Challenges and Priorities to 2030 – Regional Analysis: Sub-Saharan Africa.* FAO, Rome, Italy.
    - **Relevance**: Offers insights into global farming system challenges, with lessons that can be adapted for Indian contexts in agricultural development.
4. **Dixon, J., Gulliver, A., & Gibbon, D. (2001)**. *Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World.* FAO & World Bank, Rome & Washington, DC.
    - **Relevance**: Focuses on farming systems' role in poverty alleviation and rural livelihood improvement.
5. **Evenson, R.E. (2000)**. *Agricultural Productivity and Production in Developing Countries.* In *FAO, The State of Food and Agriculture.* FAO, Rome, Italy.
    - **Relevance**: Discusses agricultural productivity, a critical factor in sustainable farming and improved livelihoods.
6. **Bhatt, B.P., *et al*. (ICAR Research Complex for Eastern Region)**. *Livelihood Improvement of Underprivileged Farming Community: Experiences from Bihar.* Patna, Bihar.
    - **Relevance**: Case studies on improving livelihoods in rural India, relevant to learning about region-specific agricultural interventions.
7. **Panwar *et al.* (2020)**. *Integrated Farming System Models for Agricultural Diversification, Enhanced Income, and Employment.* Indian Council of Agricultural Research, New Delhi.
    - **Relevance**: Provides models for agricultural diversification and income enhancement, which align with farming system topics.
8. **Reddy, S.R. (2016)**. *Farming System and Sustainable Agriculture.* Kalyani Publishers, New Delhi.
    - **Relevance**: Covers sustainable agriculture principles and farming system models, essential for sustainable livelihood systems.
9. **Singh, J.P. *et al*. (2016)**. *Region Specific Synthesized Integrated Farming System Models for Improved Production, Profitability and Nutrition (Series-1).* Bulletin, ICAR-Indian Institute of Farming Systems Research, Modipuram, Meerut (U.P.).
    - **Relevance**: Discusses integrated farming models tailored to different agro-climatic regions of India, essential for practical learning.
10. **Walia, S.S., & Walia, U.S. (2020)**. *Farming System and Sustainable Agriculture.* Scientific Publishers, Jodhpur, Rajasthan.
    - **Relevance:** Provides insights into sustainable agricultural practices and integrated farming systems with regional focus.

Semester	**: I (New)**		
Course No.	**: MATH-111***	**Credit Hrs. :**	**2(2+0) Need-based; G**
Course Title	**: Basic Mathematics**		
***Gradial** Need-based Course only for **B.Sc. (Hons.) Agri-Business Management**			

SYLLABUS

Objectives:

(i) To introduce the basic principles and functions in Mathematics,
(ii) To study differentiation and integration,
(iii) To study matrices and determinants.

THEORY

Algebra: Progressions: Arithmetic Progression: Definition, Sum of n terms, Examples. Geometric Progression: Definition, sum of n terms, Examples. Harmonic Progression: Definitions, Examples.

Determinants: Definition of Determinant, Expansion of determinant up to 3rd order, Examples; Properties of determinants up to 3rd order (without proof).

Matrices: Definition of Matrices, Order of Matrix, Types of Matrices, Algebra of Matrices: Addition, Subtraction, Multiplication, Examples, Transpose of Matrix and it's properties (without proof).

Differential Calculus: Definition, Differentiation of function using first principle, Examples. Rules of Differentiation: Derivatives of sum, difference, product and quotient of two functions (Formulae only), Derivative of Standard Functions: Algebraic Function, Trigonometric, Logarithmic and Exponential Functions (Formulae only), Examples. Increasing and Decreasing Functions, Growth rate, Average cost, Marginal cost, and Marginal revenue. Examples.

Partial Differentiation: Definition, Homogeneous function, Euler's theorem, Examples. Maxima and Minima of the functions of the form y = f (x) and y = f (x1, x2), Examples.

Integral Calculus: Definition of Indefinite and Definite Integrals, Integrals of elementary functions (Formulae only), Theorems of integration (without proof), Integration by substitution, Examples. Integration by parts, Examples, Application of Integration: To find Area under simple well-known curves (Simple problems based on it).

Mathematical Models: Agricultural systems - Mathematical models - Classification of mathematical models- Fitting of Linear, Quadratic and Exponential models to experimental data.

Suggested Readings:

1. NCERT, 2012, Mathematics of Class XII, NCERT, India.
2. A Textbook of Mathematics XI and XII (Part I and II) Maharashtra State Board of Secondary and Higher Secondary Education, Pune.
3. Sharma RD, 2014, Mathematics of Class XII, Dhanpat Rai Publisher.

TEACHING SCHEDULE

THEORY [MATH-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1 - 3	**Algebra: Progressions**	Arithmetic Progression: Definition, Sum of n terms, Examples.	10
		Geometric Progression: Definition, Sum of n terms, Examples. Harmonic Progression: Definitions, Examples.	
3 - 6	**Determinants**	Definition of Determinant, Expansion of determinant up to 3rd order, Examples.	10
		Properties of determinants up to 3rd order (without proof)	
6 - 12	**Matrices**	Definition- Matrices, Order of Matrix, Types of Matrices	20
		Algebra of Matrices: Addition, Subtraction, Multiplication, Examples.	
		Transpose of Matrix and it's Properties (without proof)	
		Inverse of Matrix up to 3rd order by Adjoint method, Examples.	
13 - 20	**Differential Calculus**	Definition, Differentiation of function using First Principle, Examples.	20
		Rules of Differentiation: Derivatives of sum, Difference, Product and quotient of two functions (Formulae only), Derivative of Standard Functions: Algebraic Function, Trigonometric, Logarithmic and Exponential Functions (Formulae only), Examples.	
		Increasing and Decreasing Functions,	
		Growth rate, Average cost, and Marginal cost, Marginal revenue. Examples.	
21 - 23	**Partial Differentiation**	Definition, Homogeneous function, Euler's theorem, Examples.	10
		Maxima and Minima of the functions of the form- y = f (x) and y = f (x1, x2), Examples.	
24 - 30	**Integral Calculus**	Definitions of Indefinite and Definite Integrals.	20
		Integrals of elementary functions (Formulae only)	
		Theorems of integration (without proof).	
		Integration by substitution, Examples.	
		Integration by parts, Examples.	
		Application of Integration: to find Area under simple well-known curves (Simple problems based on it).	
31 - 32	**Mathematical Models**	Agricultural systems - Mathematical models - classification of mathematical models- Fitting of Linear, Quadratic and Exponential models to experimental data.	10
		Total =	**100**

Semester	**:**	**I**		
Course No.	**:**	**BOT-111****	**Credit Hrs. : 2(2+0)**	**Need-based; G/NG**
Course Title	**:**	**Basic Botany**		
Need-based Common Course among 3 UG Degrees: **B.Tech. (Biotech.) - Gradial / B.Sc. (Hons.) A.B.M. - Gradial / B.Tech. (Food Tech.) - Non-Gradial				

SYLLABUS

Objectives:
i. To study the basic taxonomy and classification of plants,
ii. To study the features of plant kingdom and morphology,
iii. To study the internal structures of plants.

THEORY

Plant Kingdom and Features of each group. Plant taxonomy, Systems of classification. Morphology, Modifications and Functions of Root, Stem, Leaf, Flower and Inflorescence. Pollination and Fertilization. Fruit types. Structure of dicot and monocot seed, and seed germination. Cell structure. Chromosome, DNA and Genes. Cell and tissue types. Internal structure of root, stem and leaf. Characteristics and economic importance of Poaceae, Brassicaceae, Fabaceae, Malvaceae, Rutaceae, Rosaceae, Asteraceae and Solanaceae families.

TEACHING SCHEDULE

THEORY [BOT-111]

Lecture No.	Topics	Sub-topics/ Key Points	Weightage (%)
1-3	**Plant Kingdom and Features:**	Classification of Plant Kingdom (Major plant groups: Bryophytes, Pteridophytes, Gymnosperms, and Angiosperms.) Key distinguishing features/ Characteristics of each group with examples. Plantae Kingdom.	8
4-5	**Plant Taxonomy and Systems of Classification:**	Binomial nomenclature and other systems of classification (in brief)	5
6-7	**Plant Cell and Tissue Types:**	Basic Structure of a Plant Cell and Tissue, Types of Plant Cells and Tissues; Plant Cell Functions.	8
8-9	**Chromosome:**	Definition and Overview, Chemical Composition; Chromosome Morphology, Types of Chromosomes.	8

Continued…

10-11	**DNA:**	Brief historical overview of DNA discovery, Watson-Crick model of DNA, Chemical composition, Components of a nucleotide, Structures of Purines and Pyrimidines.	8
12	**Genes:**	Definitions (Gene, Allele, Genotype, Phenotype, Exon, Intron, Codon) and Historical Overview; Structure: Basic layout of a gene- (Exon, Intron, etc.); Types of genes, Codons (Start/ Stop).	8
13-14	**Pollination and Fertilization:**	Definitions/Terminology, Types, Agents of pollination, Processes/Events, Significances, Barriers to Fertilization, Differences between their types.	10
15-16	**Root and Stem:**	Morphology, Modifications with examples and Functions	8
17-19	**Leaf, Flower and Inflorescence:**	Morphology, Modifications with examples and Functions	8
20	**Fruits:**	Types of fruits with examples	3
21-22	**Structures of Monocot and Dicot Seeds:**	Structure, Diagrams, Differences	5
23-24	**Seed Germination:**	Definitions, Types, Differences and Stages of seed germination	5
Plant taxonomy-Classification; Characteristics and Economic Importance; Members/ Examples of following Families viz.,			
25-26	Poaceae and Brassicaceae		4
27-28	Fabaceae and Malvaceae		4
29-30	Rutaceae and Rosaceae		4
31-32	Asteraceae and Solanaceae		4
		Total=	**100**

Suggested Readings [BOT-111]:

1. Bendre AM and Kumar A, 1999, Textbook of Practical Botany. Vol. 2, 7th Edn, Rastogi Publications.
2. Bendre AM and Pande PC, 2009, Introduction to Botany, Rastogi Publications.
3. Bhatia KN and Tyagi MP, 2020, Elementary Biology. A Truemen Publication.
4. David M Hillis, H Craig Heller, Sally D Hacker, David W Hall, David E Sadava, 2020. (eBook) Life: The Science of Biology, 12th Edn, Sunderland Publication.
5. Dutta AC, 1995, A Class-Book of Botany, 16th Edn, Oxford University Press.
6. NCERT, 2021. Biology of Class XI. NCERT, India.
7. Pande PC and Jain DK, 2022, A Textbook of Botany Angiosperm. S. Chand Publications.

Semester	**:**	**I**		
Course No.	**:**	**ABM-111**	**Credit Hrs.** **:**	**2(2+0)**
Course Title	**:**	**Introduction to Agri-Business Management**		

SYLLABUS

Objectives:

(i) To gain a comprehensive understanding of agribusiness structures, functions, a and dynamics;

(ii) To develop essential management skills applicable to agricultural enterprises;

(iii) To explore strategies for optimizing production efficiency and maximizing profitability in agribusiness; and

(iv) To prepare for diverse careers in farm management, agricultural marketing, finance, and consulting.

THEORY

Indian Agriculture: Place of Agriculture in Indian Economy, Trends in the structure of Indian Economy Role of Agriculture in Economic Development in India. Trends in agricultural production and productivity, cropping pattern size of farms and farm efficiency. Functions of Management: Planning, organizing, staffing, motivation and control and Principles of Management. Indian Agriculture; Impact of Liberalization, Privatization and Globalization on Agribusiness sector. Agribusiness Management: Definition, Importance, Scope of Agribusiness Management, Nature and Functions. Agribusiness input and output services, Agricultural credit and foreign trade, Planning and Organizing agribusiness. New trends in Agribusiness: Contract farming, Types and Scope of contract farming, Working of Contracts, Contract Models, Organic Farming, Genetically Modified Food, Farmer Producers' Organizations (FPO) Case Studies.

