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

- UG-Certificate in Agriculture
- UG-Diploma in Agriculture
- UG-Degree: B.Sc. (Hons.) Agriculture

Mahatma Phule Krishi Vidyapeeth, Rahuri

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

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UG Degree Syllabus State Coordinator

with

UG Degree Syllabus Discipline Coordinators &

DICC - UG Degree Syllabus Core Committee

Submitted to the

Directors of Instruction and Deans (F/A) Coordination Committee

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

Course Layout

B.Sc. (Hons.) Agriculture

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*/ BIO-111****	Introductory Mathematics*/ Basic Biology**	1(1+0)	NG & Need-based
6.	**EXTN-111**	Rural Sociology and Educational Psychology	2(2+0)	
7.	**AGRO-111**	Fundamentals of Agronomy	3(2+1)	
8.	**SOIL-111**	Fundamentals of Soil Science	3(2+1)	
9.	**HORT-111**	Fundamentals of Horticulture	3(2+1)	
10.	**SEC-111**	Skill Enhancement Course-I *(#To be offered from the bouquet of SEC Courses)*	2(0+2)	
11.	**SEC-112**	Skill Enhancement Course-II *(#To be offered from the bouquet of SEC Courses)*	2(0+2)	
		Total Credits Hrs.	**21(11+10) G 3(1+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/ **BIO-111 for **PCM** student/ **PCMB** student is NOT required to take any of these Need-based/Deficiency Courses.

[#] **List/ Bouquet of Skill Enhancement Courses (SECs)**:

Sr. No.	Course No.	Course Title	Credit Hrs.
1.	SEC-xxx	Biofertilizer and Biopesticide Production	2(0+2)
2.	SEC-xxx	Mushroom Production Technology	2(0+2)
3.	SEC-xxx	Seed Production Technology	2(0+2)
4.	SEC-xxx	Post-harvest Processing Technology	2(0+2)
5.	SEC-xxx	Beneficial Insect Farming	2(0+2)
6.	SEC-xxx	Horticulture Nursery Management	2(0+2)
7.	SEC-xxx	Plantation Crops Production and Management	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.

The detailed course-wise syllabus of above SEC courses 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-wise Syllabus with Teaching Schedules

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	Weightage (%)
1	Orientation, History, Objectives, Principles, Symbols, Badge	10
2	Regular Programmes under NSS	10
3	Organisational 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, Analysing 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, Firefighting, 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	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: precis 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		Precis 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

Exercise No.	Exercise Topic
1	Listening and Note taking
2	Writing skills- Precís 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 pattern 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 life style.

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
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*. (2015)**. *Region Specific Integrated Farming System Models.* ICAR-Indian Institute of Farming Systems Research, Modipuram.
    - **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**	
Course No.	**:**	**EXTN-111**	**Credit Hrs : 2(2+0)**
Course Title	**:**	**Rural Sociology and Educational Psychology**	

SYLLABUS

Objective: To provide knowledge on concept and importance of Sociology and Rural Sociology as well as the relationship with Extension Education.

THEORY

Extension Education and Agricultural Extension: Meaning, Definition, Scope and Importance. Sociology and Rural Sociology: Meaning, Definition, Scope, Importance of Rural Sociology in Agricultural Extension and interrelationship between Rural Sociology and Agricultural Extension. Indian Rural Society: Important characteristics, differences and relationship between Rural and Urban societies. Social Groups: Meaning, Definition, Classification, Factors considered information and organization of groups, Motivation in group formation and Role of social groups in Agricultural Extension. Social Stratification: Meaning, Definition, Functions, Basis for stratification, Forms of social stratification- Characteristics and differences between Class and Caste System. Cultural concepts: Culture, Customs, Folkways, Mores, Taboos, Rituals. Traditions: Meaning, Definition and their Role in Agricultural Extension. Social Values and Attitudes: Meaning, Definition, Types and Role of Social Values and Attitudes in Agricultural Extension. Social Institutions: Meaning, Definition, Major institutions in Rural Society, Functions and their Role in Agricultural Extension. Social Organizations: Meaning, Definition, Types of organizations and role of social organizations in Agricultural Extension. Social control: Meaning, Definition, need of social control and Means of Social control. Social change: Meaning, Definition, Nature of social change, Dimensions of social change and factors of social change. Leadership: Meaning, Definition, Classification, Roles of leader, Different methods of selection of Professional and Lay leaders. Training of Leaders: Meaning, Definition, Methods of training, Advantages and limitations in use of Local leaders in Agricultural Extension, Psychology and Educational Psychology: Meaning, Definition, Scope and Importance of Educational Psychology in Agricultural Extension. Intelligence: Meaning, Definition, Types, Factors affecting intelligence and Importance of intelligence in Agricultural Extension. Personality: Meaning, Definition, Types, Factors influencing the Personality and Role of personality in Agricultural Extension. Teaching - Learning Process: Meaning and Definition of Teaching, Learning, learning experience and Learning situation, Elements of learning situation and its characteristics. Principles of learning and their implication of teaching.

TEACHING SCHEDULE

THEORY [EXTN-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1-2	Extension Education and Agricultural Extension	Meaning, Definition, Scope and Importance	5
3-4	Sociology and Rural Sociology	Meaning, Definition, Scope, Importance of Rural Sociology in Agricultural Extension and Interrelationship between Rural Sociology and Agricultural Extension.	10
5-6	Indian Rural Society	Important characteristics, Differences and relationship between Rural and Urban societies.	5
7-8	Social Groups	Meaning, Definition, Classification, Factors considered in formation and organization of groups and Role of social groups in Agricultural Extension.	10
9-10	Social Stratification	Meaning, Definition, Functions, Basis for stratification, forms of social stratification, characteristics and differences between Class and Caste system	5
11-12	Cultural Concepts	Culture, Customs, Folkways, Mores, Taboos, Rituals. Traditions - Meaning, Definition and their role in Agricultural Extension.	5
13	Social Values and Attitudes	Meaning, Definition, Types and Role of social values and attitudes in Agricultural Extension.	5
14-15	Social Institutions	Meaning, Definition, Major institutions in rural society: Marriage, family and religion, functions and their role in Agricultural Extension.	5
16-17	Social Organization	Meaning, Definition and Types of organization, Role of social organization in Agricultural Extension	5
18	Social Control	Meaning, Definition, Need of social control and Means of social control.	5
19-20	Social Change	Meaning, Definition, Nature of social change, Dimensions of social change and Factors of social change.	5
21-22	Leadership	Meaning, Definition, Classification, Roles of leaders, Different methods of selection of Professional and Lay leader types and their role in Agricultural Extension	5
23-24	Training of Leaders	Meaning, Definition, Methods of training, Advantages and Limitations in use of Local Leaders of Agricultural Extension.	5

Continued…

25-26	Psychology and Educational Psychology	Meaning, Definition, Scope and Importance of Educational Psychology in Agricultural Extension.	5
27-28	Intelligence	Meaning, Definition, Types, Factors affecting intelligence and Importance of intelligence in Agricultural Extension	5
29-30	Personality	Meaning, Definition, Types, Factors influencing personality and Role of personality in Agricultural Extension.	5
31-32	Teaching-Learning Process	Meaning and Definition of teaching, Learning, Learning experience and Learning situation, Elements of learning situation and its characteristics, Principles of learning and their implication for teaching.	10
		Total=	**100**

Suggested Readings [EXTN-111]:

1. Ray, G.L. (2003). Extension Communication and Management. Kalyani Publishers. Fifth Revised and Enlarged Edition.
2. Dahama, O.P. and Bhatnagar, O.P. (2003). Education and Communication for Development. Oxford and IBH Publishing Co. Pvt. Ltd.
3. Sandhu, A.S. (1993). Textbook on Agricultural Communication: Process and Methods. Oxford and IBH Publishing Co. Pvt. Ltd.
4. Chitambar, J.B. (2008). Introductory Rural Sociology. New Age International (P) Limited.
5. Sachdeva, D.R. and Bhushan, V. (2007). An Introduction to Sociology. Kitab Mahal Agency.
6. Chitambar, J.B. (1973). Introductory Rural Sociology. New York, John Wilex and Sons.
7. Desai, A.R. (1978). Rural Sociology in India. Bombay, Popular Prakashan, 5th Rev. Edn.
8. Doshi, S.L. (2007). Rural Sociology. Delhi Rawat Publishers.
9. Jayapalan, N. (2002). Rural Sociology. New Delhi, Altanic Publishers.
10. Sharma, K.L. (1997). Rural Society in India. Delhi, Rawat Publishers.
11. Velusamy R. Textbook on Rural Sociology and Educational Psychology.
12. Ghorpade M.B. - Essential of Psychology.

Semester	**:**	**I**
Course No.	**:**	**AGRO-111**
Credit Hrs.	**:**	**3(2+1)**
Course Title	**:**	**Fundamentals of Agronomy**

SYLLABUS

Objective: To impart the basic and fundamental knowledge of Agronomy.

THEORY

Agronomy and its scope: Definition, meaning and scope of Agronomy; Art, science and business of crop production, Relation of Agronomy with other disciplines of Agricultural Science. Field crops: Classification, Importance, Ecology and ecosystem. Seeds and sowing: Definitions of Crop, Variety and Seed. Factors affecting crop stands establishment: good quality seed, proper tillage, time of sowing, seed rate, depth and methods of sowing (broadcasting, drilling, dibbling, sowing behind country plough and transplanting etc.). Tillage and tilth: Definition, Objectives, types, advantages and disadvantages of tillage including Conservation tillage, Modern Concept of Tillage. Crop density and Geometry: Plant geometry and Planting geometry, its effect on growth and yield. Crop nutrition: Definition of essential nutrients, Criteria of essentiality, Functional elements, Classification of essential nutrients, Role of macro and micro nutrients. Nutrient absorption, Active and Passive absorption of nutrients, forms of plant nutrients absorbed by plants, Combined/ Un-combined forms. Manures and fertilizers, Nutrient use efficiency: Sources of nutrients: Inorganic (fertilizers), organic (manures) and biofertilizers; their classification and characteristics, method of preparation and role of organic manures in crop production. Integrated Nutrient Management (INM): Meaning, different approaches and advantages of INM. Green manures- role in crop production: Definition, objectives, types of green manuring, desirable characteristics, advantages and limitations of green manuring. Water management: Water resources of the World, India and the State; Soil Moisture Constants: gravitational water, capillary water, hygroscopic water. Weeds: Definition, importance and basis of classification of weeds and their control. Agro-climatic zones of India and the State. Cropping systems: Factors affecting cropping systems, major cropping patterns and systems in the country. Sustainable crop production: Definition, importance and practices, natural resources and conservation, pollution and pollutants. Allelopathy: Meaning and importance in crop production. Growth and development of crops: Definition, meaning and factors affecting growth and development.

PRACTICAL

A visit to Instructional Crop Farm and study of field crops, Identification of crops, seeds, fertilizers, pesticides; Crops and cropping systems in different Agro-climatic zones of the state; Study of some preparatory tillage implements; Study of inter-tillage implements, Practice of ploughing/ puddling; Study and practice of inter-cultivation in field crops; Numerical exercises on calculation of seed, plant population and fertilizer requirement; Study of yield contributing characters and yield estimation of crops; Identification of weeds in different crops; Seed germination and viability test of seed; Practice on time and method of application of manures and fertilizers.

