ACADEMIC PROGRAMME (6th dean)
Semester wise course and credits Allocation

FOR

FACULTY OF AGRICULTURE AND ALLIED SCIENCE

[B.Sc. (Hons.) Agriculture]

(First Semester)

Academic Session- 2025-26

Syllabus According to 6th dean Committee of ICAR

UNITED UNIVERSITY

विद्या कल्पलतेव

PRAYAGRAJ

University Vision

"To established a Value based Global University having dynamic learning environment encouraging creativity and innovation, research inspired experimental learning and focusing on topics that are pertinent to the development of the region, the Country and the World."

University Mission

- To provide a dynamic, inspiring, and varied learning environment with global exposure.
- To position the institution as a premier hub for research and experiential learning.
- To develop into an adaptable university meeting the demands of society and business.
- To incorporate Value thinking, integrity, wisdom and passion in professional for their career and life.

Department Vision

- To establish a preeminent role in advancing education, extension activities, and research within the field of agriculture.
- To cultivate a dynamic environment that nurtures entrepreneurial endeavors generates job opportunities, and develops a skilled workforce proficient in agricultural practices.
- To improve the quality and effectiveness of agricultural practices through strategic public-private partnerships.
- To contribute to the economic development of society and the nation by leveraging innovative agricultural strategies and collaborations."

Department Mission

- To provide a rigorous and comprehensive education in agricultural sciences, equipping students with advanced knowledge, critical thinking skills, and practical experience.
- To conduct and promote high-impact research that addresses contemporary challenges in agriculture fosters innovation, and advances scientific understanding.
- To engage with local, regional, and global communities through extension programs that disseminate knowledge, provide practical solutions, and support sustainable agricultural practices.
- To support and inspire entrepreneurship in agriculture by offering resources, mentor ship, and opportunities that encourage the creation of new ventures and job prospects."

Program Educational Objectives

1. **PEOs-1: Foundational Agricultural Knowledge**: To provide students with a strong foundation in the principles and practices of agriculture, including crop science, soil management, horticulture, animal husbandry, and agricultural engineering.
2. **PEOs-2: Application of Technology in Agriculture**: To enable students to apply modern technologies and scientific tools, such as precision farming, biotechnology, and remote sensing, for enhancing agricultural productivity and sustainability.
3. **PEOs-3: Sustainability and Environmental Stewardship**: To cultivate awareness of sustainable agricultural practices and environmental conservation, ensuring that students can promote resource-efficient farming systems that safeguard biodiversity and ecosystems.
4. **PEOs-4: Agribusiness and Entrepreneurship Development**: To foster an entrepreneurial mindset and equip students with agribusiness management skills, enabling them to explore business opportunities and contribute to the development of rural economies.
5. **PEOs-5: Ethical and Social Responsibility**: To nurture a sense of ethics and social responsibility in agricultural practices, ensuring graduates work towards equitable, socially responsible, and environmentally sustainable agriculture for the benefit of society.

Programme Outcomes

On successful completion of the Bachelor of Science (Honors) Programme the student will be able to:

PO1 - Core Agricultural Knowledge: Graduates will possess a comprehensive understanding of agricultural science, including crop production, horticulture, animal husbandry, soil health, plant protection, and agricultural engineering.

PO2 – Application of Scientific Principles: Graduates will be able to apply scientific principles and methodologies to improve agricultural practices, enhance productivity, and address the challenges in sustainable agriculture

PO3 -. **Problem-Solving Skills**: Graduates will be proficient in analyzing agricultural issues, diagnosing problems, and developing practical solutions through research, innovation, and the use of modern technology.

PO4 – Sustainable Agriculture Practices: Graduates will be skilled in designing and implementing sustainable farming practices, integrating knowledge of resource conservation, organic farming, water management, and climate-resilient agriculture.

PO5 – Communication and Collaboration: Graduates will effectively communicate agricultural concepts, ideas, and research findings to a wide range of stakeholders, including farmers, scientists, and policy makers, while working collaboratively in multidisciplinary teams.

PO6 – Entrepreneurship and Agribusiness Management: Graduates will have the knowledge and skills necessary to pursue entrepreneurial ventures in agriculture, including agribusiness, food processing, and rural development, contributing to the agricultural economy.

PO7 – Use of Modern Tools and Technology: Graduates will be proficient in using modern agricultural tools and technologies such as GIS, precision agriculture, drones, and biotechnology to enhance farming efficiency and productivity.

PO8 – Ethical Responsibility and Professionalism: Graduates will demonstrate ethical practices in agriculture, respecting environmental sustainability, food safety, and social responsibility, while adhering to professional standards.