TEACHING SCHEDULE

THEORY [ABM-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1-3	Indian Agriculture	Place of Agriculture in Indian Economy, Trends in the structure of Indian Economy, Role of Agriculture in Economic Development in India	10
4		Trends in Agricultural Production and Productivity	6
5		Cropping pattern, Size of farms and Farm efficiency	
6	Functions of Management-Planning	Meaning, Importance and Characteristics	4
7	Directing	Meaning, Importance and Principles	4
8	Organizing	Meaning, Nature/ Characteristics, Purpose	4
9	Staffing	Meaning, Objectives, Importance, Process of Selection	4
10	Controlling	Meaning, Nature, Characteristics and Importance	4
11-13	Principles of Management	Principles of Management-Meaning, Evolution, Features, Levels of Management, Roles of Manager, Managerial Skills	12
14-15	Indian Agriculture	Impact of Liberalization, Privatization, Globalization on Agribusiness sector	6
16-18	Agri-business Management	Definition, Importance, Scope, Nature, Functions of Agri-business Management	6
19-20	Agri-business	Input services, Output services	6
21	Agricultural Credit	Trends of Agricultural Credit in India, Agricultural Credit Policy	6
22	Agricultural Foreign Trade	Importance, Policy, Trade Organizations	

Continued…

23-24	Planning and Organizing Agri-business	Business Planning; Market Analysis, Financial Planning, Legal considerations, Organizational Structure, Financial & Risk Management	4
25-28	New Trends in Agri-business	Contract farming, Definitions, Types and Scope of contract farming, Working of contracts, Contract models	12
29	Organic Farming	Characteristics of Organic Farming, Principles of Organic Farming	2
30	Genetically Modified Food	Definition, Examples, Indian Scenario	4
31 -32	Farmer Producers' Organizations (FPO)	Definition, Introduction, Importance, Organisation, Functions; Case Studies (Two only)	6
		Total=	**100**

Suggested Readings [ABM-111]:

1. A Handbook of Agribusiness- S.C. Gaur and D. Singh
2. A Textbook of Agri-business Management- Sanket S. Kadam, Universal Prakashan, Pune.
3. Indian Agriculture and Agri-business Management, Dr. Smita Diwase, Krishi Resource Management Network.
4. Farm Business Management: The Fundamentals of Good Practice by Peter L Nuthall.
5. Fundamentals of Agribusiness Finance by Ralph W. Battles and Robert C. Thompson.
6. Objective Agri-business Management by S.R. Panigrahy.
7. Agri-business: Management, Marketing, Human Resource Development, Communication, and Technology by Robert H. Usry and Lanny W. Hass
8. Agri-business and Market Management by Amod Sharma.

Semester	**:**	**I**		
Course No.	**:**	**ECON-111**	**Credits Hrs. :**	**2(2+0)**
Course Title	**:**	**Fundamentals of Agricultural Economics**		

SYLLABUS

Objectives:

(i) To understand the fundamental principles of economics as they apply to Agriculture,

(ii) To analyze the economic factors influencing agricultural production, distribution and consumption,

(iii) To explore the role of government policies and international trade in shaping the agricultural economy,

(iv) To develop critical thinking skills to evaluate and address economic challenges and opportunities in Agriculture.

THEORY

Agricultural Economics: Meaning, Definition, Characteristics of Agriculture, Nature and Scope of Agricultural Economics, Distinction between Agriculture and Industry, Role of Agriculture in economic development, Role of Government Interventions in Agricultural development. Planning and Agricultural Development: Meaning and Objectives, Economic planning, Benefits of planning, Agricultural development during different Five-year Plans in India, Measures of reorganization of agriculture and NITI Aayog. Factors of production: Meaning of land and its Characteristics, Labour concept, Characteristics of labour and Efficiency of labour, Capital concept and its Characteristics, Forms of capital in Agriculture and Process of capital formation, Organization of business firms, Forms of business organizations and their characteristics. Land reforms: Land reforms and Land tenure systems, Concepts of agricultural land holdings in India. Theory of production: Meaning, Definition, Types of production functions, Laws of Diminishing Marginal Returns and Elasticity of production. Scale of production: Meaning, Classification and Economies of scale. Theory of costs: Meaning, Definitions and Different types of costs and their Measurement. Revenue concept: Total revenue, Average revenue, Marginal revenue and Profit maximization.

TEACHING SCHEDULE

THEORY [ECON-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1-2	Agricultural Economics	Meaning, Definition, Characteristics of Agriculture, Nature and Scope of Agricultural Economics	10
3	Distinction between Agriculture and Industry	Distinction between Agriculture and Industry	2
4-5	Role of Agriculture	Role of Agriculture in economic development, Role of Government interventions in agricultural development	8
6-7	Planning and Agricultural Development	Meaning and Objectives, Economic planning, Benefits/ Importance of planning,	4
8-11	Agricultural Development during different Five-Year Plans in India	Plan period, Outlay Share, Growth rates and Achievements in the field of Agriculture in brief	8
12-13	Measures of Reorganization of Agriculture	Measures of reorganization of Agriculture	2
14-16	NITI Aayog	History of Planning Commission, NITI Aayog, Organization, Working, Role for Agricultural development	8
17-20	Factors of Production	Meaning of land and its characteristics, Labour concept, Characteristics of labour and Efficiency of labour, Capital concept and its characteristics, Forms of capital in Agriculture and Process of capital formation, Organization of business firms, Forms of business organizations and their characteristics.	10
21-22	Land Reforms	Land reforms, Land tenure systems, Concepts of agricultural land holdings in India	8
23-24	Theory of Production	Meaning, Definition, Types of Production functions	8

Continued…

25-26	Laws of Diminishing Marginal Returns and Elasticity of Production	Laws of Diminishing Marginal Returns and Elasticity of production	8
27-28	Scale of Production	Meaning, Classification and Economies of scale	10
29-30	Theory of Costs	Meaning, Definitions and Different types of costs and their measurement	10
31-32	Revenue Concept	Total revenue, Average revenue and Marginal revenue and Profit maximization	4
		Total=	**100**

Suggested Readings [ECON-111]:

1. Agriculture Economics by Shubha Reddy.
2. Finance by Shubha Reddy.
3. Economic of farm production and management by V.T. Raju and V.S. Rao.
4. Agricultural marketing in India by S.S. Acharya and N.L. Aggarwal.
5. Modern Microeconomics by Koutsoyiannis.

Semester	**:**	**I**		
Course No.	**:**	**AGRO-111**	**Credits Hrs. :**	**2(1+1)**
Course Title	**:**	**Introduction to Agronomy and Crop Production Technology**		

SYLLABUS

Objectives :

(i) To understand the principles of Agronomy and Crop Production Technology,

(ii) To learn about crop growth and development, including factors influencing yield and quality,

(iii) To explore sustainable and efficient farming practices to enhance crop productivity while minimizing environmental impact,

(iv) To gain practical knowledge of crop management techniques, including soil fertility, pest control and irrigation.

THEORY

Agriculture, Agronomy and their Scope, Tillage and Tilth, Crop density and Geometry, Factors affecting growth and development, Crops and Cropping systems, Crop rotation and its principles, Manures and Fertilizers, Irrigation, Water resources, Crop water requirement, Water Use Efficiency, Irrigation-scheduling criteria and methods, Quality of irrigation water, drainage. Weeds - Importance, Classification, Crop weed competition, Concepts of weed management- Principles and methods, Herbicides. Origin, Geographical distribution, Economic importance, Soil and Climatic requirements, Varieties, Cultural practices and Yield of *Kharif* crops viz., Rice, Maize, Sorghum, Minor millets, Pigeon pea, Mungbean, Groundnut and Soybean. *Rabi* crops viz., Sorghum, Wheat, Chickpea, Rapeseed and Mustard, Sunflower; and Sugarcane, Cotton, Tobacco, Chilli.

PRACTICAL

Identification of crops, seeds, fertilizers, herbicides and tillage implements, Identification of weeds in crops, Methods of herbicide and fertilizer application, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Methods of irrigation. Methods of sowing of different crop. Nutrient function and deficiency. Top dressing and foliar feeding of nutrients. Study of yield contributing characters and yield calculation of important crops. Visit to research centres of related crops.

TEACHING SCHEDULE

THEORY [AGRO-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Agriculture, Agronomy	Definitions: Agriculture, Agronomy, Scope. Tillage: Definition, Objects of tillage, Types of tillage, Tilth: Definition and Characteristics of ideal tilth.	8
2	Crop Density and Geometry	Crop density and Geometry concept, Factors affecting growth and crop development, Cropping systems-types, Crop rotation- Concept and its Principles.	6
3	Manures and Fertilizers, Role of plant nutrients	Manures and Fertilizers - Meaning, Classification of manures and fertilizers, Role of plant nutrients.	8
4	Irrigation, Water resources	Irrigation meaning, Water resources of India, Crop water requirements, Water use efficiency: Concept, Irrigation efficiencies: Def'ns/Concept.	6
5	Criteria and Methods of irrigation	Criteria for scheduling of irrigation, Methods of irrigation, Advantages and Disadvantages.	8
6	Water quality parameters and Drainage	Quality of irrigation water. Drainage: Concept and importance, Types of drainage, Factors affecting drainage.	4
7	Weeds	Weed- Definition, Importance, Merits and Demerits, Classification of weeds, Meaning of crop-weed competition.	6
8	Concept of Weed Management	Principles and Methods of weed management viz., Cultural, Mechanical, Chemical, Biological Weed control methods and IWM concept, Classification of herbicides.	8
9-12	Production Technology of *Kharif* crops	Origin, Geographical distribution, Economic importance, Soil and Climatic requirements, Varieties, Cultural practices and Yield of: Rice, Maize, Sorghum, Minor millets, Pigeon pea, Mung bean, Groundnut and Soybean.	6

Continued…

13-16	Production technology of *Rabi* crops	Origin, Geographical distribution, Economic importance, Soil and Climatic requirements, Varieties, Cultural practices and Yield of: Sorghum, Wheat, Chickpea, Rapeseed, Mustard and Sunflower.	4
17	Sugarcane Production Technology	Origin, Geographical distribution, Economic importance, Soil and Climatic requirements, Varieties, Cultural practices and Yield	8
18	Production Technology of Chilli	Origin, Geographical distribution, Economic importance, Soil and Climatic requirements, Varieties, Cultural practices and Yield	6
19	Production Technology of Tobacco and Cotton	Origin, Geographical distribution, Economic importance, Soil and Climatic requirements, Varieties, Cultural practices and Yield	4
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [AGRO-111]

Exercise No.	Exercise Title
1	Identification of crops and seeds.
2	Identification of fertilizers.
3	Identification of herbicides.
4	Identification of tillage implements.
5	Identification of weeds in crops.
6	Study methods of herbicide and fertilizer application.
7	Numerical exercises on fertilizer requirement.
8	Numerical exercises on calculation of plant population.
9	Numerical exercises on calculation of herbicide requirement.
10	Numerical exercises on calculation of water requirement.
11	Study of different methods of irrigation.
12	Study of methods of sowing of different crops.
13	Study of nutrient functions and deficiencies.
14	Study of top dressing and foliar feeding of nutrients.
15	Study of yield contributing characters and yield calculation of important crops.
16	Visit to Research Centers of related crops.

Suggested Readings [AGRO-111]:

1. Principles of Agronomy by T.Y. Reddy and G.H. Sankara Reddi:

   Relevance: This book provides a comprehensive overview of agronomic principles, including crop production techniques, soil management, and crop physiology.

2. Fundamentals of Crop Production by Stephen R. Kaffka and Larry L. Strand:

   Relevance: This textbook covers the basics of crop production, including plant growth and development, crop management practices, and environmental factors affecting crop yield.

3. Introduction to Agricultural Engineering Technology: A Problem-Solving Approach by Harry L. Field and John B. Solie:

   Relevance: This book offers insights into the technological aspects of agronomy, including machinery, irrigation systems and precision agriculture techniques.

4. Crop Production: Evolution, History, and Technology by C. Wayne Smith and Julian R. Betters:

   Relevance: This book explores the history and evolution of crop production technologies, providing a broader context for understanding modern agronomic practices.

Semester	**:**	**I**		
Course No.	**:**	**GPB-111**	**Credits Hrs. :**	**2(1+1)**
Course Title	**:**	**Introduction to Genetics and Plant Breeding**		

SYLLABUS

Objectives:

(i) To understand the principles of Genetics and their application in Plant Breeding,

(ii) To learn about breeding techniques used to improve crop traits such as yield, its quality and disease resistance,

(iii) To explore the importance of genetic diversity and its role in crop improvement and adaptation to changing environments,

(iv) To develop skills to evaluate and select superior plant genotypes for breeding programs aimed at enhancing agricultural productivity and sustainability.