TEACHING SCHEDULE

THEORY [AGRO-111]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1-2	Agronomy and its Scope	Definition, Meaning and Scope of Agronomy, Art, science and business of crop production. Relation of Agronomy with other disciplines of Agricultural Science. Role of Agronomist.	6
3	Field crops	Classification and importance of field crops, Ecology and ecosystem.	6
4	Growth and Development of crops	Definition, Meaning, Factors affecting growth and development, Growth curve.	4
5-7	Seeds and Sowing:	Definitions- Crops, Variety and Seed. Factors affecting crop stand and its establishment; good quality seed, proper tillage, sowing time, seed rate, sowing depth, seed treatment; Methods of sowing/planting: (broadcasting, drilling, dibbling and transplanting, sowing behind plough etc.), Advantages, Disadvantages, Crops to be sown.	10
8	Tillage and Tilth	Definition, Objectives, Types, Advantages and Disadvantages of tillage, including Conservation tillage.	4
9-10	Modern Concept of Tillage	Modern Concept of Tillage: Types, Definition, Concept, Advantages and Disadvantages.	8
11	Crop Density and Geometry	Definitions- Crop density, Crop geometry and Plant geometry. Effects of planting geometry on growth and yield.	5
12-13	Crop Nutrition	Definition of Essential nutrients; Criteria of essentiality, Functional elements, Classification of essential nutrients; Role of macro- and micro- nutrients in plant growth and development.	8
14	Nutrient Absorption	Active and Passive absorption of nutrients, Forms of major plant nutrients (NPK) absorbed by plants; Combined/ Un-combined forms.	

Continued….

15-17	Manures and Fertilizers	Classification of manures and fertilizers including biofertilizers with examples; Methods of preparation (FYM and Compost) and Role of organic manures in crop production.	8
18	INM and NUE	Definition, Meaning, Different approaches and Advantages of Integrated Nutrient Management (INM); Concept of Nutrient Use Efficiency (NUE)	6
19	Role of Green Manures in Crop Production	Definition, Objectives and Types of Green manuring; Desirable characteristics, Advantages and Limitations of Green manuring.	6
20	Water Management	Water resources of the World, India and State (Maharashtra)	10
21-24	Soil Moisture Constants and Methods of Irrigation	Soil Moisture Constants- Field capacity, Saturation point and PWP; Soil water: Gravitational water, Capillary water, Hygroscopic water; Methods of irrigation, Scheduling of irrigation, Different approaches of scheduling irrigation	
25-26	Weed Management	Definition, Importance and classification of weeds on season and life cycle basis; Weed control methods- preventive, curative (cultural, physical, mechanical, biological and chemical)	8
27	Allelopathy	Meaning, its effect on crops and weed; Importance in crop production	
28-29	Major Cropping Patterns and Systems in India.	Cropping system: Definition, Classification with examples. Factors affecting cropping systems, Major cropping patterns and Systems in the country.	5
30-32	Sustainable Crop Production	Definition, Components, Importance and Limitations; Practices, Natural resources and Conservation, Pollution and pollutants.	6
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [AGRO-111]

Exercise No.	Exercise	Practical Sub-topics/ Titles
1	Instructional Crop Farm Visit	Visit to Instructional Crop Farm and Study on field crops.
2	Identification of crops, seeds, fertilizers and pesticides	Identification of crops, seeds, fertilizers and pesticides; Preparation of Seed Album.
3	Crops and cropping systems in different Agro-climatic state zones	Study of crops and cropping systems in Agro-climatic zones of Maharashtra.
4	Study of some preparatory tillage implements	Study of implements required for primary tillage and secondary tillage operations.
5	Study of inter-tillage implements	Study of implements required for inter tillage or after cultivation operations.
6	Practice of ploughing/ puddling	Study of ploughing/ puddling in rice.
7-8	Study and practice of inter-cultivation in field crops	Study and Practices of inter-cultivation in field crops with tools and implements.
9-10	Numerical exercises on calculation of seed, plant population and fertilizer requirement	Numerical problems on seed rate and plant population. Calculation of fertilizer doses.
11	Study of yield contributing characters and yield estimation of crops	Study of yield contributing characters and yield estimation of major crops of region.
12	Identification of weeds in different crops	Identification and preparation of Weed Herbarium of 20 major weeds in different crops [*Parthenium, Lavala, Hariayali, Ekdandi, Kena, Math, Dudhani* (small, medium and large), *Ghaneri, Kunjru, Reshimkata* etc.].
13	Seed germination and viability test of seed	Study of seed germination test of major crops; Methods of viability test of seed of major crops.
14	Practice on time and method of application of manures and fertilizers.	Organic Manure application; Basal application, top dressing and foliar application of fertilizers.
15	Determination of soil moisture	Determination of soil moisture using gravimetric method
16	Determination of field capacity	Determination of field capacity by field method

Suggested readings:

1. William L Donn. 1965. Meteorology. McGraw-Hill Book Co. New York.
2. Yawalkar K S and Agarwal J P. 1977. Manures and Fertilizers. Agricultural Horticultural Publishing House, Nagpur.
3. Rao V S. 1992. Principles of Weed Science. Oxford and IBH Publishing Co. Ltd., New Delhi.
4. Reddy Yellamanda T and Shankar Reddy G H. 1995. Principles of Agronomy. Kalyani Publishers, Ludhiana.
5. Reddy S R. 2008. Principles of Crop Production, Kalyani Publisher, Ludhiana.

Semester	**:**	**I**	
Course No.	**:**	**SOIL-111**	**Credits : 3(2+1)**
Course Title	**:**	**Fundamentals of Soil Science**	

SYLLABUS

Objective: To impart knowledge on soil genesis, basic soil properties with respect to plant growth.

THEORY

Soil: Pedological and Edaphological Concepts; Rocks and minerals, Weathering; Silicate clays: constitution and properties; Sources of charge, ion exchange, cation and anion exchange capacity and base saturation (after buffering capacity); Soil formation, Soil organic matter, Pedogenic processes; Soil colloids: inorganic and organic, Properties of soil colloids and Ion exchange in soils; Soil profile, Soil texture, Soil structure; Bulk density and Particle density; Soil consistency; Soil temperature, Soil air, Soil water; Soil reaction and Buffering capacity; Soil taxonomy; Keys to soil orders; Soils of India.

PRACTICAL

Study of general properties of minerals; Study of minerals-silicate and non-silicate minerals; Study of rocks-igneous, sedimentary and metamorphic rocks; Study of a soil profile, Collection and processing of soil for analysis; Study of soil texture-feel method, mechanical analysis, determination particle density and soil porosity, Determination of soil colour; Study of soil structure and aggregate analysis; Determination of soil moisture; Determination of soil moisture constants field capacity; water holding capacity; Study of infiltration rate of soil; Determination of pH and Electrical conductivity of soil.

TEACHING SCHEDULE

THEORY [SOIL-111]

Lecture No.	Topic	Sub-topics/ Key points	Weightage (%)
1 & 2	History and development of Soil Science, its scope and importance. Soil as natural body, Pedological and edapholgical concept of soil.	History, Scope and importance of Soil Science, Approaches of Soil Study, Pedological concepts, Edapholgical concept of soil.	6
3 & 4	Soil genesis, soil forming rocks and minerals	Definitions, Formation of rocks, Classification of rocks, Classification of minerals, Properties of minerals, Soil forming minerals.	4
5 & 6	Weathering of rocks and minerals	Definitions, Types of weathering, Subtypes of weathering, Examples.	6
7 & 8	Processes and factors of soil formation	Definitions, Types of soil forming processes, Soil forming factors, Equation, Types of soil forming factors.	6
9	Soil profile, Soil horizons and Soil components	Definitions, Development of Soil Profile, Components of soils, Volume composition of mineral soil, Soil horizons.	4
10 & 11	Soil physical properties: Soil texture, Soil structure	Definitions, Types of soil physical properties, Importance of soil texture, Soil textural classes, Soil structure, Formation of soil structure, Types and Classes of structure, Factors affecting soil structure, Importance of structure	4
12	Soil bulk density and Particle density	Definitions, Importance of soil density, Porosity of soil, Factors affecting soil density.	4

Continued….

13 & 14	Soil consistency, Plasticity and Soil colour	Definitions, Soil consistency, Soil stickiness and plasticity.	4
15	Soil Temperature: Source, effect on plant growth and nutrient availability	Definition, Importance of soil temperature, Source of soil temperature, Factors affecting absorption of heat, Factors affecting soil temperature, Role of soil temperature in nutrient availability	4
16	Soil Air- Composition of gases, exchange in soil, its impact on plant growth	Definition, Soil air and its composition of gases, Gases exchange in soil, Impact on plant growth, Effect on plant growth,	4
17 &18	Soil Water: Soil water classification, Soil water retention, Soil water potential, Soil moisture constants, Hydraulic conductivity, Permeability, Percolation, Movement and availability in soil.	Importance of Soil Water, Classification of Soil water, Factors affecting soil water, Soil water potential, Measuring soil moisture, Soil Moisture Constants, Soil water movement, Hydraulic conductivity, Water permeability, Percolation, Water movement and availability in soil.	6
19 & 20	Soil Organic Matter: Sources, composition, Properties, Factors affecting SOM, its importance and influence on soil properties	Definitions, Sources of soil organic matter, Decomposition of soil organic matter, Role of Organic matter, Properties of soil organic matter, Factors affecting Soil organic matter, Influence on Soil properties.	6
21 & 22	Silicate Clays: Constitution and Properties	Definition, Layer silicate clays, Types of silicate clay minerals; Properties of silicate minerals	6
23 & 24	Sources of charge, ion exchange, cation and anion exchange capacity and base saturation (after buffering capacity)	Definitions, Sources of charge, Ion exchange, Cation and anion adsorption, Mechanism of Cation Exchange, Cation Exchange Capacity, Importance of Cation Exchange, Source of positive charge, Importance of anion exchange	6

Continued….

25 & 26	Humic substances: Nature and Properties	Definition, Importance of humic substances, Nature and properties of humic substances	6
27	Soil Colloids: Inorganic and Organic, Properties of Soil colloids and Ion exchange in soils	Definitions, General Properties of Soil colloids, Types of Soil colloids, Ion exchange in soil.	5
28	Soil reaction and Buffering capacity: Soil pH, Buffering capacity, Effect of soil pH on nutrient availability.	Definition of pH, Buffering capacity, Buffer action, Importance of buffering, Significance of soil reaction in plant nutrition.	4
29 & 30	Soil Taxonomy: Soil Survey, Soil Taxonomy, Classification, Land Capability Classification, Land Irrigability Classification.	Definition, Salient features of Soil Taxonomy, Importance of Soil survey, Types of Soils survey, Diagnostic Horizons of Mineral Soils, Land Capability Classification, Land Irrigability Classification.	5
31	Keys to Soil Orders	Definition, Importance of soil orders, Classification of soil orders, Characteristics of soil orders.	6
32	Soils of India and Maharashtra	Soils of India, Classification of soils of India, Soils of Maharashtra, Distribution and classification of soils of Maharashtra.	4
		Total=	**100**

Suggested Readings (Theory- SOIL-111):

1. ISSS. 2009. Fundamentals of Soil Science. 2nd Edn. Indian Society of Soil Science, New Delhi- 110 012. pp. 728.
2. Das D.K. 2011. Introductory Soil Science, 3rd revised and Enlarged Edn, Kalyani Publisher, Ludhiana. pp. 645.
3. Patil, V.D. and Mali C.V. 2007. Fundamentals of Soil Science, Aman Publication, Meerut.
4. Brady, N.C. 2016. The Nature and Properties of Soils. 15th Edn. Publisher: Pearson Education.
5. Biswas, T.D. and Mukherjee, S.K. 1995. Text Book of Soil Science 2nd Edn. Tata McGraw Hill Publisher, Delhi. pp. 433.
6. Daji J.A., Kadam J.R. and Patil N.D. 1996. Textbook of Soil Science, Bombay Media Promoters and Publishers Pvt. Ltd.