THEORY

History of Genetics and Plant Breeding, Study of Chromosome- Structure and Functions, Cell Division, Mendel's Laws of inheritance, Modes of inheritance- Monogenic, Polygenic, Cytoplasmic. Modes of reproduction and their significance in Plant Breeding, Modes of Pollination, Self incompatibility, Male sterility and their significance in Plant Breeding, Breeding for Self-pollinated crops- Mass, Pure line, Pedigree method and Bulk method; Breeding for Cross-pollinated crops- Ear to row method, Backcross method, Development of Synthetics, Development of Composites and Hybrids; Vegetative Propagated Crops viz., Clonal selection.

PRACTICAL

Study of Microscopy, Simple and compound microscopes, Mendelian ratios- Monohybrid, Dihybrid and Problems related to segregation and independent assortment, Study of floral biology and structure of a model flower, Study of floral structure and biology of important cereals, Study of floral structure and biology of important pulses and oil seeds, Study of floral structure and biology of important commercial crops, Study of Plant Breeder's kit, Selfing and crossing techniques, Male sterility: A, B and R lines and their utility, Pollen, fertility study and its importance, Study of germplasm of various crops, Problems in hybrid seed production, Layout of field experiments, Principles, data recording and elementary statistics and analysis of data, Visit to different crop breeding schemes.

TEACHING SCHEDULE

THEORY [GPB-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	**History of Genetics and Plant Breeding**	Definitions: Genetics, Plant Breeding, Domestication, Plant introduction; History/ Milestones/ Major Contributions in/of Genetics and Plant Breeding.	5
2	**Study of Chromosome**	Structure of chromosomes: Nucleosome-solenoid model. Types of chromosomes: Based on position of centromere, Autosomes and Sex chromosomes, Special chromosomes (in brief). Structural aberrations: (deletions, duplications, inversions and translocations); Polyploidy in plants: (Numerical aberrations: Autopolyploidy and Allopolyploidy). Definitions: Chromosome, Karyotype. Functions of chromosomes in inheritance.	10
3	**Cell Division**	Mitosis: Stages and Significance in growth and asexual reproduction; Meiosis: Stages and Significance in genetic diversity.	10
4	**Mendel's Laws of Inheritance**	Law of Segregation: Statement, Explanation and Example with pea plants. Law of Independent Assortment: Statement, Explanation and examples. Reasons for Mendel's Success, Exceptions to Mendelism; [Definitions: Gene, Allele, Dominant and Recessive alleles, Epistasis, Genotype, Phenotype, Monohybrid cross, Dihybrid cross, Back cross, Test cross].	5
5	**Modes of Reproduction**	Sexual and Asexual modes of reproduction; Definitions, Their significance in Plant Breeding	5
6	**Modes of Pollination**	Self-pollination: Definitions, Characteristics, Promoting Mechanisms and Examples. Cross-pollination: Definitions, Characteristics, Promoting Mechanisms and Examples. Often-cross pollination: Definitions and Examples. Pollinators in brief:(insects, animals, wind, water)	5

Continued…

7	**Self Incompatibility**	Definition, Mechanisms of self-incompatibility; Types of self-incompatibility/ SI Systems: (sporophytic, gametophytic) with Examples. Role / Use of SI in Plant Breeding.	10
8-9	**Male Sterility**	Definitions of male sterility systems in plants. Types of male sterility: (Cytoplasmic, genetic, CGMS and Environmental) Significance in Plant Breeding: Utilization/ Role of male sterility in developing hybrid crops and hybrid seed production.	10
10-11	**Breeding for Self-pollinated Crops**	Breeding Objectives for self-pollinated crops with examples. Definitions, Principles/Concept, Purpose, Method/Steps involved, Advantages, Applications of following breeding methods: Mass Selection: Pure Line Selection: Pedigree Method: Bulk Method:	10
12-13	**Breeding for Cross-pollinated Crops**	Breeding Objectives for cross-pollinated crops with examples. Definitions, Principles/Concept, Purpose, Method/Steps involved, Advantages, Applications of following breeding methods: Ear-to-Row Method: Backcross Method: Development of Synthetics: Development of Composites: Development of Hybrids:	10
14	**Breeding for Vegetatively Propagated Crops**	Breeding Objectives for vegetatively propagated crops. Clonal Selection: Definitions, Principles, Steps, and importance, Merits & Demerits. Examples of vegetative propagating crops; Role of clonal selection in crop improvement.	10
15-16	**Mutation**	Mutation (Definition); Introduction; Characteristics; Classification/Kinds/Types of Mutation. Mutagenic agents/Mutagen (Definition), Types of mutagens (Physical, Chemical- with e.g.), and Induction (method of mutagenesis). Role of Mutation in Plant Breeding.	10
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [GPB-111]

Exercise No.	Exercise Title
1	Study of Microscopy, Simple and Compound microscope
2	Monohybrid - Mendelian ratios and Problems solving.
3	Dihybrid - Mendelian ratios and Problems related to Segregation and Independent Assortment
4	Study of floral biology and structure of a model flower
5	Study of floral structure and biology of important cereals
6	Study of floral structure and biology of important pulses and oilseeds
7	Study of floral structure and biology of important commercial crops
8	Study of Plant Breeder's Kit
9	Selfing and Crossing techniques
10	Male sterility: A, B and R lines and their utility
11	Pollen fertility study and its importance
12	Study of germplasm of various major crops
13	Problems in hybrid seed production
14	Layout of field experiments
15	Principles, Data recording and Elementary statistics and Analysis of data
16	Visit to different crop breeding schemes/stations.

Suggested Readings [GPB-111]:

1. An Introduction to Genetic Analysis, Suzuki *et. al*.
2. Principles of Genetics, E.J. Gardner, M.J. Simmons, D.P. Snustad, Wiley India (P) Ltd.
3. Genetics, P.K. Gupta, Rastogi Publication, Meerut.
4. Fundamentals of Genetics, B.D. Singh, Kalyani Publication, New Delhi.
5. Genetics, M.W. Strickberger, Peerson Education, New Delhi.
6. Elements of Genetics, Phundan Singh, Kalyani Publication, New Delhi.
7. Genetics, Sushant Elrod and William Stansfield, McGraw Hill Publishing Company Limited, New Delhi.
8. Plant Breeding Principles and Methods, B.D. Singh, Kalyani Publication, New Delhi.
9. Essentials of Plant Breeding, Phundan Singh, Kalyani Publication New Delhi.
10. Principles and Practices Plant Breeding, J.R. Sharma, McGraw Hill Publishing Company Limited, New Delhi.
11. Plant Breeding Theory and Practices, V.L. Chopra, Oxford and IBH, Publishing Company, New Delhi.

Semester	**:**	**I**		
Course No.	**:**	**PATH-111**	**Credits Hrs. :**	**2(1+1)**
Course Title	**:**	**Management of Plant Diseases**		

SYLLABUS

Objectives:

(i) To understand the Biology, Epidemiology and Ecology of plant diseases,

(ii) To learn effective strategies for disease prevention, diagnosis and management in agricultural systems,

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

(iv) To develop skills to mitigate the impact of plant diseases on crop yield, quality and sustainability.

THEORY

Economic significance of post-harvest diseases and seed-borne diseases. Historical development in Seed Pathology and Post-harvest diseases. Objectives of Seed Pathology and Post-harvest diseases. Study of important Post-harvest Diseases (transport, storage and market) of perishables and grains etc. Important post-harvest diseases. Storage/Field fungi responsible for production of toxins and their effects on consumption. Mycotoxins and Aflatoxin. Identification and detection of plant pathogens carried through seeds, vegetatively propagating material. Seed processing, treatment and storage. Seed transmission, Seed contamination, accompanying pathogens, false seed transmission. Processing, seed treatment, seed packaging, packaging materials. Functional requirement to packing materials. Epidemiology, Factors affecting disease development, Assessment of disease severity and crop losses. Principles of plant disease management viz., Avoidance, Exclusion, Eradication, Protection, Immunization-HPR and Biological control. Pesticides, Classification of fungicides. Modes of application. Management of post-harvest diseases. Biotechnological approaches of diseases management. IPR and related issues. IDM concepts and importance. IDM module for important post-harvest diseases.

PRACTICAL

Study of post-harvest disease symptoms caused by fungi, bacteria, virus, nematodes etc. Methods of diagnosis of various post-harvest diseases. Methods of estimation of disease severity and losses; Seed health testing techniques. Methods of detection and identification of seed-borne pathogens; Isolation of biocontrol agents; Testing the efficacy of biocontrol agents by dual culture technique. Mass multiplication and methods of application of bioagents. Study of fungicides, bactericides, nematicides and their formulations. Study of pesticide compatibility and their safe-use. Study of plant protection equipments. Bioassay of fungicides; Seed treatment techniques for the control of seed-borne diseases; Biocontrol of post-harvest diseases. Study of seed packaging and storage techniques. Visit to vegetable and fruit markets, biopesticide/pesticide firms. Visit to processing warehouse and testing laboratories.

TEACHING SCHEDULE

THEORY [PATH-111]

Lecture No.	Topic with Sub-topics/ Key Points	Weightage (%)
1	Economic significance of post-harvest diseases and seed-borne diseases.	5
2	Historical developments in Seed Pathology and Post-harvest diseases.	5
3	Objectives of Seed Pathology and Post-harvest diseases.	5
4	Study of important Post-harvest Diseases (transport, storage & market) of vegetables, fruits, oil seeds etc.	5
5	Important post-harvest diseases. Storage/Field fungi responsible for production of toxins and their effects on consumption. Mycotoxins and Aflatoxin.	10
6	Identification and detection of plant pathogens carried through seeds, vegetatively propagating material. Seed processing, treatment and storage.	5
7	Seed transmission, Seed contamination, Accompanying pathogens, False seed transmission.	5
8	Processing, Seed treatment, Seed packaging, Packaging materials.	10
9	Functional requirement of packing materials.	5
10	Epidemiology, Factors affecting disease development, Assessment of disease severity and crop losses.	5
11	Principles of plant disease management viz., Avoidance, Exclusion, Eradication, Protection, Immunization- HPR and Biological control.	10
12	Pesticides. Classification of Fungicides.	5
13	Modes of application of Fungicides	5
14	Management of Post-harvest diseases	10
15	Biotechnological approaches of diseases management. IPR related Issues.	5
16	IDM concepts and importance. IDM module for important post-harvest diseases.	5
	Total=	**100**

TEACHING SCHEDULE

PRACTICAL [PATH-111]

Exercise No.	Exercise Title
1-2	Study of post-harvest disease symptoms caused by fungi, bacteria, virus, nematodes etc.
3	Methods of diagnosis of various post-harvest diseases.
4	Methods of estimation of disease severity and losses; Seed health testing techniques.
5	Methods of detection and identification of seed-borne pathogens.
6	Isolation of biocontrol agents; Testing the efficacy of biocontrol agents by dual culture technique.
7	Mass multiplication and methods of application of bioagents.
8	Study of fungicides, bactericides, nematicides and their formulations.
9	Study of pesticide compatibility and their safe-use.
10	Study of plant protection equipments.
11-12	Bioassay of fungicides; Seed treatment techniques for the control of seed-borne diseases.
13	Biocontrol of post-harvest diseases.
14	Study of seed packaging and storage techniques.
15-16	Visit to vegetable and fruit markets, biopesticide/ pesticide firms, processing warehouse and testing laboratories.

Suggested Readings [PATH-111]:

1. Pathak, V.N. Essentials of Plant Pathology. Prakash Publ., Jaipur
2. Agrios, G.N. 2010. Plant Pathology. Academic Press.
3. Kamat, M.N. Introductory Plant Pathology. Prakash Publ., Jaipur
4. Singh R.S. 2008. Plant Diseases. 8th Edn. Oxford & IBH. Publ. Co.
5. Singh R.S. 2013. Introduction to Principles of Plant Pathology. Oxford and IBH Publ. Co.
6. Alexopoulos, Mims and Blackwel. Introductory Mycology.
7. Mehrotra, R.S. and Aggarwal, A. 2007. Plant Pathology. 7th Edn. Tata McGraw Hill Publ. Co. Ltd.
8. Verma, J.P. 1998. The Bacteria. Malhotra Publ. House, New Delhi.
9. Goto, M. 1990. Fundamentals of Plant Bacteriology. Academic Press, New York.
10. Dhingra, O.D. and Sinclair, J.B. 1986. Basic Plant Pathology Methods. CRC Press, London, Tokyo.
11. Nene, Y.L. and Thapliyal, P.N. 1993. Fungicides in Plant Disease Control. 3rd Edn. Oxford and IBH, New Delhi.
12. Vyas, S.C. 1993. Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw Hill, New Delhi.

#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)
.	**SEC-xxx**	*(To be added)*	2(0+2)
.	**SEC-xxx**	*(To be added)*	2(0+2)

Note: 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.

In case of unavailability of said detailed course-wise syllabus of above or new SEC courses, the same can be primarily developed and followed at College/ University level in the academic year, 2024-25; However, the same will be obtained from the respective UG Degree Coordinator/ Discipline Coordinators and can be followed w.e.f. AY, 2025-26.

[Above list is an indicative list/bouquet of SEC courses and subject to modification as applicable therein]

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.

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…

MKT-121 (Practical)…

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…

MKT-121 (Practical)…

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.

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 | 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, 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**: Gradial, **NG**: Non-gradial

[†] **Note:** It is mandatory for each Student to complete **total 10 credits** (Non-gradial) of **Online Courses** from available resources across III to VIII semesters under the guidance of assigned Faculty/Advisor.

Semester	**:**	**III**		
Course No.	**:**	**AEC-235**	**Credit Hrs.**	**: 2(0+2)**
Course Title	**:**	**Physical Education, First Aid, Yoga Practices and Meditation**		
Gradial 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, Ardhchandrasan, Bhujangasan, Utanpadasan, Sarvangasan, Parvatasan, Patangasan, Shishupalanasan- left & right leg, Pavanmuktasan, Halasan, Sarpasan, Ardhdhanurasan, 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, Dhyanmudra, 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, Ardhdhanurasan, 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**		
Gradial 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 (*in brief*)	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	Importance of Vegetables; Planning and layout of 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 (*Only Definitions*)	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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Course Curriculum of Fourth 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, 2025-26 ~

Course Layout

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

Semester: IV (New) ***w.e.f.*** **Academic Year: 2025-26**

Sr. No.	Course No.	Course Title	Credit Hrs.	Remark
1.	**VAC-242**	Agricultural Informatics and Artificial Intelligence	3(2+1)	-
2.	**MDC-243**	Entrepreneurship Development and Business Management	3(2+1)	-
3.	**ABM-244**	Business Laws and Ethics	2(2+0)	-
4.	**ABM-245**	Principles of Management and Organizational Behaviour	2(1+1)	-
5.	**ECON-244**	International Trade and Policy in Agriculture	2(2+0)	-
6.	**MKT-243**	Agricultural Marketing Regulations	3(2+1)	-
7.	**ENGG-242**	Farm Machinery and Power & Custom Hiring Services	2(1+1)	-
8.	**HORT-242**	Post-harvest Management and Value Addition of Fruits and Vegetables	2(1+1)	-
9.	**SEC-246**	Skill Enhancement Course-VI[#] (*To be offered from bouquet of SEC Courses*)	2(0+2)	-
10.	**OC-1/ OC-2/..**	Online Course(s)/ MOOCs[†]	As opted by student	NG
		Total Credits Hrs.=	**21(13+8)**	**G**
VAC: Value Added Course, **MDC:** Multidisciplinary Course, **SEC**: Skill Enhancement Course, **OC**: Online Course; **G**: Gradial; **NG**: Non-gradial				
[†]**Note:** It is mandatory for each Student to complete **total 10 credits** (Non-gradial) of **Online Courses** from available resources across III to VIII semesters under the guidance of assigned Faculty/Advisor.				
Post-IV Semester (Only for exit option with UG-Diploma in Agri-Business Management)				
11.	**INT-242**	Internship (10-week)	10 (0+10)	NG

Course-wise Syllabus with Teaching Schedules

Semester : **IV**		
Course No. : **VAC-242**	**Credit Hrs. : 3(2+1)**	
Course Title : **Agricultural Informatics and Artificial Intelligence**		
Gradial Common Course across 8 UG degrees viz., B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Horticulture, B.Tech. (Biotechnology), B.Tech. (Food Technology), B.Sc. (Hons.) Agri. Business Management, B.Sc. (Hons.) Forestry, B.F.Sc. (Hons.) and B.Sc. (Hons.) Community Science		

SYLLABUS

Objectives :

(i) To acquaint students with the basics of computer applications in Agriculture, multimedia, database management, application of mobile app and decision-making processes etc.

(ii) To provide basic knowledge of computer with applications in Agriculture.

(iii) To make the students familiar with Agricultural-Informatics, its components and applications in Agriculture and Artificial Intelligence.

THEORY

Introduction to Computers, Anatomy of Computers, Memory Concepts, Units of Memory, Operating System: Definition and types, Applications of MS-Office® for creating, Editing and Formatting a document, Data presentation, Tabulation and graph creation, Statistical analysis, Mathematical expressions, Database- concepts and types, creating database, Uses of DBMS in Agriculture, Internet and World Wide Web (WWW): Concepts and components. Computer programming: General concepts, Introduction to general programming concepts and standard input/output operations. e-Agriculture, Concepts, Design and Development; Application of innovative ways to use Information and Communication technologies (IT) in Agriculture, Computer Models in Agriculture: Statistical, Weather analysis and Crop simulation models, Concepts, Input-Output files, Limitation, Advantages and Application of models for understanding plant processes, Sensitivity, Verification, Calibration and Validation, IT applications for Computation of water and Nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone mobile apps in

Agriculture for farm advice: Market price, Post-harvest Management etc. Geospatial technology: Techniques, Components and Uses for generating valuable agri-information, Decision Support Systems: Concepts, Components and Applications in Agriculture. Agriculture Expert System: Soil Information Systems etc. for supporting farm decisions. Preparation of Contingent Crop Planning and Crop calendars using IT tools, Digital India and Schemes to promote digitalization of Agriculture in India. Introduction to Artificial Intelligence, Background and Applications, Turing test. Control strategies, Breadth-first search, Depth-first search, Heuristics search techniques: Best-first search, A*algorithm, IoT and Big Data; Use of AI in Agriculture for Autonomous Crop Management and Health, Monitoring Livestock Health, Intelligent Pesticide Application, Yield Mapping and Predictive Analysis, Automatic Weeding and Harvesting, Sorting of produce and Other Food Processing Applications; Concepts of Smart Agriculture, Use of AI in Food and Nutrition Science etc.

PRACTICAL

Study of computer components, accessories, practice of important DoS Commands, Introduction of different operating systems such as Windows, Unix/ Linux, creating files and folders, File Management. Use of MS-WORD and MS-Power Point for creating, editing and presenting a scientific document, MS-EXCEL - Creating a spreadsheet, Use of statistical tools, Writing expressions, Creating graphs, Analysis of scientific data. MS-ACCESS: Creating Database, Preparing queries and Reports, Demonstration of Agri-information system, Introduction to World Wide Web (WWW) and its components, Introduction of programming languages such as - Visual Basic, Java, Fortran, C, C++, Hands-on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/Crop Syst/Wofost, Preparation of inputs file for CSM and Study of model outputs, Computation of water and Nutrient requirements of crop using CSM and IT tools, Use of smart phones and Other devices in agro-advisory and Dissemination of market information, Introduction of Geospatial Technology, AR/ VR demonstration, India Digital Ecosystem of Agriculture (IDEA).

TEACHING SCHEDULE

THEORY [VAC-242]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1 - 3	**Introduction to Computers, Anatomy of Computers** **Memory Concepts:** **Operating System:**	Definitions; Characteristics of Computer; Components of Computer; CPU: CU, ALU, MU; Input Devices; Output Devices; Units of Memory: bit to TB, Types: Primary, Secondary; Definitions and Types: Single user, Multi-user and features. OS Special Types (Brief Overview): Batch, Real-Time, Time Sharing, Distributed, Network OS. Functions of operating system	7
4 - 6	**Applications of MS Office®**	MS Word: Creating a New Document, Formatting option features; Insertion of Table; MS Excel: Creating worksheet and graph, Functions for Data Analysis: AVERAGE, COUNT, SUM, MIN, MAX, MEDIAN, MODE, STDEV, STDEVP, VAR, VARP, CORREL, PERCENTILE; Mathematical functions in MS-Excel: SUM, AVERAGE, AVERAGEIF, COUNT, COUNTIF, MOD, ROUND	7
7 - 9	**Database and DBMS**	Database: Definitions, Concepts and Types; Uses of DBMS in Agriculture; Characteristics of Database; Structure of Database Management System, Tables: Concept of view, Primary key, Foreign key; Creating Database: SQL query: Create, Insert, Select, Delete, Update. Form: Steps for Creating Forms, Entering Data in forms, Report using MS-ACCESS: Steps for Creating Reports, Printing reports.	7

Continued…

10	**Internet and World Wide Web (www)**	Concepts and components; Internet: Introduction; Definition of LAN, WAN, MAN and Internet Internet Service Provider (ISP); World Wide Web; Hypertext; Web Browser; Web Page and Websites; E-Mail: Creating Email, Email Addresses, Using Email, Sending the message, CC and BCC; Search Engine	7
11 - 12	**Introduction to Computer Programming**	Computer Programming: Introduction, General concepts, Standard input/output operations.	7
13 - 14	**e-Agriculture**	Concepts, Application & Importance of IT in e-Agriculture; AGRINET: Introduction, Objectives; Advantages and Challenges in Agriculture.	7
15 - 16	**Computer Models in Agriculture**	Statistical, Weather Analysis and Crop Simulation Models; Concepts, Input-output files, Limitation, Advantages and Application of models for understanding plant processes, Sensitivity, Verification, Calibration and Validation	7
17 - 19	**IT and IoT Applications in Agriculture**	IT Applications & their role in Agriculture with emphasis on Computation of Water and Nutrient Requirement of Crop; IoT - Definition, Benefits/ Applications/ Uses in Agriculture: Precision Farming, Agricultural Drones, Smart Greenhouses, Drones; Challenges.	7

Continued…

20 - 21	**Computer-controlled Devices; Smartphone Apps and Geospatial Technology**	Computer- controlled Devices (Automated systems) for Agri-input management- Examples of Automation Devices: Robotics Application in Planting, Drones for Irrigation, Harvest Automation Tools, Automated Tractors etc., AWS - Automatic Weather Station, AIS - Automatic Irrigation System. Smartphone Mobile Apps in Agriculture- Introduction- Irrigation Systems, Fertilizer Application, Pest and Disease Management; Seeding and Planting, Harvesting Systems; Weather Forecasting, Soil Testing and Analysis, Crop Management, Market Prices; Farm Management, Financial & Insurance Services. Geospatial Technology (*in brief*) – Introduction, Techniques, Components and Uses for generating valuable agri-information.	7
22 - 23	**Decision Support System (DSS)**	DSS: Introduction, Concepts, Components, Types and Applications in Agriculture.	7
24 - 25	**Agriculture Expert System (AES)**	AES: Introduction, Concepts, Components and Applications in Agriculture- Soil Information Systems for supporting farm decisions.	7
26 - 27	**Contingent Crop Planning using IT Tools**	Preparation of Contingent Crop Planning and Crop Calendars: Introduction, Definition, Benefits, Steps to prepare Contingent Crop Planning and Calendars using IT Tools.	7
28 - 30	**Digital India and Schemes to promote Digitalization of Agriculture in India**	Digital India and Schemes to promote Digitalization of Agriculture in India; Digital Agriculture in India: Status, Challenge, Digital India and Initiatives in Agriculture Sector. Digital Agriculture or NeGP-A 2.0	8
31 - 32	**Introduction to and Uses of Artificial Intelligence (Overview)**	Introduction to Artificial Intelligence, Background and Applications, Turing test. Control strategies, Breadth-first search, Depth-first search, Heuristics search techniques: Best-first search, A*algorithm, IoT and Big Data; Use of AI in Agriculture for autonomous crop management and health, monitoring livestock health, Intelligent pesticide application, Yield mapping and Predictive analysis, Automatic Weeding and Harvesting, Sorting of produce and Other food processing applications; Concepts of Smart Agriculture, Use of AI in Food and Nutrition Science etc.	8
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [VAC-242]