PRACTICAL [SOIL-111]

Exp. No.	Title of Experiment
1	Study of general properties of minerals.
2	Study of silicate and non-silicate minerals.
3	Study of rocks- Igneous, sedimentary and metamorphic.
4	Study of soil profile.
5	Study of soil sampling tools, collection and processing of soil for analysis.
6	Determination of soil texture by feel method.
7	Determination of soil texture by mechanical analysis.
8	Determination of bulk density by clod coating method.
9	Determination of particle density by pycnometer method and porosity of soil.
10	Determination of soil colour by Munsell soil colour chart.
11	Study of soil structure and aggregate analysis.
12	Determination of moisture content in soil by gravimetric method.
13	Determination of soil moisture constants- Field capacity.
14	Determination of water holding capacity.
15	Study of infiltration rate of soil.
16	Determination of pH and electrical conductivity of soil.
17	Determination of hydraulic conductivity of soil by constant head method.
18	Estimation of organic carbon and organic matter content in soil by Walkely and Black method.

Suggested Readings (Practical- SOIL-111):

1. 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.
2. Jakson, M.L. 1973. Soil Chemical Analysis. Printice Hall, India, Pvt. Ltd. New Delhi. pp 498.
3. 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.
4. Klute, A. 1986. Methods of Chemical Analysis, 2nd Ed. American Soc. Agron. Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
5. Piper, C.S. 1966. Soil and Plant Analysis. Inters Science. Hans Publisher, Mumbai.
6. Black, C.A. 1965. Soil Chemical Analysis, Part I and Part II. American Soc. Agron, Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
7. Hesse, P.R. 1971. A Text Book of Soil Chemical Analysis. John Murray, London.
8. Richards, L.A. 1968. Diagnosis and Improvement of Saline Alkali Soils. Oxford and IBH Publication Co. Calcutta.
9. Chopra, S.L. and Kanwar, J.S. 1991. Analytical Agricultural Chemistry, Kalyani Publisher New Delhi.
10. Chapman, H.D., and P.F. Pratt. 1961. Methods of Analysis for Soils, Plants and Waters. Division of Agricultural Sciences, University of California.

Semester	**:**	**I**		
Course No.	**:**	**HORT-111**	**Credit Hrs.**	**: 3(2+1)**
Course Title	**:**	**Fundamentals of Horticulture**		

SYLLABUS

Objectives:

(i) To provide knowledge on different branches of Horticulture *viz.*, Pomology, Olericulture, Floriculture and Landscaping, Spices and Medicinal plants,

(ii) To provide knowledge on orchard management, propagation methods, cultural operations and nutrient management of horticultural crops,

(iii) To provide knowledge on different physiological aspects of horticultural crops.

THEORY

Horticulture: Its different branches, importance and scope; Horticultural and Botanical classification; Soil and Climate for horticultural crops; Plant propagation: Methods and propagating structures; Seed dormancy and seed germination; Merits and demerits of sexual and asexual propagation; Stock-Scion relationship. Principles of orchard establishment; Principles and methods of training and pruning of fruit crops; Juvenility and flower bud differentiation; Unfruitfulness in horticultural crops; Pollination, pollinizers and pollinators; Fertilization and parthenocarpy; Medicinal and aromatic plants; Spices and condiments; Importance of plant bio-regulators in horticultural crops; Irrigation and its methods; Fertilizers application in horticultural crops; Principles, features and styles and types of garden; Types of vegetable gardening; Kitchen gardening.

PRACTICAL

Identification of garden tools; Identification and nomenclature of fruits; Layout of an orchard; Pit making and system of planting; Nursery raising techniques of fruit crops; Understanding of plant propagation structures; Propagation through seeds and plant parts, Propagation techniques for horticultural crops, Container, potting mixture, potting and repotting; Training and pruning methods on fruit crops; Preparation of fertilizer mixture and application, Preparation and application of PGR; Layout of different irrigation systems; Maturity studies and harvesting; Grading, packaging and storage.

TEACHING SCHEDULE

THEORY [HORT-111]

Lecture No.	Topic	Subtopics/ Key Points	Weightage (%)
1-2	Scope and Importance of Horticulture	Definitions and Branches of Horticulture, Meaning; Role, Scope, Importance, - Areas with examples.	10
3-4	Classification of Horticultural crops	Basis of Classification, Horticultural and Botanical Classification, Types with suitable examples.	10
5-6	Soil and Climate for Horticultural crops	Meaning, Soil and Climatic requirement for Horticultural crops, Suitable examples.	
7-11	Plant Propagation - Methods and Propagating Structures	Sexual and Asexual methods of Propagation, Its merits and demerits; Propagation by propagules, Propagating structures, Stock-Scion relationship.	15
12-13	Seed Dormancy and Seed Germination	Definitions, Types of Seed dormancy, Causes of seed dormancy and methods to break seed dormancy; Seed germination and changes in seed during germination.	10
14-15	Principles of Orchard Establishment	Site selection criteria, Principles, Preparation of land and layout, Planting systems.	
16-17	Training and Pruning of Fruit crops	Principles and methods of training and pruning of fruit crops and Canopy management.	10
18-19	Juvenility and Flower Bud Differentiation	Definitions, Maturation phase, Techniques to reduce juvenile phase, Ways for rejuvenation or reversion to juvenile stage.	10
20	Unfruitfulness in Horticultural crops	Definitions, Fruitfulness, Fruit setting, Unfruitfulness and factors responsible for it, Steps to overcome it, Suitable examples.	
21-22	Pollination, Pollinizers and Pollinators	Definitions, Types of pollinations, Mechanisms to promote self and cross-pollination, Advantages and disadvantages, Important pollinators and pollinizers with examples.	05
23	Fertilization and Parthenocarpy	Definitions, Types of Parthenocarpy with examples.	

Continued…

24	Medicinal and Aromatic Plants	Scope, Importance and its Classification	05
25	Spices and Condiments	Scope, Importance and its Classification	
26	Importance of Plant Bio-regulators in Horticultural crops	Definition, Role of Bio-regulators and its uses in Horticulture with examples	05
27	Irrigation Methods in Horticultural crops	Irrigation methods and its advantages and disadvantages.	10
28	Fertilizers Application in Horticultural crops	Types of fertilizers; Methods of fertilizers application, their advantages and disadvantages	
29-30	Principles, Features and Styles and Types of Garden	Principles, Features and Styles and Types of Garden.	05
31	Types of Vegetable Gardening	Different types of Vegetable gardening	05
32	Kitchen Gardening	Explanation and Components of Kitchen gardening.	
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [HORT-111]

Exercise No.	Title
1	Identification of garden tools
2-3	Identification and Nomenclature of fruits
4	Layout of an orchard
5	Pit making and system of planting
6	Nursery raising techniques of fruit crops
7	Understanding of plant propagation structures
8	Propagation through seeds and plant parts
9	Propagation techniques for horticultural crops
10	Container, potting mixture, potting and repotting
11	Training and pruning methods on fruit crops
12	Preparation of fertilizer mixture and application
13	Preparation and application of PGR
14	Layout of different irrigation systems
15	Maturity studies and harvesting
16	Grading, packaging and storage

Suggested Readings:

1. Basics of Horticulture by Jitendra Singh
2. Introduction to Horticulture by N. Kumar
3. Handbook of Horticulture by K.L. Chadda
4. Jain, S.K. 1968. Medicinal Plants. National Book Trust New Delhi. Oxford & IBH, New Delhi.
5. Atal, E.K. and Kapur, B. 1982. Cultivation and Utilization of Medicinal and Aromatic Plants. CSIR, New Delhi.

Semester	**:**	**I**	
Course No.	**:**	**MATH-111***	**Credit Hrs. : 1(1+0) NG; Need-based**
Course Title	**:**	**Introductory Mathematics**	
*Need-based, Non-Gradial Common Course across 5 UG Degrees: **B.Sc. (Hons.) Agri. / B.Sc. (Hons.) Horti. / B.Sc. (Hons.) Forestry / B.F.Sc. (Hons.) / B.Sc. (Hons.) C.S.**			

SYLLABUS

Objective: To impart knowledge on Introductory Mathematics as a need-based/ deficiency course.

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) and 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.

Partial Differentiation: Definition, Homogeneous function, Euler's Theorem, Examples.

Maxima and Minima of the functions of the form y = f (x) 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).

Mensuration: Statement of Simpson's 1/3rd Rule (Without Proof). Examples on Simpson's Rule.

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.
4. Mensuration-I by Pierpoint.

TEACHING SCHEDULE

THEORY

Lecture No.	Topic	Subtopics/ Key Points	Weightage (%)
1-2	Algebra: Progressions	Arithmetic Progression: Definition, Sum of n terms, Examples.	10
		Geometric Progression: Definition, Sum of n terms, Examples. Harmonic Progression: Definitions, Examples.	
3-4	Determinants	Definition of Determinant, Expansion of determinant up to 3rd order, Examples	10
		Properties of determinants up to 3rd order (without proof)	
5-7	Matrices	Definition of Matrices, Order of Matrix, Types of Matrices	20
		Algebra of Matrices: Addition, Subtraction, Multiplication, Examples	
		Transpose of Matrix and it's Properties (without proof)	
8-10	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) and 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.	
11-12	Partial differentiation	Definition, Homogeneous function, Euler's theorem, Examples.	10
		Maxima and Minima of the functions of the form y = f (x) Examples.	
13-15	Integral Calculus	Definition 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).	
16	Mensuration	Statement of Simpson's 1/3rd Rule (without Proof). Examples on Simpson's Rule.	10
		Total =	**100**

Semester	**:**	**I**				
Course No.	**:**	**BIO-111****	**Credit Hrs.**	**:**	**1(1+0)**	**Need-based; NG**
Course Title	**:**	**Basic Biology**				
Need-based, Non-Gradial Common Course across 5 UG Degrees: **B.Sc. (Hons.) Agri. / B.Sc. (Hons.) Horti. / B.Sc. (Hons.) Forestry / B.F.Sc. (Hons.) / B.Sc. (Hons.) C.S.						

SYLLABUS

Objectives:

(i) To impart foundational knowledge of biological principles including diversity, genetics, evolution of living organisms,

(ii) To impart basic knowledge about flowering plants and animals with a focus on their application in Agriculture.