Exercise No.	Exercise Title
1 - 2	Study of computer components, accessories, practice of important DOS command Introduction to different Operating systems- such as Windows, Unix/ Linux; Creating files and folders, Files Management.
3 - 4	Use of ~ MS-WORD: Creating files and folders; Files management and MS-POWERPOINT: Presentation for creating, editing and presenting scientific documents. MS-EXCEL: Mathematical calculations; Preparation of Spread sheets; Use of statistical tools; Writing expressions; Creating graphs; Analysis of scientific data.
5	MS-ACCESS: Creating Database; Preparing queries and reports.
6	Demonstration of Agri-information system(s)
7 - 8	Introduction of Programming Languages & Program in C-Language: a) Program to enter name and print name b) Program to calculate sum and subtraction of numbers c) Program to calculate Area of Circle d) Program to calculate Area of Triangle e) Program to calculate Area of Rectangle
9	Introduction to Internet, World Wide Web (WWW) and its components.
10 - 11	Hands-on Practice on Crop Simulation Models (CSM): CROPWAT 8.0/ DSSAT/ Crop-Info/ CropSyst/ Wofost/ etc. Computation of water and nutrient requirements of crop using CSM and IT tools.
12	Use of Smartphone Apps (developed by SAUs) and other devices in agro-advisory and dissemination of market information
13	Introduction to Geospatial Technology (Use of Open-source GIS Tools)
14	Study/ Demonstration of general AR/VR tools (as available)
15	Hands-on Practice on Decision Support System (DSS);
16	Introduction to India Digital Ecosystem of Agriculture (IDEA)

Suggested Readings [VAC-242]:

1. Fundamentals of Computer by V. Rajaraman, PHI Learning.
2. Introduction to Information Technology by Pearson.
3. Introduction to Database Management System by C.J. Date, Pearson Education, N. Delhi.
4. Concepts and Techniques of Programming in C by Dhabal Prasad Sethi and Manoranjan, Wiley India.
5. Introductory Agri Informatics by Mahapatra, Subrat K. *et al.*, Jain Brothers Publication.
6. Russell, Stuart, Artificial Intelligence: A Modern Approach, Pearson Edition 2013.
7. Nilson N.J. 2001. Principles of Artificial Intelligence. Narosa Publ.
8. Agricultural Informatics and Artificial Intelligence for B.Tech.(Agril Technology) by Prashant Publ.

➢ ***Online Resources:*** **(VAC-242)**

- https://en.wikipedia.org/wiki/Computer
- https://www.javatpoint.com/computer
- https://iasri.icar.gov.in/
- https://www.nrsc.gov.in/EO_Agr_Objective?language_content_entity=en
- https://www.agrimoon.com
- https://www.agriinfo.in
- https://eagri.org
- https://www.agriglance.com
- https://agritech.tnau.ac.in
- https://loksabhadocs.nic.in/Refinput/New_Reference_Notes/English/Agriculture_and_Digital_India.pdf
- https://www.investindia.gov.in/team-india-blogs/digitalisation-agriculture-india
- http://courseware.cutm.ac.in/wp-content/uploads/2020/06/Session-11-Preparation-of-Contingent-Crop-Planning-and-Crop-Calendars-Using-IT-Tools.pdf
- https://optimizeias.com/indias-digital-ecosystem-for-agriculture/
- https://www.igi-global.com/chapter/introduction-to-agricultural-information-systems/266572#:~:text=Agricultural%20Information%20Systems%3A%20Information%20system,knowledge%20utilization%20by%20agricultural%20producers.
- https://cropcalendar.apps.fao.org/#/home
- http://www.irdindia.in/journal_ijrdmr/pdf/vol4_iss1/7.pdf
- https://learn.microsoft.com/en-us/office365/servicedescriptions/office-applications-service-description/office-applications
- https://ebooks.inflibnet.ac.in/hsp16/chapter/application-of-software-in-statisticalanalysis-i-microsoft-excel/
- http://eagri.org/eagri50/STAM102/index.html
- https://edu.gcfglobal.org/en/internetbasics/using-a-web-browser/1/
- https://www.javatpoint.com/what-is-world-wide-web
- https://www.mdpi.com/journal/agriculture/special_issues/Decision_Support_Systems_Application
- https://apps.gov.in/ministry/ministry-agriculture
- http://courseware.cutm.ac.in/wp-content/uploads/2020/06/Session-11-Preparation-of-Contingent-Crop-Planning-and-Crop-Calendars-Using-IT-Tools.pdf
- https://apps.mgov.gov.in/apps_by_category;jsessionid=8206D0DAE69F48FB50962462A8922C23?name=Agriculture

➢ ***Tools available for Student for Academic Purpose only:*** **(VAC-242)**

1. DSSAT (Decision Support System for Agrotechnology Transfer)
   - Purpose: A comprehensive crop modeling tool.
   - Use: Simulates plant growth, development, and yield for various crops under different management and environmental conditions.
   - Download:https://dssat.net/
2. APSIM (Agricultural Production Systems Simulator)
   - Purpose: A powerful plant simulation tool.
   - Use: Models the effects of environmental variables like soil, climate, and management strategies on plant growth and crop yield.
   - Download:https://www.apsim.info/
3. Open Sim Root
   - Purpose: A root growth modeling software.
   - Use: Helps understand plant root growth processes, interactions with soil, and how they respond to environmental conditions.
   - Download: Available as open-source software via research platforms like Git Hub.

   https://gitlab.com/rootmodels/OpenSimRoot
4. Virtual Plant
   - Purpose: A tool for visualizing and modeling plant metabolic and regulatory networks.
   - Use: Helps in understanding complex plant processes such as gene regulation, metabolic pathways, and how they respond to environmental conditions.

   Download: https://sourceforge.net/projects/virtualplant/
5. R Studio (with Bioconductor and Plant Modeling Libraries)
   - Purpose: A programming environment for statistical computing.
   - Use: Using plant modeling libraries like plant and photosynthesis, researchers can model plant growth, carbon assimilation, and nutrient cycling.
   - Download: https://posit.co/downloads/
6. WOFOST (World Food Studies)
   - Purpose: A plant process and crop growth simulation model developed by the FAO.
   - Use: Helps in understanding crop development, photosynthesis, and biomass accumulation under different environmental and management conditions.
   - Download:https://www.wur.nl/en/research-results/research-institutes/environmental-research/facilities-tools/software-models-and-databases/wofost/downloads-wofost.htm
7. Green Lab
   - Purpose: A plant growth model focused on plant architecture and functional growth processes.
   - Use: Simulates plant organ development and growth processes, integrating functional and structural aspects of plant behavior.
   - Download: https://greenlab.cirad.fr/GLUVED/html/P3_Tools/Tool_simul_003.html

Semester : IV		
Course No. : MDC-243	**Credit Hrs. : 3(2+1)**	
Course Title : Entrepreneurship Development and Business Management		
Gradial Common Course across 4 UG degrees viz., B.Sc. (Hons.) Agriculture, B.Tech. (Agricultural Engineering), B.Tech. (Food Technology) and B.Sc. (Hons.) Agri-Business Management		

SYLLABUS

Objectives:

(i) To provide an insight into the concept and scope of entrepreneurship,

(ii) To expose the student to various aspects of establishment and management of a small business unit,

(iii) To enable the student to develop financially viable agribusiness proposal.

THEORY

Development of entrepreneurship, Motivational factors, Social factors, Environmental factors, Characteristics of entrepreneurs, Entrepreneurial attributes/ Competencies. Concept, need for and Importance of entrepreneurial development. Evolution of entrepreneurship, Objectives of entrepreneurial activities, Types of entrepreneurs, Functions of entrepreneurs, Importance of entrepreneurial development and Process of entrepreneurship development. Environment scanning and opportunity identification need for scanning - Spotting of opportunity - Scanning of environment - Identification of product/ service - Starting a project; Factors influencing sensing the opportunities. Infrastructure and Support systems - Good policies, Schemes for entrepreneurship development; Role of financial institutions and other agencies in entrepreneurship development. Steps involved in functioning of an enterprise. Selection of the product / Services, Selection of form of ownership; Registration, Selection of site, Capital sources, Acquisition of manufacturing know how, Packaging and Distribution. Planning of an enterprise, Project Identification, Selection and Formulation of project; Project report preparation, Enterprise management. Production management - Product, Levels of products, Product mix, Quality control, Cost of production, Production controls, Material management. Production management - Raw material costing, Inventory control. Personal management - Man power Planning, Labour turn over, Wages / Salaries. Financial Management / Accounting - Funds, Fixed capital and Working capital, Costing and Pricing, Long term planning and Short-Term Planning, Book Keeping, Journal, Ledger, Subsidiary books, Annual financial statement and Taxation. Marketing management- Market, Types, Marketing assistance, Market strategies. Crisis management - Raw material, Production, Leadership, Market, Finance, Natural etc.

PRACTICAL

Visit to small scale industries / Agro-industries, Interaction with successful entrepreneurs / agric-entrepreneurs. Visit to financial institutions and support agencies. Preparation of project proposal for funding by different agencies.

TEACHING SCHEDULE

THEORY [MDC-243]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Introduction to Entrepreneurship	Meaning and Definitions of an Entrepreneur, Entrepreneurship; Concept & Scope of Entrepreneurship	6
2	Importance of Entrepreneurship	Importance of Entrepreneurship in Agribusiness	
3	Entrepreneurship Development	Need for and objectives of Entrepreneurial development	4
4	Motivational Factors	Types of motivational factors, Role of social and environmental factors in entrepreneurship	4
5	Characteristics of Entrepreneurs	Characteristics, Entrepreneurial attributes and Competencies	4
6	Types of Entrepreneurs	Various types and their significance	4
7	Functions of Entrepreneurs	Key roles and Responsibilities	2
8	Evolution of Entrepreneurship	Historical perspective and Growth	3
9	Process of Entrepreneurship Development	Stages and Approaches in developing entrepreneurship	4
10	Environmental Scanning	Need for scanning, Techniques	2
11	Opportunity Identification	Spotting and Analysing opportunities	2
12	Infrastructure and Support Systems	Policies, Schemes and Role of financial and other agencies in entrepreneurship development	4
13	Enterprise Functioning Steps	Steps to establish an enterprise	4
14	Selection of Products/Services	Choosing products, Services and Business forms	3
15	Enterprise Location and Capital Sources	Registration, Site selection, Capital sources/Acquisition	3
16	Manufacturing and Distribution	Acquiring manufacturing know-how, Packaging and Distribution essentials	3
17	Planning of an Enterprise	Short term and Long-term planning of an enterprise	3
18 - 19	Project Formulation	Project identification, Selection, Steps in project formulation and Report preparation, etc.	8
20	Enterprise Management	Basics and Importance of managing an enterprise	3

Continued….

21	Production Management	Product types, Levels of products, Product mix, Quality control, Cost of production, Production control	4
22	Material Management	Raw material costing and Inventory control strategies	4
23	Personnel Management/Human Resource Management	Manpower planning, Labour turnover, Wages/Salaries	4
24	Financial Management	Funds, Fixed and Working capital, Costing, Pricing, Book-keeping basics	4
25 - 26	Accounting and Taxation	Journals, Ledgers, Subsidiary books, Annual financial statements, Taxation basics	4
27	Marketing Management	Market, Types of markets, Marketing assistance	4
28 - 29	Market Strategies and Pricing	Marketing strategies, Pricing strategies and Market penetration	4
30	Crisis Management	Crisis types, Strategies for managing raw material, etc.	2
31	Leadership in Crisis Situations	Role of leadership in handling crises	2
32	Financial Crises and Solutions	Strategies for financial crisis management	2
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL [MDC-243]

Exercise No.	Exercise Topic/Title
1	Visit to Small-Scale Industries/Agro-Industries. (Objective: To understand setup and operations of small-scale units)
2	Interaction with Successful Entrepreneurs. (Objective: To gain insights from real-life entrepreneurial experiences)
3	Case Study on Agro-Entrepreneurs. (Objective: To analyse successful agribusiness ventures)
4	Visit to Financial Institutions. (Objective: To learn about funding options and financial support)
5	Identification of Agribusiness Ideas. (Objective: To identify viable agribusiness ideas based on demand)
6	Analysing Project Proposals. (Objective: To study structure and elements of project proposals)

Continued…

7	Preparing a Project Proposal. (Objective: To develop a basic proposal for an agribusiness venture)
8	Project Report Writing Techniques. (Objective: To practice format and structure for project reports)
9	Marketing Strategies Case Study. (Objective: To analyse effective marketing strategies in agribusiness)
10	Production and Cost Control Analysis (Objective: To study basic cost control measures in production)
11	Inventory Control Simulation (Objective: To apply inventory management methods in a hypothetical setup)
12	Basic Bookkeeping (Objective: To practice fundamental bookkeeping for small businesses)
13	Market Research Techniques (Objective: To use surveys and questionnaires for market insights)
14	Project Proposal Presentation (Objective: To present project ideas for feedback)
15	Review of Project Proposal (Objective: To refine project proposals based on feedback)
16	Final Evaluation of Proposals (Objective: To assess and finalize projects)

Suggested Readings [MDC-243]:

1. **Charantimath P.M. 2009.** Entrepreneurship Development and Small Business Enterprises. Pearson Publications, New Delhi.
2. **Desai V. 2015.** Entrepreneurship: Development and Management, Himalaya Publishing House.
3. **Desai Vasant. 1997.** Small Scale Industries and Entrepreneurship. Himalaya Publ. House.
4. **Gupta C.B. 2001.** Management Theory and Practice. Sultan Chand and Sons.
5. **Indu Grover. 2008.** Handbook on Empowerment and Entrepreneurship. Agrotech Public Academy.
6. **Khanka S.S. 1999.** Entrepreneurial Development. S. Chand and Co.
7. **Mehra P. 2016.** Business Communication for Managers. Pearson India, New Delhi.
8. **Pandey M. and Tewari D.2010.** The Agribusiness Book. IBDC Publishers, Lucknow.
9. **Singh D. 1995.** Effective Managerial Leadership. Deep and Deep Publ.
10. **Singhal R.K.2013.** Entrepreneurship Development and Management, Katson Books.
11. **Tripathi P.C and Reddy P.N.1991.** Principles of Management. Tata McGraw Hill.

Semester	**:**	**IV**		
Course No.	**:**	**ABM-244**	**Credit Hrs.**	**: 2(2+0)**
Course Title	**:**	**Business Laws and Ethics**		

SYLLABUS

Objectives :

(i) To understand the legal framework governing business operations and transactions.

(ii) To learn about ethical principles and practices in business decision-making and conduct.

(iii) To explore the implications of business laws and ethics on organizational behaviour, corporate governance and social responsibility.

(iv) To develop skills to navigate legal and ethical challenges, ensuring compliance and fostering trust in business relationships.

THEORY

Introduction to Indian legal system: Legislative Powers of the States and the Union. Scope and Importance of Business laws. Contracts - Meaning, Significance, Types and Essentials of a valid contract. The Indian Contract Act, 1872. The Indian Partnership Act, 1932 - General Nature, Registration of Partnership, Partnership Deed, Types of Partners, Rights and Duties of Partners. The Companies Act, 1956 and 2013- General Nature, Types of companies, Incorporation of a Company, Memorandum of Association and Articles of Association, management of a company. Provisions of important Acts enacted over time related to business environment: Industries (Regulation and Development) Act, 1951; Income Tax Act, 1961. Central Excise Act, 1944; Foreign Exchange Regulation Act (FERA), 1973; Foreign Exchange Management Act (FEMA), 1999; Monopolistic and Restrictive Trade Practices (MRTP), Act, 1969; Competition Act, 2002; Food Safety and Standards Act, 2006; Customs Act, 1962 and Goods and Service Tax, 2011. FDI Policy of GoI. Business Ethics - Nature and importance of ethics and moral standards. Scope of business ethics in business functional area. Governance mechanism. Companies Act Amendment2023, OPC, FPC, Section 8.

Suggested Readings [ABM-244]:

1. Business Law and Ethics - Concepts, Methodologies, Tools and Applications 2015. Editor: Information Resources Management Association.
2. Business Law and Ethics: Concepts, Methodologies, Tools and Applications.
3. Business Law and Ethics: Concepts, Methodologies, Tools and Applications. Volume 1. Business Science Reference, 2015.

TEACHING SCHEDULE

THEORY [ABM-244]

Lecture No.	Topic	Sub-topics / Key Points	Weightage (%)
1 - 2	Introduction to Indian Legal System	Legislative Powers of the States and the Union	7
3	Business Laws & Ethics	Scope and Importance	5
4 - 5	Contracts, The Indian Contract Act	Meaning, Significance, Types and Essentials of a valid contract under Indian Contract Act, 1872	7
6 - 7	The Indian Partnership Act	General Nature, Registration of Partnership, Partnership Deed, Types of Partners, Rights and Duties of Partners under Indian Partnership Act, 1932	7
8 - 9	The Companies Act,1956 and 2013	General Nature, Types of companies, incorporation of a Company, Memorandum of Association and Articles of Association, Management of a company of Companies Act,1956 and 2013	10
10 - 11	Provisions of Important Acts	Enacted overtime related to business environment: Industries (Regulation & Development) Act, 1951;	5
12 - 13	Income Tax Act	Rules for Taxation, Assessment and Collection of Income Tax Act, 1961	5
14 - 15	Central Excise Act	Collection of Excise Duties, Levy and Collection of excise duties of Central Excise Act,1944.	5
16 - 17	Foreign Exchange Regulation Act (FERA)	Objectives and Key provisions of FERA, 1973	5
18 - 19	Foreign Exchange Management Act (FEMA)	Objectives and Key provisions of FEMA, 1999	5
20 - 21	Monopolistic and Restrictive Trade Practices (MRTP) Act	Aims and Monopolistic, Restrictive and Unfair Trade Practices of MRTP Act, 1969	5
22 - 23	Competition Act	Objectives and Key features Competition Act, 2002	5
24 - 25	Food Safety and Standards Act	Objectives and Importance Food Safety and Standards Act, 2006	5
26 - 27	Customs Act	Levy and Collection of duty on import and export of goods of Customs Act, 1962	5
28 - 29	Goods and Service Tax	Introductions of subsumed taxes in India under GST Act, 2011	7
30	FDI Policy of GoI.	Policy details and recent reforms	5
31 - 32	Business Ethics Section 8.	Nature and importance of ethics and moral standards. Governance mechanism. Companies Act Amendment 2023, OPC, FPC.	7
		Total =	**100**

Semester	**:**	**IV**		
Course No.	**:**	**ABM-245**	**Credit Hrs.**	**: 2(1+1)**
Course Title	**:**	**Principles of Management and Organizational Behaviour**		

SYLLABUS

Objectives :

(i) To understand the fundamental principles of management theory and practice.

(ii) To explore the dynamics of organizational behaviour, including individual and group dynamic, communication and motivation.

(iii) To learn to apply management concept and behavioural theories to solve organizational challenges and improve effectiveness.

(iv) To develop skills in leadership, decision-making and conflict resolution to enhance organizational performance and employee satisfaction.

THEORY

Introduction to Management - Management functions - Management Levels - Managerial roles- Management skills - Role of management. Evolution of management thought.

Functions of management: Planning: Nature and importance- Types of planning - Steps in planning - Decision making - Meaning - Types of decisions.

Organizing - Meaning - Nature and Purpose of organizing - Principles of organizing - Organization structure - Managing Human Resources- Human Resource Planning - Recruitment- Sources of recruitment -0 Selection - Steps in the selection process - Orientation - Training - Management development programmes.

Leading - Meaning - Leadership theories - Motivation - Meaning and purpose - Motivational Theories - Communication - Meaning - Objectives - Importance - Types - Barriers.

Controlling - Meaning and Nature of controlling - Essential elements of controlling. Ethics and Corporate social responsibility in business.

Organizational Behaviour - Definition, Importance, Historical background of Organizational Behaviour, Challenges - The organizational context - Environment - Technology.

Learning - Importance of learning - Process - Approaches to learning - The learning organization. Personality - Defining personality - Types and Traits - Personality types - The big five - The development of self - Selection methods - Perception - Meaning, Selectivity and Organization - Perceptual sets and Perceptual worlds - Factors influencing perception and shortcuts in judging others.

Group Dynamics - Meaning, Need for joining groups, Stages of group development and Group decision making techniques. Team types, Difference between teams and groups. Managing conflicts. Work stress - Types and Management strategies. Organizational culture - Definition and Creating a culture in organization. Organizational change.

PRACTICAL

Study of management structure and organizational pattern of selected business units. Preparation, Analysis and Presentation of case studies.

TEACHING SCHEDULE

THEORY [ABM-245]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	**Introduction to Management**	Management functions-Management Levels - Managerial Roles - Management skills - Role of Management.	10
2	**Evolution of Management Thoughts**	Approaches and Categories	4
3	**Functions of Management**	Planning: Nature and importance – Types of planning - Steps in planning – Decision making -Meaning - Types of decisions.	8
4	**Organizing**	Meaning, Nature and Purpose of organizing- Principles of organizing - Organization structure- Managing Human Resources- Human Resource Planning- Recruitment- Sources of recruitment	10
5	**Selection - Steps in Selection Process**	Orientation - Training - Management Development Programmes	4
6	**Leading- Meaning**	Meaning and Purpose and Leadership theories	8
7	**Communication and Motivation**	Meaning - Objectives - Importance - Types - Barriers, Motivational Theories	
8	**Controlling**	Meaning and Nature of controlling - Essential elements of controlling. Ethics and Corporate social responsibility in business	8
9	**Organizational Behaviour**	Definition, Importance, Historical background of Organizational Behaviour, Challenges – The organizational context - Environment - Technology	8
10	**Learning**	Importance of learning - Process - Approaches to learning - The learning organization.	7
11	**Personality**	Defining personality - Types and Traits - Personality types - The big five - The development of the self - Selection methods	7
12	**Perception**	Meaning, Selectivity and Organization - Perceptual sets and Perceptual worlds – Factors influencing perception and Shortcuts in judging others	7
13	**Group Dynamics**	Meaning, Need for joining groups, Stages of group development and group decision making techniques.	5
14	**Teams**	Types, Difference between Teams and Groups.	5
15	**Conflicts and Work Stress Management**	Types and Management strategies.	5
16	**Organizational Culture**	Definition and Creating a culture in organization. Organizational change	4
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [ABM-245]

Exercise No.	Exercise Title
1 - 2	Management of business unit and its functions.
3	Visit to the business unit.
4 - 5	Organizational Structure of business unit.
6	Recruitment and Selection process of business unit.
7 - 8	SWOT analysis of business unit.
9	Power point presentation of national level business unit.
10	Power point presentation of international level business unit.
11 - 12	Financial analysis of business unit.
13	Preparation of business project proposal.
14	Case study of local level business unit.
15	Demonstration of Leadership qualities through group discussion.
16	Analysis of personality traits using standard assessment tools.

Suggested Readings [ABM-245]:

1. **Andrew J. Dubrin, 2012.** Essentials of Management, Thomson South Western, 9th Edition.
2. **Charles W., L. Hill and Steven L McShane, 2007.** Principles of Management, McGraw Hill Education, Special Indian Edition
3. **Harold Koontz and Heinz Weihrich, 2012.** Essentials of Management.
4. An International and Leadership Perspective, 9th Edition, Tata McGraw- Hill Education.
5. **Samuel C. Certo and Tervis Certo, 2012.** Modern Management: Concepts and skills, Pearson Education, 12th edition.
6. **Aaker, David, V. Kumar and George Day, 1995,** Marketing Research, 8th Edition, John Wiley & Sons.
7. **Kerlinger, Fred N., 1986,** Foundations of Behavioral Research, 3rd Edition.
8. **Kotler, P., 2001.** Marketing Management. Grada, Praha,10th Edition.
9. **Koudelka, J., 1997.** Consumer behaviour and marketing. Grada, Praha.
10. **Michael A. Kamins, 1993.** Secondary Research: Information, Sources and Methods, Applied Social Research Methods, Volume 4, Sage Publications.