THEORY

Introduction to the living world, Diversity and characteristics of life. Origin of life, Evolution and Eugenics. Genetics and Basics concepts. Binomial nomenclature and Classification. Cell and cell division. Morphology of flowing plants. Seed and Seed germination. Plant systematics- *viz*., Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

TEACHING SCHEDULE

THEORY

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	Introduction to Living World	Definition of Biology; Composition and Biological Classification of living world.	5
2	Diversity and Characteristics of Life	Definitions: Diversity, Biodiversity; Characteristics of life; Building blocks of life and relationship between different organisms.	5
3	Origin of Life	Theories of Origin of Life; Oparin - Haldane Theory of Chemical origin.	5
4	Evolution and Eugenics	Evidences of Organic Evolution, Theories of Evolution; Eugenics: Definition.	5

Continued…

5	Genetics and Basics Concepts	Genetics and Mendel's Experiments (Basic Concepts)	5
6	Binomial Nomenclature	Binomial nomenclature and classification; Overview of taxonomic hierarchy/ ranks.	10
7	Cell: Structure and Function	Cell structure, Composition and Cell organelles and their functions.	5
8-9	Cell Division	Definition, Types: Mitosis and Meiosis, their Significance, Stages.	10
10-12	Morphology of Flowering plants	Morphology, Structure and Functions: Roots, Stems, Leaves, Flowers and Fruits.	25
13	Seed and Seed Germination	Definitions, Types of seed (Monocot and Dicot seed), Types of seed germination and factors affecting it.	5
14-15	Plant Systematics – Study of Families	Key features, Economic importance and Examples of - A) Brassicaceae B) Fabaceae C) Poaceae	15
16	Role of Animals in Agriculture	Livestock in farming systems: Nutritional and economic contributions; Role of pollinators in crop production; Biological pest control (Predatory use); Sustainable integration of animals in agroecosystems.	5
		Total =	**100**

Suggested Readings [BIO-111]:

1. Cell Biology, Genetics, Molecular Biology and Evolution by P.S. Verma, V.K. Agrwal. Publisher- S. Chand and Company Ltd., Ram Nagar, New Delhi. India.
2. Evolution of Vertebrates by Edwin H. Colbert, Publisher- A Wiley, Inter Science Publication, John Wiley and Sons, New York. US.
3. A Class-book of Botany by A.C. Dutta, Publisher- Oxford University Press, YMCA Library Building. Jai Singh Road, New Delhi - 110001, India.
4. Fundamentals of Genetics by B.D. Singh, Publisher- Kalyani Publ. B-I/1292, Rajinder Nagar, Ludhiana.
5. A Textbook of Practical Botany-2 by Ashok M. Bendre, Ashok Kumar, Publisher- Rastogi Publications, Shivaji Road, Meerut, India.
6. Botany-An Introduction to Plant Biology by Jamesh D. Mauseth, Publisher- Continental Prakashan, 1962, Pune.
7. Anatomy of Seed Plants by A.C. Datta, Sigh V., Pande P.G., Publisher- Sai Print Opack, New Delhi, Rastogi Publication, Meerut, India.
8. Handbook of Animal Husbandry by ICAR, New Delhi Publication, Publisher- Directorate of Knowledge Management in Agriculture, Krishi Anusandhan Bhavan, Pusa, New Delhi - 110012, India.

Letterhead of the College Associate Dean / Principal

To,

The Dean (F/A) & Director of Instruction,

(*University Name*)

Subject: Declaration/Compliance with DICC Circular No. MAUEB/DICC-Circular/New UG Syllabi/420/24; Dated. 29.11.2024; *Reg*.- Implementation of New UG Degree Syllabus as per Sixth DCR…

Declaration/ Compliance Report

This is to confirm and declare hereby that in response to the above-referred DICC-Circular, the undersigned has ensured the initiation and implementation of the New Undergraduate Syllabus for the **UG Degree:** _____ at **(College Name & Address)** and the implementation is effective from the Academic Year, 2024-25 and strictly adheres to the finalized course layouts and syllabi as detailed in **Annexure - _____** appended to the said Circular.

It is further certified that this implementation aligns with the **ICAR - Sixth Deans' Committee Report** and is in full compliance with the guidelines stipulated under the regime of **the DICC Core Committee**. No deviations have been made in the course allotments, credit hours, or any other aspects of the prescribed syllabus/ curriculum.

Hence, Certified and Submitted.

Signature and Seal:

Name of AD/ Principal: _____

Designation: _____

College Name: _____

Official Stamp/Seal: _____

Date: _____

Course Curriculum of Second Semester

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

AGRICULTURE

- **UG-Certificate in Agriculture**
- **UG-Diploma in Agriculture**
- **UG-Degree: B.Sc. (Hons.) Agriculture**

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. S.B. Kharbade
Dean (F/A) & DI and Associate Dean, PGI, 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 and Deans (F/A) Coordination Committee

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

Course Curriculum of Second Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programme in AGRICULTURE

Course Layout

B.Sc. (Hons.) Agriculture

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 (NSS-II)/ National Cadet Corps (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.	**SOIL-122**	Soil Fertility Management	3(2+1)	--
5.	**ENTO-121**	Fundamentals of Entomology	3(2+1)	--
6.	**PATH-121**	Fundamentals of Plant Pathology	3(2+1)	--
7.	**AHDS-121**	Livestock Production and Management	2(1+1)	--
8.	**SEC-123**	Skill Enhancement Course-III[#] (*To be offered from the list of SEC Courses*)	2(0+2)	--
9.	**SEC-124**	Skill Enhancement Course-IV[#] (*To be offered from the list of SEC Courses*)	2(0+2)	--
		Total Credits Hrs.	**21(10+11)**	**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)				
10.	**INT-121**	Internship (10 Weeks)	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				

SYLLABUS

Objectives: 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 (6th Edn). 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 : 1. To expose and acquire the knowledge on the environment,

2. 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. Biogeographical 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.	**:**	**SOIL-122**	**Credit Hrs. : 3(2+1)**
Course Title	**:**	**Soil Fertility Management**	

SYLLABUS

Objective: To provide a comprehensive knowledge and its application in respect of Soil Fertility, Plant Nutrition, Fertilizers and Nutrient Management.

THEORY

History of Soil Fertility and Plant Nutrition. Criteria of essentiality. Role, Deficiency and Toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, Factors affecting nutrient availability to plants. Chemistry of macro- and micro-nutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Introduction and importance of manures and fertilizers. Fertilizer recommendation approaches. Integrated Nutrient Management. Chemical fertilizers: Classification, Composition and Properties of Major fertilizers, Secondary and Micronutrient fertilizers, Complex fertilizers, Customized fertilisers. Water soluble fertilizers, Nanofertilizers, Soil amendments, Fertilizer Storage, Fertilizer Control Order. Methods of fertilizer recommendations to crops. Factors influencing nutrient use efficiency (NUE), Methods of application under rainfed and irrigated conditions. STCR/ RTNM/ IPNS, Carbon sequestration and Carbon Trading, Preparation and properties of major manures (FYM, Compost, Vermicompost, Green manuring, Oilcakes).

PRACTICAL

Introduction of analytical instruments and their principles, Calibration and applications of Colorimetry and Flame photometry; Estimation of alkaline hydrolysable N in soils; Estimation of soil extractable P in soils; Estimation of exchangeable K in soils; Estimation of exchangeable Ca and Mg in soils; Estimation of soil extractable S in soils; Estimation of DTPA extractable Zn in soils; Estimation of N in plants; Estimation of P in plants; Estimation of K in plants; Estimation of S in plants.

TEACHING SCHEDULE

THEORY [SOIL-122]

Lecture No.	Topic	Subtopics/ Key Points	Weightage (%)
1 - 2	History of Soil Fertility and Plant Nutrition	Definitions of Soil Fertility; History of Soil Fertility and Plant Nutritions; Role of Soil Fertility in Sustainable Agriculture	4
3 - 5	Essential Plant Nutrients	Criteria of Essentiality of Nutrients; Essential and Beneficial Nutrients and their Role; Forms of nutrients in soil and critical levels of different nutrients in soil; Deficiency and Toxicity symptoms of essential plant nutrients.	8
6 - 7	Manures and Fertilizers	Introduction and Importance of Manures and Fertilizers; Preparation and Properties of Major Manures: FYM, Compost, Vermicompost, Green Manuring, Oilcakes.	8
8	Carbon Sequestration and Carbon Trading	Definitions, Carbon cycle, Concept, Carbon sink, Types of Carbon sequestration and Carbon trading	6
9 - 11	Chemical Fertilizers; Nitrogenous fertilizers	Definition and their Classification Nitrogenous fertilizers: Classification, Composition, Properties and their Reaction in soils.	6
12 - 13	Phosphatic Fertilizers	Classification, Composition, Properties and their Reaction in soils.	6
14 - 15	Potassic Fertilizers	Classification, Composition, Properties and their reaction in soils.	6
16 - 17	Secondary and Micronutrient Fertilizers	Definitions, Types, Composition, Reaction in soil and Effect on crop growth; Soil amendments.	6
18 - 19	Complex Fertilizers	Complex fertilizers: Definition, their fate and reaction in the soil; Liquid fertilizers and Nanofertilizers	4
20	Handling and Storage of Fertilizers	Handling and Storage of Fertilizers (in detail); Fertilizer Control Order Inorganic, Organic, Inorganic or Mixed: Purpose & Key Provisions of FCO, Regulatory Bodies.	4
21 - 22	Methods of Fertilizer Recommendations in Crops	STCR, RTNM, IPNS and INM Concepts	6
23 - 24	Soil Fertility Evaluation	Soil Fertility Evaluation and Different Approaches (in detail)	6
25 - 26	Mechanism of Nutrient Uptake and Transport to Plants	Mechanism of nutrient uptake and transport to plants: Factors affecting nutrient availability to plants.	6

Continued…

27 - 28	Chemistry of Soil Nutrients	Chemistry of Soil N, P, K, Calcium, Magnesium, Sulphur and Micronutrients.	6
29	Plant Analysis and Critical Levels	Plant Analysis and Critical Levels of different Nutrients in Plant, Rapid plant tissue test and Indicator plants.	6
30	Nutrient Use Efficiency (NUE).	Definition & Factors influencing Nutrient Use Efficiency (NUE).	6
31 - 32	Methods of Nutrient Applications	Methods of Nutrient Applications for different Soils and Crops grown under Rainfed and Irrigated conditions.	6
		Total	**100**

TEACHING SCHEDULE

PRACTICAL (SOIL-122)

Exercise No.	Exercise Title
1	Introduction of analytical instruments and their principles.
2	Calibration and applications of colorimetry and flame photometry.
3	Determination of organic carbon content from soil by wet oxidation method.
4	Determination of calcium carbonate content from soil by rapid titration method.
5	Estimation of available nitrogen in soil by alkaline permanganate method.
6	Estimation of available phosphorous content in soil.
7	Estimation of available potassium in soil by flame photometric method.
8	Estimation of exchangeable calcium and magnesium in soil by Versenate titration method.
9	Estimation of available sulphur in soil by turbidimetric method.
10	Estimation of DTPA extractable micronutrients (Fe, Mn, Zn and Cu) from soil.
11	Estimation of total nitrogen in plant by micro-Kjeldhal method.
12	Estimation of total phosphorus in plant sample by Vanado molybdate method.
13	Estimation of total potassium from plant sample by flame photometric method.
14	Estimation of sulphur concentration in plant sample.
15	Estimation of total micronutrients (Fe, Mn, Cu & Zn) from plant sample.
16	Determination of organic matter from compost / FYM / oilcake by Ignition method.