Semester	**:**	**IV**	
Course No.	**:**	**ECON-244**	**Credit Hrs. : 2(2+0)**
Course Title	**:**	**International Trade and Policy in Agriculture**	

SYLLABUS

Objectives :

(i) To understand the principles and mechanism of international trade in agricultural commodities,

(ii) To learn about agriculture trade policy, agreement and their impact on global markets,

(iii) To explore strategy for market access, trade negotiation and resolving trade disputes in agriculture,

(iv) To develop skills to analyse the national trade trend, access market opportunities and navigate regulatory framework to facilitate agriculture exports and imports.

THEORY

International Trade - Meaning, Definition, Nature and Scope. Salient features of International Trade, Differences between Internal trade and International trade, Advantages and Disadvantages of International Trade.

Theories of International Trade - Mercantilism, Theory of Absolute Cost Advantage, Theory of Comparative Cost Advantage and Modern Theory of International Trade. Terms of trade - Meaning and Types. Free trade - Meaning, Advantages and Disadvantages, Free Trade agreements.

Protectionism - Meaning, Advantages and Disadvantages of protectionism, Types of protection - Tariffs, Quotas, Subsidies, Dumping, Cartels and Commodity agreements.

Balance of Trade (BoT) and Balance of Payments (BoP) - Meaning, Differences between BoT and BoP, India's BoT and BoP position. Foreign exchange - Meaning, Foreign Exchange Rate, Types of Foreign Exchange Rate, Mechanisms of determining Foreign Exchange Rate. Foreign Exchange Market - Meaning and Functions, Instruments of international payments, Foreign Exchange Control and Foreign Exchange Reserves.

WTO - Origin, Structure, Objectives and Functions. Agreement on Agriculture - Domestic support, Market access and Export subsidies. FAO/WHO Codex Alimentarius and SPS measures. Export procedures and documentations, Types of export - Direct export and Indirect export, Export houses - Objectives and Types. Agricultural Export Promotion Organizations - APEDA, MPEDA, Commodity Boards and State Export Promoting Agencies. India's Agricultural Exports and Imports - Composition and Trading countries. India's Foreign Trade Policy - Meaning and Objectives.

TEACHING SCHEDULE

THEORY [ECON-244]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1 - 2	International Trade	Meaning, Definition, Nature and Scope. Salient features of International Trade	5
3	Internal Trade and International Trade	Differences between Internal trade and International trade, Advantages and Disadvantages of International Trade.	5
4 - 5	Theories of International Trade	Mercantilism and Theory of Absolute Cost Advantage	6
6 - 7	Theory of Comparative Cost	Advantages and Modern Theory of International Trade.	6
8 - 9	Terms of Trade	Meaning and Types. Free trade - Meaning, Advantages and Disadvantages, Free trade agreements.	6
10 - 11	Protectionism	Meaning, Advantages and Disadvantages of Protectionism, Types of Protection -Tariffs, Quotas, Subsidies, Dumping, Cartels and Commodity agreements.	7
12 - 13	Balance of Trade (BoT) and Balance of Payments (BoP)	Meaning. Differences between BoT and BoP, India's BoT and BoP position.	5
14 - 15	Foreign Exchange	Meaning, Foreign Exchange Rate, Types of Foreign Exchange Rate, Mechanisms of determining Foreign Exchange Rate.	6
16 - 17	Foreign Exchange Market	Meaning and Functions, Instruments of International Payments, Foreign Exchange Control and Foreign Exchange Reserves.	6
18 - 19	World Trade Organization (WTO)	Origin, Structure, Objectives and Functions. Agreement on Agriculture - Domestic support, Market access and Export subsidies.	8
20	Food Safety Measures	FAO/ WHO Codex Alimentarius and SPS measures.	6
21 - 22	Export Procedures and Documentation	Steps involved in export procedures and documentation	5
23	Types of Export	Direct export and Indirect export	4
24	Export Houses	Objectives and Types	4
25	Agricultural Export	Promotion Organizations – APEDA and MPEDA	6
26 - 27	Commodity Boards and State Export Promoting Agencies	Tea board, Coffee board, Rubber board, Spices board, Tobacco board and Coconut Development Board	6
28 - 30	India's Agricultural Exports and Imports	Composition and Trading Countries.	5
31 - 32	India's Foreign Trade Policy	Meaning and Objectives.	4
		Total =	**100**

Suggested Readings [ECON-244]:

1. **Mithani, D.M.** - Money, Banking, International Trade and Public Finance.
2. **Cherunilam, Prancis** - International Trade and Export Management.
3. **Haberler, G.** - Theory of International Trade.
4. **Ajami Riad, A.** - International Business- Theory and Practices
5. **Jain, Arunkumar** - International Business
6. **Venkateshwaran, N.** - International Business Management
7. **Cherunilam and Dominick Salvatore** - International Economics
8. **Tappa, Ashwa** - International Business
9. **Justin Paul** - International Business
10. **Vaish, M.C. and Singh, Sudama** - International Economics
11. **Jhingan, M.L.** - International Economics.

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Semester	**:**	**IV**			
Course No.	**:**	**MKT-243**	**Credit Hrs.**	**:**	**3(2+1)**
Course Title	**:**	**Agricultural Marketing Regulations**			

SYLLABUS

Objectives :

(i) To understand regulatory framework governing agricultural marketing at local, national and international levels.
(ii) To learn about marketing laws, policies and regulations affecting the sale and distribution of agricultural products,
(iii) To explore role of government agencies and industry organization in enforcing marketing regulation and ensuring fair trade practices.
(iv) To develop skills to navigate compliance requirements, understand market access regulations and mitigate legal risk in agricultural marketing activities.

THEORY

Evolution of market legislation. Need and scope for market legislation. Review of Agricultural Produce Market Acts in India and Maharashtra. Distribution of legislative powers between parliament and state assemblies. Salient features of essential commodities Act - Food Safety and Standards Act 2006, Consumer Protection Bill 2019, Patent Act, 2002, Monopolies and Restrictive Trade Practices Act/ Competition Act, 2002, Forward Markets Act, 1952, Standards of Weights and Measures Act, 1976, The Central Warehousing Corporation Act. Provisions of Maharashtra Agricultural Marketing (Development Regulation) Act, 2007 - Establishment of Market, Constitution of Market Committee (APMC), Special Market, Conduct of Business of the Market Committee, Powers and Duties of Market Committee, Staff of the Market Committee, Regulation of the Contract Farming Trade, Maharashtra State Agricultural Marketing Board - Constitution and Functions. Role of state department of Agricultural Marketing and Directorate of Agricultural Marketing and Inspection. Agricultural Marketing Policies of the Government - Administered Price Policies -Commission for Agricultural Costs and Prices (CACP) and its Working. Policies of Procurement, Levy and Public Distribution System. Minimum Support Prices, Ceiling Price and Parity Prices. Floor Price Scheme. Food Security Policy - Procurement, Buffer Stock, Distribution, Subsidies. Food Zone. Agri Export Zones (AEZs)/ Export Oriented Units (EOUs). Introduction and Meaning of Intellectual Property, Brief Introduction to GATT, WTO, Trips and WIPO, Treaties for IPR Protection: Madrid Protocol, Berne Convention, Budapest Treaty, etc. Types of Intellectual Property and Legislations Covering IPR in India: Patents, Copyrights, Trademark, Industrial Design, Geographical Indications, Integrated Circuits, Trade Secrets. Patents Act, 1970 and Patent System in India, Patentability, Process and Product Patent, Filing of Patent, Patent Specification, Patent Claims, Patent Opposition and Revocation, Infringement, Compulsory Licensing, Patent Cooperation Treaty, Patent Search and Patent Database.

PRACTICAL

Evolution and Historical Perspectives of Agricultural Marketing Legislation, Marketing Tax and Fees, Different Agents Involved in Marketing Practices, Study on Different Agricultural Marketing Models, Review of Agricultural Marketing Policies. Study on Reform in Agricultural Marketing Sectors in India. Presentation and group discussions on above topics, Visits to different APMCs.

TEACHING SCHEDULE

THEORY [MKT-243]

Lecture No.	Topic	Sub-topics/Key Points	Weightage (%)
1	Introduction to Agricultural Marketing Regulations	Concept, Need and Importance, Evolution of Agricultural Markets in India	3
2	Evolution of Market Legislation	Pre-independence, Post-independence, Reform era (1990s - 2020s) Need and Scope for market legislation	2
3	Constitutional Framework and Legislative Powers	Union, State, Concurrent Lists Agriculture as a state subject: Implications	3
4	Agricultural Produce Market Acts in India	Purpose, Structure, Strengths and Limitations, Overview of reforms	2
5	Review of Maharashtra APMC Act (Historical)	Evolution and Key amendments, Issues addressed by reforms	2
6	Model Act : APLM Act, 2017 and Post - 2020 Reforms	Features of APLM 2017, Private markets, Direct marketing, e-trading, Impact on state APMC systems	3
7	Maharashtra Agricultural Marketing (Development and Regulation) Act, 2007 -Part I	Establishment of markets. Market area/ Yards, Licensing	3
8	Market Committees (APMCs)	Constitution Membership, Representation, Elections	4
9	Conduct of Business in Market Committees	Meetings, Powers, Responsibilities Finance, Audit, Market fee	3
10	Powers, Duties and Staff of APMCs	Enforcement, Regulation, Dispute resolution, Penalties, Licensing decisions	4
11	Special Markets and Contract Farming Regulation	Private markets, Farmer - Consumer Markets, Contract farming provisions.	4
12	Maharashtra State Agricultural Marketing Board (MSAMB)	Structure, Functions, Infrastructure development.	4
13	Dept. of Agricultural Marketing (State level)	Support services, Supervision, Reforms	3
14	Directorate of Marketing and Inspection (DMI) and AGMARK	AGMARK standards, Role in National Market Integration	3
15	National Agriculture Market (e-NAM)	Objectives, Functioning, Benefits. Interoperability with APMC markets.	5

Continued...

16	Agricultural Infrastructure Fund (AIF)	Financing for storage, Logistics, Digital infra, FPOs, Entrepreneurs and Cooperatives.	3
17	Digital and Online Agri-Market places	E-commerce platforms, Digital FPOs. Role of technology and Data governance.	2
18	Agricultural Marketing Policies in India	Policy framework, Reforms trajectory	3
19	Administered Price Policies	Objectives, Rationale price stabilization	3
20	CACP: Role, Cost Concepts & MSP System	Cost of production concepts MSP determination	5
21	Ceiling Price, Floor Price, Parity Price	Concepts and Applications	2
22	Food Security Policy	Procurement, Buffer stocks, Subsidies, Targeted PDS Food Zones and Food logistics	4
23	Essential Commodities Act (ECA) and Food Safety and Standards Act (FSSAI)	Controls on hoarding, Black-marketing FSSAI standards, Regulations and Licensing	5
24	Competition Act 2002	Anti-competitive practices, Role of Competition Commission of India (CCI)	3
25	Forward Markets Act 1952 and Warehousing Laws	Forward Trading Regulation Central Warehousing Corporation Act Standards of Weights and Measures (Brief)	4
26	Agri Export Zones (AEZs) and Export Oriented Units (EOUs)	Functions, Incentives, Examples	2
27	Global Trade Agreements	GATT, WTO, Agreement on Agriculture- Impact on Indian Agriculture Trade	3
28	Introduction to IPR in Agriculture	Meaning, Need, Importance Relevance to seeds, Biotech, Innovations	2
29	IPR Treaties and International Framework	TRIPS, WIPO, Madrid Protocol, Berne Convention, Budapest Treaty	3
30	Types of IPRs in India	Patents, Copyright, Trademarks, Industrial Designs, GI, IC Protection, Trade secrets	3
31	Patents Act 1970 and Patent System in India	Patentability criteria, Process vs Product Patents	3
32	Patent Procedure and Management	Filing, Specifications, Claims Opposition, Revocation, Infringement compulsory licensing, Patent Cooperation Treaty (PCT) Patent search and Databases.	2
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [MKT-243]

Exercise No.	Practical Topic/ Title	Content
1	Study of Evolution and Historical Perspectives of Agricultural Marketing Legislation	Early Market Systems, Pre-/ Post-Independence Laws, Introduction to APMC structure
2	Study of Market Fees, Charges, Cess and Taxation in Agricultural Markets	Market fee structure, User charges, Licensing fees. Differences across states
3	Study of Different Marketing Agents	Commission agents, Traders, Brokers, Weighmen. Roles and Responsibilities
4	Study of Market Functionaries in Regulated Markets	Warehouse managers, Graders, Auctioneers, Hamalis. Their contribution to price discovery and Market efficiency
5	Study of Agricultural Marketing Models	Traditional vs Modern models. Cooperative, Private, Public, PPP-based models.
6	Study of National Market Models (e-NAM and Digital Platforms)	Online trading, Assaying, Digital payment systems. Integration with APMCs
7	Study of Agricultural Marketing Policies in India	MSP, APMC reforms, CACP mechanisms
8	Study of Food Security and Price Stabilization Policies	Buffer stocks, PDS, Subsidy mechanisms
9	Study of Reforms in Agricultural Marketing Sector in India	Model APLM Act, 2017 Contract Farming Regulations Post-2020 Reforms
10	Study of Agricultural Produce Market Committee (APMC) Structure	Constitution, Roles, Governance
11	Study of APMC Operations & Conduct of Business	Auctioning, Licensing, Market regulation Fee collection procedures
12	Study of State Agricultural Marketing Board	Organizational structure, Roles, Schemes
13	Study of Market Infrastructure (Storage, Grading, Assaying, Weighing Systems)	Cold storages, Warehouses, Packhouses
14	Group Presentations and Discussions on Case Studies	Students present APMC, e-NAM, Export Zones, etc.
15	Field Visit to APMC Marketing Yard	Observation of auction, Grading, Trader interactions
16	Field Visit to Agricultural Marketing Institution	(e.g., MSAMB, DMI office, Agri-logistics centre, Warehouse, Ore-NAM integrated mandi)

Suggested Readings [MKT-243]:

1. **Jagdish Prasad, 1999.** Encyclopedia of Agricultural Marketing - Market Regulation and Development,(Vol.3)
2. **Satphal Puliani, 2020.** The Karnataka Agricultural Produce Marketing (Regulation and Development) Act 1966
3. **Acharya, S.S. and Agrawal, N.L., 1994.** Agricultural Prices - Analysis and Policy, Oxford and IBH, New Delhi.
4. **Kahlon, A.S. and George, M.V.,1965.** Agricultural Marketing and Price Policies, Allied Publishers Private Limited, New Delhi.

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Semester	**:**	**IV**		
Course No.	**:**	**ENGG-242**	**Credits Hrs. :**	**2(1+1)**
Course Title	**:**	**Farm Machinery and Power and Custom Hiring Services**		

SYLLABUS

Objectives :

(i) To understand the principles and operation of farm machinery and power equipment.

(ii) To learn about the selection, maintenance and efficient use of agricultural machinery for various farm operations.

(iii) To explore the concept and benefits of custom hiring services in agriculture.

(iv) To develop skills to optimize farm machinery usage, reduce operational costs and improve overall farm productivity through efficient machinery management and custom hiring services.

THEORY

Status of Farm Power in India, Sources of Farm Power, I.C. engines, Working principles of I.C. engines, Comparison of two stroke and four stroke cycle engines. Study of different components of I.C. engine, I.C. engine Terminology and Solved problems, Familiarization with different systems of I.C. engines: Air cleaning, Cooling, Lubrication, Fuel supply and Hydraulic control system of a tractor, Familiarization with Power Transmission System : Clutch, Gear box, Differential and Final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, Implement for intercultural operations, Familiarization with sowing and planting equipment, Calibration of a seed drill and solved examples, Familiarization with plant protection equipment, Familiarization with Harvesting and Threshing equipment.

PRACTICAL

Study of different components of I.C. engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, Differential and Final drive of a tractor, Familiarization with lubrication and Fuel supply system of engine, Familiarization with brake, Steering, Hydraulic control system of engine, Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of Primary and Secondary tillage implements: Mould plough, Disc plough and Disc harrow. Familiarization with seed - cum - fertilizer drills their seed metering mechanism and calibration, Planters and Transplanter. Familiarization with different types of sprayers and Dusters, Familiarization with different inter - Cultivation equipment, Familiarization with Harvesting and Threshing machinery.

TEACHING SCHEDULE

THEORY [ENGG-242]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	**Status of Farm, Power in India, Source of Farm, Power in India**	Human Power, Animal Power, Mechanical Power, Electrical Power Renewable Energy (Biomass, Sun and Wind)	10
2	**I.C. Engines**	Types of I.C. engines, Petrol and Diesel Engine, Two Stroke and Four Stroke Engines, Working Principles, Comparison between Petrol and Diesel engine, Two-stroke and Four-stroke cycle engines, Components of Engine	10
3 - 4	**I.C. Engine - Terminology**	Stroke Bore Ratio, Piston Displacement, Compression ratio, Displacement Volume, Horse Power, Break Horse Power, Thermal Efficiency, Mechanical efficiency, Solved problems	10
5 - 6	**Different Systems of I.C. Engines**	Air cleaning, Cooling Systems, Fuel Supply Systems, Lubrication Systems, Hydraulic control system of a Tractor	10
7 - 8	**Power Transmission System**	Clutch, Gear Box, Differential unit and Final drive of a tractor, Power take-off, Tractor types, Cost analysis of tractor power and attached implement	10
9	**Tillage Implements**	Tillage - Objectives/ Functions Primary and Secondary tillage implements: Primary tillage implements: Indigenous plough, Mould Board Plough, Disk Plough Secondary Tillage implements: Harrow - Disk Harrow, Drag Harrow, Blade Harrow	10
10 - 11	**Sowing and Planting Equipments**	Sowing: Seed drill, Seed-cum-Fertilizer drill, Seed Metering Mechanisms, Calibration of Seed Drill Paddy Transplanter: Manual Rice Planter, Self Propelled Paddy Transplanter, Establishing modified mat nursery	10
12	**Implement for Hill Agriculture & Intercultural Operations**	Types of cultivators, Equipment for weed control	5
13	**Harvesting and Threshing Equipments**	Harvesting equipments: Mowers, Reapers Threshing-Methods and Power Thresher, Combine Harvester	10

Continued...

14-15	**Plant Protection Equipments**	Sprayers- Components: Bucket type sprayer, Knapsack type sprayer, Compression type sprayer, Hand atomizer, Engine powered Sprayers, Dusters: Plungers type hand dusters, Rotary type, Knapsack type, Power-operated dusters, Air Plane dusters	10
16	**Custom Hiring**	Definition, Objectives, Principles and Benefits, Potential for Custom Hiring Centers	5
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [ENGG-242]

Exercise No.	Exercise Title
1	Study of different components of Internal Combustion Engine
2	Study of air cleaning and cooling system of engine
3 - 4	Study of clutch, transmission, differential and final drive of a tractor
5	Study of lubrication and fuel supply system of engine
6	Study of brake, steering, hydraulic control system of engine
7	Learning tractor driving
8	Study of operation of power tiller
9	Study of Implements for hill agriculture
10 - 11	Study of different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow
12 - 13	Study of seed-cum-fertilizer drills, their seed metering mechanism and calibration, planters and transplanter
14	Study of different types of sprayers and dusters
15	Study of different inter-cultivation equipment
16	Study of harvesting and threshing machinery.

Suggested Readings [ENGG-242]:

1. **Nakra, C.P.** Farm Machinery and Equipment's, , Dhanpat Rai and Sons, New Delhi
2. **Jagadishwar Sahay,** Elements of Agricultural Engineering, Standard Publishers Distributors, New Delhi
3. **Michael, A.M. and T.P. Ojha,** Principles of Agricultural Engineering (Vol-I), Tata McGraw Hill Publishing Co. Ltd, New Delhi
4. **Singhal, O.P.,** Elements of Agricultural Engineering, Merath Aman Public House, Meerut.

Semester	**:**	**IV**		
Course No.	**:**	**HORT-242**	**Credit Hrs.**	**: 2(1+1)**
Course Title	**:**	**Post-harvest Management and Value Addition of Fruits and Vegetables**		

SYLLABUS

Objectives :

(i) To understand the principles and techniques of post-harvest management for fruits and vegetables.

(ii) To learn about value addition processes such as sorting, grading, packaging and processing.

(iii) To explore methods to minimize post-harvest losses and extend the shelf life of fruits and vegetables.

(iv) To develop skills to add value to agricultural produce, increase marketability, and enhance profitability for farmers and stakeholders.

THEORY

Importance of post-harvest processing of fruits and vegetables; Extent and possible causes of post-harvest losses; Pre-harvest factors affecting post-harvest quality, Maturity, Ripening and Changes occurring during ripening; Respiration and Factors affecting respiration rate; Harvesting and Field handling; Storage (ZECC, Cold storage, CA, MA and Hypobaric); Value addition concept: Principles and Methods of preservation; Minimal processing: Intermediate moisture foods- Jam, Jelly, Marmalade Concepts and Standards; Fermented and Non-fermented beverages; Drying/Dehydration of fruits and vegetables - Concept and Methods; Canning Concepts and Standards, Packaging of products.

PRACTICAL

Containers for shelf-life extension; Effect of temperature on shelf life and quality of produce; Chilling and freezing injury in vegetables and fruits; Extraction and preservation of pulps and juices; Preparation of Jam, Jelly, RTS, Nectar, Squash, Wine Fruit bar. Candy, Tomato products; Quality evaluation of products- physio- chemical and sensory; Visit to processing unit/ industry.

TEACHING SCHEDULE

THEORY [HORT-242]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	**Pre-harvest Management**	Importance of post-harvest processing of fruits and vegetables	8
2		Extent and Possible causes of post-harvest losses	6
3		Pre-harvest factors affecting post-harvest quality	6
4	**Maturity and Ripening**	Maturity - Definition, Types, Judging Maturity Ripening - Definition, Changes occurring during ripening	8
5	**Respiration**	Definition, Factors affecting respiration rate.	8
6	**Harvesting**	Definition, Methods of harvesting field handling	8
7	**Storage**	Storage - ZECC, Cold storage, CA, MA and Hypobaric	8
8	**Value addition**	Value addition concept, Principles of preservation, Methods of preservation	10
9		Minimal Processing, Intermediate moisture foods	6
10-11	**Concept and Standards**	Jam, Jelly and Marmalade	8
12-13		Fermented and Non-fermented beverages	6
14		Drying/ Dehydration of Fruit and Vegetables	6
15		Canning	6
16	**Packaging**	Definition, Types and Principles	6
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [HORT-242]

Exercise No.	Exercise Title
1	Containers for shelf-life extension
2	Effect of temperature on shelf life and quality of produce
3	Chilling and Freezing injury in vegetables and fruits
4	Extraction and Preservation of pulps and juices
5	Preparation of Jam
6	Preparation of Jelly
7	Preparation of RTS
8	Preparation of Nectar
9	Preparation of Squash
10	Preparation of Wine
11	Preparation of Fruit bar
12	Preparation of Candy
13	Preparation of Tomato products
14	Quality evaluation of products-physico-chemical and sensory
15 - 16	Visits to Processing units/ Industry

Suggested Readings [HORT-242]:

1. **Bhutani, R.C., 2003.** Fruit and Vegetable Preservation, Biotech Books.
2. **Mitra, S.K., 1997**. Post Harvest Physiology and Storage of Tropical and Sub-tropical Fruits, CABI.
3. **Ranganna S., 1997**. Hand Book of Analysis and Quality Control for Fruit and Vegetable Products, Tata McGraw-Hill.
4. **Sudheer, K.P., and Indira, V., 2007**. Post Harvest Technology of Horticultural Crops, New India Publ. Agency.
5. **Willis, R., McGlassen, W.B., Graham, D. and Joyce, D., 1998**. Post Harvest: An Introduction to the Physiology and Handling of Fruits, Vegetables and Ornamentals, CABI**.**

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

List/ Bouquet of Skill Enhancement Courses (SECs)

[in continuation of the SECs' Syllabi prescribed under I, II & III semesters]

Sr. No.	Course No.	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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