Suggested Readings [SOIL-122]:

1. Dilip Kumar Das, Introductory Soil Science, Kalyani Publishers.
2. Singh, S.S. Soil Fertility and Nutrient Management, Kalyani Publishers.
3. Samual L. Tisdale, Werner L. Nelson and James D. Beaton, Soil Fertility and Fertilizers by Macmillan Publishing Company, New York.
4. Brady, N.C. 2016. The Nature and Properties of Soils. 15th edition Publisher, Pearson Education.
5. Jakson, M.L. 1973. Soil Chemical Analysis. Printice Hall, India, Pvt. Ltd. New Delhi. pp 498.
6. Piper, C.S. 1966. Soil and Plant Analysis. Inters Science. Hans Publisher, Mumbai.
7. Chopra, S.L. and Kanwar, J.S. 1991. Analytical Agricultural Chemistry, Kalyani Publisher New Delhi.

Semester	**: II**		
Course No.	**: ENTO-121**	**Credit Hrs.**	**: 3(2+1)**
Course Title	**: Fundamentals of Entomology**		

SYLLABUS

Objectives:

1. To understand the basic knowledge of Entomology and insect classification, morphology along with their relationship with other arthropods,
2. To explore insect physiology, growth, development and communication,
3. To identify major insect orders and economically important families.

THEORY

History of Entomology in India. Major points related to Dominance of Insects in Animal Kingdom. Classification of Phylum Arthropoda up to Classes. Relationship of Class Insecta with other Classes of Arthropoda. Morphology: Structure and functions of insect cuticle and moulting. Body segmentation. Structure of head, thorax and abdomen. Structure and modifications of insect antennae, Mouth parts, Legs, Wing venation, Modifications and wing coupling apparatus. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive systems in insects. Types of reproduction in insects. Major sensory organs. Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors and biotic factors. Categories of pests. Systematics: Taxonomy– importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of Class Insecta up to Orders, Basic groups of present day insects with special emphasis to Orders and Families of Agricultural importance like, Orthoptera: Acrididae, Tettigoniidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae, Trichogrammatidae, Lchneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.

PRACTICAL

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Study of characters of Orders: Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. Insecticides and their formulations. Pesticide appliances and their maintenance. Sampling techniques for estimation of insect population and damage.

TEACHING SCHEDULE

THEORY [ENTO-121]

Lecture No.	Topic	Sub-topics/ Key points	Weightage (%)
1	Introduction and History of Entomology in India	Introduction; Definitions: Insect, Entomology and Agril. Entomology. History of Entomology in India including contributions of Scientists	10
	Premier Institutes concerned with Entomology	IARI, CAB, IOBC, IIIP, NBAIR, NIPHM, IISA, CIB & RC, CSB, NRIIPM, IGSMRI (Long form, Location and Role)	
2	Insect Dominance	Measures of dominance and Reasons of dominance (*in brief*)	
3	Classification of Phylum Arthropoda up to Classes	Onychophora, Crustacea, Arachnida, Chilopoda, Diplopoda, Trilobita and Hexapoda; Relationship of Class Insecta with other Classes of Arthropoda.	
4	Insect Cuticle	Structure and Functions of Cuticle, Cuticular appendages and processes; Moulting- Definition and Steps in moulting (*in brief*).	10
5	Body Segmentation	Structure of head, thorax and abdomen	
6	Insect Head	Insect Head Capsule: Important sclerites and sutures, Positions of head; Structure and modifications of insect antennae (with examples).	
7-8	Insect Mouthparts	Mouthparts and its modifications with feeding mechanisms. (Cockroach, Red cotton bug, House fly, Honeybee, Thrips and Butterfly)	
9	Insect Leg	Structure of Typical insect leg and its Modifications.	10
10	Insect Wing	Structure of wing, Modifications, Venation and Wing coupling apparatus with Examples.	
11-12	Metamorphosis	Metamorphosis: Definition, Types with examples; Significance of Insect Diapause: Definition and examples; Seasonal adaptations in insect: Aestivation Hibernation and Quiescence, Definitions, Types of larvae and pupae.	

Continued…..

13	Digestive system	Structure and Functions of digestive system in insects	10
14	Circulatory, Excretory and Respiratory systems	Structure and functions of circulatory, excretory and respiratory system in insects (*in brief*)	
15	Nervous System	Structure and Functions of Nervous System	
16	Secretary (Endocrine) System	Structure and Functions of Secretary (Endocrine) System in Insects	10
17-18	Reproductive System in Insects	Structure and functions of male and female reproductive systems; Types of reproduction in insects	
19	Major Sensory Organs	Mechanoreceptors, Chemoreceptors, Audioreceptors: Johnston's organ and Tympanum, Photoreceptors: Compound and Simple eyes, Thermo/Hygro-receptors; Sound producing organs in insects (*Only brief comments*)	
20	Insect Ecology	Introduction, Definition, Scope, Environment and its components.	10
21	Effect of Abiotic and Biotic Factors	(*Brief expln's of each factor*)- Abiotic factors: Temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Biotic factors: Food competition, Natural and Environmental resistance. Categories of Pests.	
22	Integrated Pest Management (IPM)	Concept, History, Scope, Limitations and Components of IPM	
23-24	Classification of Insecticides	Classification of insecticides- (Mode of entry, Mode of action, Chemical composition and Toxicity)	10
25	Toxicity and Formulations of Insecticides	Definitions (Toxicity, LD50, LC50, KD50, LT50, EC50, MRL, Waiting Period, Residue); Definition and types of formulations with examples (*in brief*).	
26	Systematics	Definition of Systematics, Classification, Taxonomy, Binomial nomenclature, Biotype, Sub-species, Species, Genus, Family and Order. Classification of Class Insecta upto Orders with examples.	10

Continued…..

ENTO-121…

Basic groups of present-day insects with special emphasis to following Orders and Families of Agricultural importance (with Key features in brief and examples of each) ~		
27 - 29	Orthoptera: Acrididae, Tettigoniidae, Gryllidae, Gryllotalpidae, Odonata; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae.	10
30 - 32	Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.	10
	Total=	**100**

TEACHING SCHEDULE

PRACTICAL (ENTO-121)

Exercise No.	Exercise Title
1	Methods of collection and preservation of insects including immature stages.
2	External features of Grasshopper/Cockroach.
3	Study of different types of insect antennae.
4 - 5	Study of mouth parts and its modifications (Cockroach and Red cotton bug)
6	Study of typical insect leg and its modifications.
7	Study of wing venation, types of wings and wing coupling apparatus.
8	Study of types of insect larvae and pupae.
9	Dissection of digestive, female reproductive and nervous system in insect: Cockroach.
10	Study of characters of Orders: Orthoptera, Dictyoptera, Odonata and their Families of agricultural importance.
11	Study of characters of Orders: Isoptera, Thysanoptera, Hemiptera and their Families of agricultural importance.
12	Study of characters of Orders: Lepidoptera, Neuroptera, and their Families of agricultural importance.
13	Study of characters of Orders: Coleoptera, Hymenoptera, Diptera and their Families of agricultural importance.
14	Insecticides and their formulations and Calculation of doses/concentrations of insecticides.
15	Study and Hands-on session on pesticide appliances and their maintenance.
16	Sampling techniques for estimation of insect population and damage.

Suggested Readings [ENTO-121]:

1. Imms' General Textbook of Entomology - O.W. Richards and R.G. Davies.
2. Introduction to the Study of Insects - D.J. Borror and DeLong's.
3. Fundamentals of Ecology - Eugene. P. Odum & Gray W. Barrett.
4. Integrated Pest Management Concept and Approaches- G.S. Dhaliwal and Ramesh Arora.
5. Insect Physiology and Anatomy - N.C. Pant and Swaraj Ghai.

Semester : II		
Course No. : PATH-121	**Credit Hrs. : 3 (2+1)**	
Course Title : Fundamentals of Plant Pathology		

SYLLABUS

Objectives:

1. To study the importance of plant disease epidemics and its economic impact on crops.
2. To study biotic (living), mesobiotic (viruses/viroids) and abiotic (non-living and environmental) causes of disease/ disorders.
3. To study the different types of symptoms, cause and pathogens characteristics and its reproduction.
4. To study the epidemiology of diseases.
5. To study and apply methods of management of plant diseases.

THEORY

Introduction, Scope and Objectives of Plant Pathology: Definition, Derivation and different disciplines of Plant Pathology; General Terms (glossary) commonly used in Plant Pathology; Scope and Objectives; Importance of Plant Pathology in Agriculture.

Importance of Plant Diseases: Plant disease epidemics that cause economic imbalance over the years; Historical and Present examples of losses caused by plant diseases viz. Irish famine, Bengal famine, Coffee rust, Discovery of Bordeaux mixture, Wheat rust etc.

History and Development of Plant Pathology: Important Milestones, Famous discoveries/ inventions and Contributions of National and International Phytopathologists; Development of Plant Pathology in India.

Definition and Concept of Plant Disease: Plant Disease; Conditions necessary for disease development; Disease triangle, disease tetrahedron/ pyramid concepts; Classification of diseases based on causal organism/ agent, symptoms, plant organs they affect and type of host plant affected and mode of spread & severity.

Causes of Plant Diseases and Symptoms: Plant diseases caused by abiotic and biotic agents; Diseases caused by Fungi, Bacteria, Viruses, Phytoplasmas and Phanerogamic parasites.

Diseases due to Biotic Agents: Symptoms and Signs; Hypoplasia, Hyperplasia, Hypertrophy and Necrotic symptoms caused by Fungi, Bacteria, Viruses, Phytoplasmas etc.

General Characteristics of Plant pathogens: Classification of Prokaryotes according to Bergey's Manual of Systemic Bacteriology, Classification of Fungi, Viruses and Mollicutes (Outlines).

Growth and Reproduction of plant pathogens and Replication of plant viruses: Types of growth, methods of measurement and kinetics of growth observed in pathogens; Reproduction types and reproductive structures in plant pathogens; Multiplication of plant viruses and phytoplasmas. Reproduction in bacteria.

Liberation/ Dispersal of Plant pathogens and Survival of Plant pathogens: Active and passive discharge of spores/ inoculum; mechanism of liberation; Distribution-dissemination, and direct and indirect methods of transmission; Introduction of plant diseases into India and in other countries; Survival of plant pathogens.

Types of Parasitism and Variability in Plant pathogens: Biotrophs, necrotrophs, pathotrophs, facultative saprophytes; Variability in microorganisms and its necessity for survival; Mechanisms of variability in fungi: bacteria and viruses. Mechanisms: Mutation, Recombination, Heterokaryosis, Heteroploidy, Parasexualism; Transmission, Transformation, Transduction and Conjugation.

Pathogenesis: Definition; Phenomenon of host infection/ Mechanism of infection by various plant pathogens; Avenues of penetration and defence mechanism associated with host.

Introduction to Principles of Plant Disease and Management: Principles; Integrated Disease Management (IDM); Methods of management. Introduction to Plant Disease Epidemiology, Factors governing epidemics. Classification of fungicides and antibiotics on the basis of chemical nature and mode of action.

PRACTICAL

Study of Laboratory Equipments and Microscopes, Study of symptoms and diagnosis of plant diseases; Study of disease symptoms caused by Virus, Viroids and Mollicutes; Morphological characters of Fungi, Bacteria, Virus, Viroids, and Mollicutes; Microscopic examination of plant pathogenic Fungi; Preparation of culture media and sterilization; Isolation and Purification techniques for Fungi and Bacteria; Methods of inoculation and Proving Koch's Postulates; Field/ Museum Visit to get acquainted with various plant disease symptoms. Detection of seed borne plant pathogens. Methods of seed treatment. Preparation of Bordeaux Mixture and Paste. Fungicide formulations. Plant disease assessment (Phytopathometry). Methods of application of fungicides. Use of biocontrol agents in plant disease management.

TEACHING SCHEDULE

THEORY [PATH-121]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1 - 2	**Introduction, Scope and Objectives of Plant Pathology**	Definition, Objectives of Plant Pathology; Derivation and different Disciplines of Plant Pathology; General Terms (Glossary) commonly used in Plant Pathology; Scope and Objectives.	10
3 - 4	**Importance of Plant Diseases**	Importance of Plant Pathology in Agriculture: Importance of Plant Diseases- (Crop losses, food security, environmental impact, health hazards, environmental sustainability). Plant disease epidemics that cause economic imbalance over the years; Historical and Present examples of losses caused by plant diseases viz., Irish famine, Bengal famine, Coffee rust, Discovery of Bordeaux mixture, Wheat rust etc. (*in brief*)	10
5 - 6	**History and Development of Plant Pathology**	Important Milestones, Famous Discoveries/ inventions and Contributions of National and International Phytopathologists; Development of Plant Pathology in India- (Contribution of Indian Scientists in brief)	
7 - 8	**Definition and Concept of Plant Disease**	Definition: Plant Disease; Conditions necessary for disease development: Disease triangle, Disease tetrahedron/ pyramid concepts; Classification of Plant diseases based on: Causal organism/ agent, Symptoms, Plant organs they affect and Type of host plant affected and Mode of spread & severity, etc.	10
9 - 10	**Causes of Plant Diseases and Symptoms**	Causes of Plant Disease with examples: i) Biotic causes: Eukaryotic- (Fungi, Protozoa, Algae, Nematode and Flowering parasites); Prokaryotic- (Bacteria, Fastidious vesicular bacteria, Phytoplasmas, Spiroplasmas, Actinomycetes). ii) Mesobiotic causes: iii) Abiotic causes:	5
11 - 12	**Diseases due to Biotic Agents**	Symptoms and Signs; Hypoplasia, Hyperplasia, Hypertrophy and Necrotic symptoms caused by Fungi, Bacteria, Viruses, Phytoplasmas.	5

Continued….

13 - 15	**General Characteristics of Plant Pathogens**	Outline of Classification of Plant Pathogens: Prokaryotes according to Bergey's Manual of Systemic Bacteriology, Classification of Fungi (according to Krik *et al*., 2008), Viruses and Mollicutes.	10
16 - 19	**Growth and Reproduction of Plant Pathogens and Replication of Plant Viruses**	Types of growth, Methods of measurement and Kinetics of growth observed in pathogens; Reproduction types and reproductive structures in plant pathogens; Multiplication of plant viruses and phytoplasmas; Reproduction in bacteria.	10
20 - 22	**Liberation/ Dispersal of Plant pathogens and Survival of Plant pathogens**	Active and passive discharge of spores/ inoculum; Mechanism of liberation; Distribution-dissemination (direct & indirect), Direct and indirect methods of transmission; Introduction of plant diseases into India and in other countries; Survival and perpetuation of plant pathogens.	10
23 - 25	**Types of Parasitism and Variability in Plant Pathogens**	Definitions; Biotrophs, Necrotrophs, Pathotrophs, Facultative saprophytes; Variability in microorganisms and its necessity for survival; Mechanisms of variability in fungi, bacteria, and viruses; Mechanisms: Mutation, Recombination, Heterokaryosis, Heteroploidy, Parasexualism, Transmission, Transformation, Transduction and Conjugation.	5
26 - 28	**Pathogenesis**	Pathogenesis: Definition; Phenomenon of host infection/ Mechanism of infection by various plant pathogens; Avenues of penetration and defence mechanism associated with host.	10
29 - 31	**Introduction to Principles of Plant Disease and Management**	Principles and Methods of plant disease management: Avoidance, Exclusion, Eradication, Protection (Chemical and Biological), Host resistance; Concept of Integrated Disease Management (IDM); Classification of fungicides and antibiotics on the basis of chemical nature and mode of action.	10
32	**Introduction to Plant Disease Epidemiology**	Definitions, Introduction to Plant Disease Epidemiology, Factors governing epidemics.	5
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL (PATH-121)

Exercise No.	Exercise Title
1	Study of microscope and Acquaintance with various laboratory equipments.
2	Study of different plant disease symptoms.
3	Field/ Museum visit to observe various disease symptoms.
4	Microscopic examination of diseased specimens.
5 - 6	Study of important fungal plant pathogens (*Alternaria, Botrytis, Colletotrichum, Cercospora, Curvularia, Dreschela, Fusarium, Pythium, Phytophthora,* Downy mildew and Powdery mildew genera, Smut and rust genera)
7	Preparation of culture media (PDA, NA, Oat meal Agar< Richard's medium)
8	Isolation and purification of plant pathogens.
9	Study of Koch's Postulates (Foliar and soil borne plant pathogens).
10	Detection of seed borne plant pathogens.
11	Methods of seed treatment.
12	Preparation of Bordeaux Mixture and Paste.
13	Fungicide formulations.
14	Plant disease assessment (Phytopathometry).
15	Methods of application of fungicides.
16	Use of biocontrol agents in plant disease management.

Suggested Readings [PATH-121]:

1. Pathak VN. Essentials of Plant Pathology. Prakash Publ., Jaipur.
2. Agrios GN. 2010. Plant Pathology. Acad. Press.
3. Kamat MN. Introductory Plant Pathology. Prakash Pub, Jaipur.
4. Singh RS. 2008. Plant Diseases. 8th Ed. Oxford & IBH Publ. Co.
5. Singh RS. 2013. Introduction to Principles of Plant Pathology. Oxford and IBH Publ. Co.
6. Alexopoulos, Mims and Blackwel. Introductory Mycology.
7. Mehrotra RS & Aggarwal A. 2007. Plant Pathology.7th Ed. Tata-McGraw Hill Publ. Co. Ltd.
8. Gibbs A & Harrison B. 1976. Plant Virology - The Principles. Edward Arnold, London.
9. Hull R. 2002. Mathews Plant Virology. 4th Ed. Academic Press, New York.
10. Verma JP. 1998. The Bacteria. Malhotra Publ. House, New Delhi.
11. Goto M. 1990. Fundamentals of Plant Bacteriology. Academic Press, New York.
12. Dhingra OD & Sinclair JB. 1986. Basic Plant Pathology Methods. CRC Press, London, Tokyo.
13. Nene YL & Thapliyal PN.1993. Fungicides in Plant Disease Control. 3rd Ed. Oxford & IBH, N. Delhi.
14. Vyas SC. 1993. Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw Hill, New Delhi.
15. Rajeev K & Mukherjee RC. 1996. Role of Plant Quarantine in IPM. Aditya Books.
16. Rhower GG. 1991. Regulatory Plant Pest Management. In: Handbook of Pest Management in Agriculture. 2nd Ed. Vol. II. (Ed. David Pimental). CRC Press.
17. Kajal Kumar Biswas, Parimal Sinha, Pranab Dutta, Prashant P. Jambhulkar, Bishnu Maya Bashyal, Srujani Behera, Manjunath Hubballi, R. Viswanathan (2024) Concepts of Plant Pathology and Disease Management, Indian Phytopathological Society Publ., New Delhi.

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

SYLLABUS

Objectives:

1. Provide basic knowledge to the students about scientific livestock practices
2. Entrepreneurship development through Livestock production

THEORY

Importance of livestock in the national economy and different development programmes of Govt. of India. Livestock Census and trends of livestock production. Terminology used in livestock management. Concepts of Precision livestock farming: Scope and limitations. Important Indian and exotic breeds of cattle and buffalo. Principles of maximization of livestock production. Feeding and management of calf, heifer and milking animal. Feeding and management of dry, pregnant, draft animals and breeding bull. Common diseases and its preventive, curative measures in cattle and buffalo. Bovine male and female reproductive system, fertility, sterility and reproductive behavior viz., estrus and parturition. Mammary gland and milk secretion. Organic livestock production- definition, importance, principles, standards, certifications, SWOT analysis. Effect of climate change on livestock production. Farm hygiene and their economic disposal of farm wastes. Cost of milk production, economical unit of cattle and buffalo.

PRACTICAL

External body parts of cattle and buffalo. Routine management practices followed on livestock farm. Methods of handling and restraining of animals. Methods of identification Marks and dehorning of animals. Estimation of age and body weight of animal. Recording the pulse rate, respiration rate and body temperature of animal. Preparation of feeding schedule and feeding different categories of cattle and buffalo. Clean and hygienic milk production and milking methods. Judging of animals for dairy and draft purpose. Study of computerized database on dairy farm. Vaccination and control of ecto and endo parasites in cattle and buffalo. Study of various dairy structures. Collection of semen, artificial insemination and pregnancy diagnosis in farm animal. Utilization of dairy farm wastes. Preparation of viable bank proposals for cattle and buffalo. Visit to dairy farms.

TEACHING SCHEDULE

THEORY [AHDS-121]

Lecture No.	Topic	Subtopics/ Key Points	Weightage (%)
1	Scope and Importance	Importance of Livestock in the National Economy and Different Development Programmes of Govt. of India.	8
2	Livestock Census and Trends	Livestock census and Trends of Livestock Production	4
3	Terminology in Livestock	Terminology used in Livestock Management	6
4	Precision Livestock Farming	Concepts of Precision Livestock Farming: Scope and Limitations	6
5	Cattle and Buffalo Breeds	Important Indian and Exotic Breeds of Cattle and Buffalo	10
6	Principles of Livestock Production	Principles of Maximization of Livestock Production	4
7	Feeding and Management	Feeding and Management of calf, heifer and milking animal	8
8	Feeding and Management	Feeding and Management of dry, pregnant, draft animals and breeding bull	6
9	Common Diseases	Common diseases and its Preventive and Curative measures in cattle and buffalo	7
10	Bovine Reproductive System	Bovine Male and Female Reproductive Systems	6
11	Reproductive Behavior of Animals	Fertility, Sterility and Reproductive behavior viz., Oestrus and Parturition.	7
12	Mammary Gland and Milk Secretion	Mammary gland and Milk secretion.	6
13	Organic Livestock Production	Organic Livestock Production- Definition, Importance, Principles, Standards, Certifications, SWOT Analysis	6
14	Climate Change	Effect of climate change on livestock production	6
15	Farm Hygiene	Farm hygiene and their economic disposal of farm wastes	6
16	Economics	Cost of milk production, Economical unit of cattle and buffalo	4
		Total=	**100**

TEACHING SCHEDULE

PRACTICAL (AHDS-121)

Exercise No.	Exercise Title
1	Study of external body parts of cattle and buffalo
2	Routine management practices followed on livestock farm
3	Methods of handling and restraining of animals
4	Methods of identification Marks and dehorning of animals
5	Estimation of age and body weight of animal
6	Recording the pulse rate, respiration rate and body temperature of animal
7	Preparation of feeding schedule and feeding different categories of cattle and buffalo
8	Clean and hygienic milk production and milking methods
9	Judging of animals for dairy and draft purpose
10	Study of computerized database on dairy farm
11	Vaccination and control of ecto and endo parasites in cattle and buffalo
12	Study of various dairy structures
13	Collection of semen, artificial insemination and pregnancy diagnosis in farm animal
14	Utilization of dairy farm wastes
15	Preparation of viable bank proposals for cattle and buffalo
16	Visit to Dairy Farms

Suggested Readings: (AHDS-121)

1. G.C. Banerjee, A Text Book of Animal Husbandry.
2. Thomas C.K. and Sastry, N.S.R., Livestock Production and Management
3. Jagdish Prasad, Principles and Practices of Dairy Farm Management.
4. Thomas C.K. and Sastry N.S.R., Dairy Bovine Production.

B.Sc. (Hons.) Agriculture

[#] List/ Bouquet of Skill Enhancement Courses (SECs): Detailed Syllabi

Sr. No.	Course No.	Course Title with Title Code	Credit Hrs.
1.	**SEC-xxx**	001-Biofertilizer and Biopesticide Production	2(0+2)
2.	**SEC-xxx**	002-Mushroom Production Technology	2(0+2)
3.	**SEC-xxx**	003-Seed Production Technology	2(0+2)
4.	**SEC-xxx**	004-Post-harvest Processing Technology	2(0+2)
5.	**SEC-xxx**	Beneficial Insect Farming	2(0+2)
6.	**SEC-xxx**	Horticulture Nursery Management	2(0+2)
7.	**SEC-xxx**	Plantation Crops Production and Management	2(0+2)
8.	**SEC-xxx**	Poultry Production and Management Technology	2(0+2)
9.	**SEC-xxx**	Processing of Milk and Milk Products	2(0+2)
10.		*(To be added)*	
11.		*(To be added)*	

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 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 Academic Programmes in AGRICULTURE

Course Layout

B.Sc. (Hons.) Agriculture

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.	**GPB-231**	Principles of Genetics	3(2+1)	--
3.	**AGRO-232**	Crop Production Technology-I (*Kharif* Crops)	3(1+2)	--
4.	**AGRO-233**	Principles and Practices of Natural Farming	2(1+1)	--
5.	**HORT-232**	Production Technology of Fruit and Plantation Crops	2(1+1)	--
6.	**AE-231**	Farm Machinery and Power	2(1+1)	--
7.	**NEMA-231**	Fundamentals of Nematology	2(1+1)	--
8.	**ECON-231**	Principles of Agricultural Economics and Farm Management	2(2+0)	--
9.	**AHDS-232**	Technology of Milk and Milk Products	2(1+1)	--
10.	**SEC-235**	Skill Enhancement Course-V[#] (*To be offered from the list of SEC Courses*)	2(0+2)	--
11.	**OC-1/ OC-2/…**	Online Course(s)/ MOOCs[†]	As opted by student	**NG**
		Total Credits Hrs.=	**22(10+12)**	**G**

AEC: Ability Enhancement 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.

B.Sc. (Hons.) Agriculture

List/ Bouquet of Skill Enhancement Courses (SECs)

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

Sr. No.	Course No.	Course Title	Credit Hrs.
1.	**SEC-xxx**	Biofertilizer and Biopesticide Production	2(0+2)
2.	**SEC-xxx**	Mushroom Production Technology	2(0+2)
3.	**SEC-xxx**	Seed Production Technology	2(0+2)
4.	**SEC-xxx**	Post-harvest Processing Technology	2(0+2)
5.	**SEC-xxx**	Beneficial Insect Farming	2(0+2)
6.	**SEC-xxx**	Horticulture Nursery Management	2(0+2)
7.	**SEC-xxx**	Plantation Crops Production and Management	2(0+2)
8.	**SEC-xxx**	Poultry Production and Management Technology	2(0+2)
9.	**SEC-xxx**	Processing of Milk and Milk Products	2(0+2)
10.	**SEC-xxx**	Agrotourism	2(0+2)
11.	**SEC-xxx**	Plantation Crop Production and Processing	2(0+2)
12.	**SEC-xxx**	Agriculture Waste Management	2(0+2)
13.	**SEC-xxx**	Organic Production Technology	2(0+2)
14.	**SEC-xxx**	Fodder Production Technology	2(0+2)
15.	**SEC-xxx**	Marketing and Export of Agricultural Produce	2(0+2)
16.	**SEC-xxx**	Processing of Farm Waste into Organic Inputs	2(0+2)
17.	**SEC-xxx**	Vermicompost Production Technology	2(0+2)
18.	**SEC-xxx**	Apiculture - Commercial Bee Keeping	2(0+2)
19.	**SEC-xxx**	Production Technology of Bioagents	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 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 current 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 Third Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programmes in HORTICULTURE

Course Layout

B.Sc. (Hons.) Horticulture

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

Sr. No.	Course No.	Course Title	Credits Hrs.	Remark
1.	**AEC-235**	Physical Education, First Aid, Yoga Practices and Meditation	2(0+2)	--
2.	**MDC-233**	Agricultural Marketing and Trade	3(2+1)	--
3.	**VS-232**	Commercial Vegetable Production	4(3+1)	--
4.	**SSAC-231**	Fundamentals of Soil Science	3(2+1)	--
5.	**FS-232**	Commercial Fruit Production	4(3+1)	--
6.	**PATH-231**	Disease Management of Horticultural Crops	3(2+1)	--
7.	**SEC-235**	Skill Enhancement Course-V[#] (*To be offered from the list of SEC Courses*)	2(0+2)	--
8.	**OC-1/ OC-2/…**	Online Course(s)/ MOOCs[†]	As opted by student	**NG**
		Total Credits Hrs.=	**21(12+9)**	**G**

AEC: Ability Enhancement 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.

B.Sc. (Hons.) Horticulture

#List/ Bouquet of Skill Enhancement Courses (SECs)

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

Sr. No.	Course No.	Course Title	Credit Hrs.
1.	**SEC-xxx**	Mushroom Cultivation	2(0+2)
2.	**SEC-xxx**	Apiculture	2(0+2)
3.	**SEC-xxx**	Orchard Floor Management	2(0+2)
4.	**SEC-xxx**	Landscape Gardening	2(0+2)
5.	**SEC-xxx**	Packing and Packaging of Horticultural Crops	2(0+2)
6.	**SEC-xxx**	Farm Machinery	2(0+2)
7.	**SEC-xxx**	Introduction to Forestry	2(0+2)
8.	**SEC-xxx**	Installation, Operation and Maintenance of Micro-Irrigation System	2(0+2)
9.	**SEC-xxx**	Computer Programming and Data Structures	2(0+2)
10.	**SEC-xxx**	Turf and Turf Management	2(0+2)
11.	**SEC-xxx**	Post-Harvest Management of Horticulture Crops	2(0+2)
12.	**SEC-xxx**	Nursery Production in Horticulture Crops	2(0+2)
13.	**SEC-xxx**	Seed Production Techniques in Vegetables Crops	2(0+2)
14.	**SEC-xxx**	Sericulture	2(0+2)
15.	**SEC-xxx**	Dairy Management	2(0+2)
16.	**SEC-xxx**	Ornamental Fishery	2(0+2)
17.	**SEC-xxx**	Poultry Management	2(0+2)
18.	**SEC-xxx**	Biofertilizers and Biopesticides	2(0+2)
19.	**SEC-xxx**	Horti-Tourism	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 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 current 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 Third Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programmes in AGRICULTURAL ENGINEERING

Course Layout

B.Tech. (Agricultural Engineering)

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

Sr. No.	Course No.	Course Title	Credit Hrs.	Remark
1.	**AEC-234**	Physical Education, First Aid, Yoga Practices and Meditation	2(0+2)	--
2.	**AE-MATH-232**	Engineering Mathematics-I	3(3+0)	--
3.	**PHY-231**	Engineering Physics	3(2+1)	--
4.	**REE-232**	Engineering Chemistry	3(2+1)	--
5.	**FS-231**	Engineering Mechanics	3(2+1)	--
6.	**SWCE-232**	Soil Mechanics	2(1+1)	--
7.	**IDE-231**	Fluid Mechanics and Open Channel Hydraulics	3(2+1)	--
8.	**PFE-231**	Engineering Properties of Agricultural Produce and Food Science	3(2+1)	--
9.	**FMPE-233**	Farm Machinery and Equipment-I	3(2+1)	--
10.	**OC-1/ OC-2/ ...**	Online Course(s)/ MOOCs†	As opted by student	**NG**
		Total Credits Hrs.=	**25(16+9)**	**G**

AEC: Ability Enhancement Course, **OC**: Online Course, **G**: Gradial, **NG**: Non-gradial

†**Note:** It is mandatory for each Student to complete **total 6 credits** (Non-gradial) of **Online Courses** from available resources across III to VIII semesters under the guidance of assigned Faculty/Advisor.

Course Curriculum of Third Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programmes in BIOTECHNOLOGY

Course Layout

B.Tech. (Biotechnology)

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.	**BT-MATH-232**	Biomathematics	2(2+0)	--
3.	**BT-236**	Recombinant DNA Technology	2(2+0)	--
4.	**BT-237**	Classical and Molecular Cytogenetics	3(2+1)	--
5.	**AHDS-231**	Livestock Production and Management	3(2+1)	--
6.	**PP-231**	Plant Physiology	3(2+1)	--
7.	**CP-231**	Fundamentals of Crop Protection	3(2+1)	--
8.	**SEC-235**	Skill Enhancement Course-V: [#] Methods in Recombinant DNA Technology	2(0+2)	--
9.	**OC-1/ OC-2/ ...**	Online Course(s)/ MOOCs[†]	As opted by student	**NG**
		Total Credits Hrs.=	**20(12+8)**	**G**

AEC: Ability Enhancement 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.

B.Tech. (Biotechnology)

#List/ Bouquet of Skill Enhancement Courses (SECs)

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

Sr. No.	Course No.	Course Title	Credit Hrs.
1.	**SEC-111**	Practices in Plant Tissue Culture	2(0+2)
2.	**SEC-112**	Laboratory Management and Instrumentation	2(0+2)
3.	**SEC-123**	Basic Techniques of Molecular Biology and Biotechnology	2(0+2)
4.	**SEC-124**	Bioinformatics and Biocomputation	2(0+2)
5.	**SEC-235**	Methods in Recombinant DNA Technology	2(0+2)
6.	**SEC-246**	Practices in Molecular Marker Technology	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, the SEC courses are already prescribed and mentioned across specific Semesters in the ICAR-Sixth Deans' Committee Report Deans' Committee Report Syllabus of B.Tech.(Biotech.) degree program.

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

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Course Curriculum of Third Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programmes in FOOD TECHNOLOGY

Course Layout

B.Tech. (Food Technology)

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

Sr. No.	Course No.	Course Title	Credit Hrs.	Remark
1.	**AEC-234**	Physical Education, First Aid, Yoga Practices and Meditation	2(0+2)	--
2.	**MDC-232**	Agricultural Marketing and Trade	3(2+1)	--
3.	**FT-MATH-232**	Engineering Mathematics-I	2(2+0)	--
4.	**FQA-234**	Food Chemistry-II	3(2+1)	--
5.	**FQA-235**	Food Microbiology	3(2+1)	--
6.	**FE-236**	Fluid Mechanics	3(2+1)	--
7.	**FE-237**	Heat and Mass Transfer in Food Processing	3(2+1)	--
8.	**FE-238**	Basic Electronic Engineering	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.=	**23(13+10)**	**G**

AEC: Ability Enhancement 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 6 credits** (Non-gradial) of **Online Courses** from available resources across III to VIII semesters under the guidance of assigned Faculty/Advisor.

***For the Student opting for Exit-option with UG-Diploma in Food Technology (Post-IV semester)**

Nomenclature of UG-Diploma	SEC to be selected from the respective disciplines	
	Semester-III	**Semester-IV**
UG-Diploma in Food Technology (Food Plant Operations)	Food Engineering	Food Plant Operations
UG-Diploma in Food Technology (Food Manufacturing)	Food Technology	Food Plant Operations
UG-Diploma in Food Technology (Food Quality Testing)	Food Quality Assurance	Food Plant Operations

B.Tech. (Food Technology)

List/ Bouquet of Skill Enhancement Courses (SECs)

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

Sr. No.	Course No.	Course Title	Credit Hrs.
Department of Food Technology			
1.	**SEC-xxx**	Introduction to Drying Technology and Dryers	2(0+2)
2.	**SEC-xxx**	Introduction to Processing of Extruded Foods	2(0+2)
3.	**SEC-xxx**	Introduction to Milling (Rice, Dal, Spices, etc.)	2(0+2)
Department of Food Quality Assurance			
4.	**SEC-xxx**	Introduction to Food Safety and Sanitation	2(0+2)
5.	**SEC-xxx**	Introduction to Good Laboratory Practices	2(0+2)
6.	**SEC-xxx**	Basic Food Analysis Laboratory Techniques	2(0+2)
Department of Food Engineering			
7.	**SEC-xxx**	Introduction to Electrical and Control Systems in Food Industry	2(0+2)
8.	**SEC-xxx**	Introduction to Mechanical Systems in Food Industry	2(0+2)
9.	**SEC-xxx**	Introduction to AutoCAD	2(0+2)
Department of Food Plant Operations			
10.	**SEC-xxx**	Maintenance of Food Processing Equipments	2(0+2)
11.	**SEC-xxx**	Introduction to Bottling and Canning Line	2(0+2)
12.	**SEC-xxx**	Introduction to Manufacturing of Bakery Products	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, students with exit option have to select/ get offered the SECs as mentioned against the Nomenclature of UG-Diploma and such course(s) is/are to be selected from respective dept./disciplines.**

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

(iii) 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 current 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 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.

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.	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.

Course Curriculum of Third Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programmes in FORESTRY

Course Layout

B.Sc. (Hons.) Forestry

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.	**FBT-234**	Wildlife Sciences	3(2+1)	--
3.	**FRM-233**	Forest Health and Protection	2(1+1)	--
4.	**FRM-234**	Forest Policy and Legislation	2(2+0)	--
5.	**FPU-232**	Wood Science and Technology	2(1+1)	--
6.	**FPU-233**	Tree Harvesting and Ergonomics	2(1+1)	--
7.	**PATH-231**	Forest Microbiology	2(1+1)	--
8.	**SS-231**	Forest Soil and Nutrient Management	2(1+1)	--
9.	**ENGG-231**	Forest Survey and Engineering	2(1+1)	--
10.	**SEC-233**	Skill Enhancement Course-III[#] (*To be offered from the list of SECs*)	2(0+2)	--
11.	**OC-1/ OC-2/ …**	Online Course(s)/ MOOCs[†]	As opted by student	**NG**
		Total Credits Hrs.=	**21(10+11)**	**G**

AEC: Ability Enhancement 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.

B.Sc. (Hons.) Forestry

List/ Bouquet of Skill Enhancement Courses (SECs):

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

Sr. No.	Course No.	Course Title	Credit Hrs.
1.	**SEC-xxx**	Commercial Seedling Production	4(0+4)
2.	**SEC-xxx**	Ecotourism	4(0+4)
3.	**SEC-xxx**	Commercial Forestry	4(0+4)
4.	**SEC-xxx**	Ornithology	4(0+4)
5.	**SEC-xxx**	Design and Development of Wood Products	4(0+4)
6.	**SEC-xxx**	Landscape Management and Restoration	4(0+4)
7.	**SEC-xxx**	Farm and Agroforestry Management	4(0+4)
8.	**SEC-xxx**	Biofertilizers and Biopesticides Production	4(0+4)
9.	**SEC-xxx**	Para-taxonomy	2(0+2)
10.	**SEC-xxx**	Tree Seed Production Technology and Certification	2(0+2)
11.	**SEC-xxx**	Herpetology	2(0+2)
12.	**SEC-xxx**	Wildlife Photography	2(0+2)
13.	**SEC-xxx**	Forest Machine Learning Technology	2(0+2)
14.	**SEC-xxx**	Production Technology of Tuber crops	2(0+2)
15.	**SEC-xxx**	Apiculture	2(0+2)
16.	**SEC-xxx**	Plantation Crops Production and Management	2(0+2)
17.	**SEC-xxx**	Sericulture	2(0+2)
18.	**SEC-xxx**	Butterfly Garden	2(0+2)
19.	**SEC-xxx**	Forest Certification	2(0+2)
20.	**SEC-xxx**	Human Wildlife Conflict	2(0+2)
21.	**SEC-xxx**	Sawmill Management	2(0+2)
22.	**SEC-xxx**	Clonal Seedling Production	4(0+4)
23.	**SEC-xxx**	Urban Forestry Designing and Planning	4(0+4)
24.	**SEC-xxx**	Wood Working and Carpentry	4(0+4)
25.	**SEC-xxx**	Wild and Commercial Beekeeping	4(0+4)
26.	**SEC-xxx**	Forest-based Industrial Training	4(0+4)
27.	**SEC-xxx**	Wood Seasoning and Preservation Technology	4(0+4)
28.	**SEC-xxx**	Zoo Management	4(0+4)
29.	**SEC-xxx**	Mining Afforestation	4(0+4)
30.	**SEC-xxx**	Advanced Wood Working	4(0+4)

Continued…

31.	**SEC-xxx**	Lac and Tassar Cultivation	4(0+4)
32.	**SEC-xxx**	Specialty Seedling Production (FBT)	2(0+2)
33.	**SEC-xxx**	Multifunctional Agroforestry (SAF)	2(0+2)
34.	**SEC-xxx**	Briquetting and Pelleting Technology (FPU)	2(0+2)
35.	**SEC-xxx**	Import and Export of Forest Products (FRM)	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 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 current 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.

Course Curriculum of Third Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programmes in FISHERIES SCIENCE

Course Layout
B.F.Sc. (Hons.)

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 Practice and Meditation	2(0+2)	-
2.	***MATH-231/ **BIO-231**	*Introductory Mathematics/ **Basic Biology	1(1+0)	**Need-based & NG**
3.	**AQC-233**	Coastal Aquaculture and Mariculture	3(2+1)	-
4.	**AQC-234**	Fish Nutrition and Feed Technology	3(2+1)	-
5.	**FRM-234**	Inland Fisheries	2(1+1)	-
6.	**ENG-231**	Fishing Craft Technology	2(1+1)	-
7.	**FPT-231**	Fundamentals of Biochemistry and Food Chemistry	2(1+1)	-
8.	**FPT-232**	Post-Harvest Handling and Preservation	3(2+1)	-
9.	**EES-231**	Fisheries Extension	2(1+1)	-
10.	**SEC-235**	Skill Enhancement Course-V[#] (*To be offered from the list of SECs)*	2(0+2)	-
11.	**OC-1/ OC-2/ …**	Online Course(s)/ MOOCs[†]	As opted by student	**NG**
		Total Credits Hrs.=	**21(10+11)**	**G**

AEC: Ability Enhancement 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.

***MATH-231 &**BIO-231** will be offered as *MATH-111 & **BIO-111, respectively in **I-semester w.e.f. AY 2025-26.**

B.F.Sc. (Hons.)

List/ Bouquet of Skill Enhancement Courses (SECs)

[in continuation with the SECs syllabus prescribed under I & II semesters]

Sr. No.	Course No.	Course Title	Credit Hrs.
1.	**SEC-111**	Breeding and Culture of Ornamental Fish	2(0+2)
2.	**SEC-112**	Net Making and Mending	2(0+2)
3.	**SEC-123**	Fish/ Shellfish Grow-out Production Management	2(0+2)
4.	**SEC-124**	Preparation and Marketing of Value-added Fish Products	2(0+2)
5.	**SEC-235**	Fish Market Survey and Value Chain Analysis	2(0+2)
6.	**SEC-246**	Preparation of Fish By-products and waste Utilization	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) In case of unavailability of said detailed course-wise syllabus of above SEC courses, the same can be primarily developed and followed at College/ University level in the current 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.

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

Course Curriculum of Third Semester as per the ICAR-Sixth Deans' Committee Report for Academic Programmes in COMMUNITY SCIENCE

Course Layout

B.Sc. (Hons.) Community Science

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.	**FN-233**	Food Packaging and Labelling	2(1+1)	--
3.	**ATS-233**	Pattern Making and Draping	3(1+2)	--
4.	**RMCS-233**	Computer-aided Interior Designing-I	3(1+2)	--
5.	**HDFS-233**	Early Childhood Education	3(2+1)	--
6.	**EECM-232**	Extension and Rural Development	3(2+1)	--
7.	**EECM-233**	Rural Sociology	2(2+0)	--
8.	**SEC-235**	Skill Enhancement Course-V[#] *(To be offered from the bouquet of SECs)*	1(0+1)	--
9.	**SEC-236**	Skill Enhancement Course-VI[#] *(To be offered from the bouquet of SECs)*	1(0+1)	--
10.	**OC-1/ OC-2/ …**	Online Course(s)/ MOOCs[†]	As opted by student	**NG**
		Total Credits Hrs.=	**20(9+11)**	**G**

AEC: Ability Enhancement 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.

B.Sc. (Hons.) Community Science

List/ Bouquet of Skill Enhancement Courses (SECs):

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

Sr. No.	Course No.	Course Title	Credit Hrs.	Offering Department
1.	**SEC-xxx**	Breads and Buns	2(0+2)	**FN**
2.	**SEC-xxx**	Biscuits and Cookies	2(0+2)	**FN**
3.	**SEC-xxx**	Cakes and Pastries	2(0+2)	**FN**
4.	**SEC-xxx**	Chocolate Making	2(0+2)	**FN**
5.	**SEC-xxx**	Quantity Cookery	1(0+1)	**FN**
6.	**SEC-xxx**	Traditional Indian Foods	1(0+1)	**FN**
7.	**SEC-xxx**	Housekeeping and Service Management-I	2(0+2)	**RMCS**
8.	**SEC-xxx**	Floral Art and Design-I	2(0+2)	**RMCS**
9.	**SEC-xxx**	Housekeeping and Service Management-II	2(0+2)	**RMCS**
10.	**SEC-xxx**	Event Planning and Management-II	2(0+2)	**RMCS**
11.	**SEC-xxx**	Interior Designing and Decoration-I	1(0+1)	**RMCS**
12.	**SEC-xxx**	Floral Art and Design-II	1(0+1)	**RMCS**
13.	**SEC-xxx**	Developmental Assessment-I (Infancy and Toddlerhood)	2(0+2)	**HDFS**
14.	**SEC-xxx**	Developmental Assessment-II (Childhood)	2(0+2)	**HDFS**
15.	**SEC-xxx**	Infant Stimulation Practices	2(0+2)	**HDFS**
16.	**SEC-xxx**	Health Practices in Early Childhood	2(0+2)	**HDFS**
17.	**SEC-xxx**	Establishment of ECCE Centers	1(0+1)	**HDFS**
18.	**SEC-xxx**	Program Planning and Execution in ECCE Centers	1(0+1)	**HDFS**

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

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

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