PO9 – Lifelong Learning and Adaptability: Graduates will recognize the importance of continuous learning and adapting to advancements in agricultural science, technology, and policy to remain competent in the evolving agricultural landscape.

Program Specific Outcomes

PSO1: Advanced Agricultural Techniques: Graduates will be equipped with the knowledge and skills to implement advanced agricultural techniques such as integrated farming, precision agriculture, and modern irrigation methods to enhance crop yield and resource management.

PSO2: Specialization in Agro-based Fields: Graduates will develop expertise in specialized areas of agriculture, including plant breeding, soil health management, pest control, and agroforestry, enabling them to address specific challenges in these fields.

PSO3: Community and Extension Services: Graduates will be able to apply agricultural knowledge to serve rural communities by providing advisory services, conducting field demonstrations, and supporting agricultural extension programs to promote sustainable and profitable farming practices.

Sr. No.	Course Code	Course Title	Evaluation Scheme					Credit
			MID TERM	QUIZ	Pr.	ESE	Total	
SEMSTER -I								
1	–	*Deeksharambh* (Induction cum Foundation course)	--	---	----	----	----	1 week (NG) Non-gradial
2	AGUCBG031P	Skill Enhancement course – I*	30	20	50 (int)	----	100	2 (0+2)
3	AGUCBG032P	Skill Enhancement course – II*	30	20	50 (int)	----	100	2 (0+2)
4	AGUCBG051C	Communication Skills	20	20	20	40	100	2 (1+1)
5	AGUCBG052C	Farming based livelihood systems	20	20	20	40	100	3 (2+1)
6	AGUCBG031T	Rural Sociology and Educational Psychology	30	20	--	50	100	2 (2+0)
7	AGUCBG053C	Fundamentals of Agronomy	20	20	20	40	100	3 (2+1)
8	AGUCBG054C	Fundamentals of Soil Science	20	20	20	40	100	3 (2+1)
9	AGUCBG055C	Fundamentals of Horticulture	20	20	20	40	100	3 (2+1)
10	AGUCBG033P	National Service Scheme (NSS-I) / National Cadet Corps (NCC-I)	30	20	50 (int)	----	100	1 (0+1)
11	AGUCBG034P	Introductory Mathematics	–	–	–	–	–	1 (1+0) Non-gradial
	AGUCBG111T	Introductory Biology with practical						2 (1+1) Non-gradial
Total			**21 (11+10)**					
1	PTSPPBG12T	Agricultural mathematics and Professional Communication	**50**	**--**	**--**	**50**	**100**	**1 (1+0)**
Grand Total = 21+1 = 22								

SYLLABUS

FOR

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FACULTY OF AGRICULTURE AND ALLIED SCIENCE

Deeksharambh (Induction-cum-Foundation Course)-Non gradial 1 (1+0)

Objectives

- Help for cultural integration of students from different backgrounds,
- Know about the operational framework of academic process in the University/College/Institute Instilling life and social skills,
- Social Awareness, Ethics and Values, Team Work, Leadership, Creativity, etc.
- Identify the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario.
- Identify strength and weakness of the students in different core areas of the discipline.
- The details of activities will be decided by the parent universities. The structure shall include, but not restricted to:
    1. Discussions on operational framework of academic process in the University, as well as interactions with academic and research managers of the University
    2. Interaction with alumni, business leaders, perspective employers, outstanding achievers in related fields, and people with inspiring life experiences
    3. Group activities to identify the strength and weakness of students (with expert advice for their improvement) as well as to create a platform for students to learn from each other's life experiences
    4. Activities to enhance cultural Integration of students from different backgrounds.
    5. Field visits to related fields/ establishments
    6. Sessions on personality development (instilling life and social skills, social awareness, ethics and values, team work, leadership, etc.) and communication skills

Communication Skills 2(1+1) Course Code: AGUCBG051C

Course Objectives;

1. Understand the nature, types, and models of communication, including verbal and non-verbal aspects.
2. Develop core communication skills—listening, speaking, reading, and writing—for academic and professional use.
3. Strengthen grammar knowledge to construct clear, correct, and impactful sentences.
4. Practice technical writing formats such as precis writing, summarizing, abstracting, and resume building.
5. Enhance confidence through group discussions, presentations, interview practice, and public speaking activities.

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 verbal; 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.

Course Outcome:

1. Demonstrate clear understanding of communication types, models, and barriers.
2. Apply effective listening, speaking, reading, and writing skills in various contexts.
3. Use correct grammar and sentence structures in written and oral communication.

4. Prepare technical documents like precis, summaries, and resumes professionally.
5. Display improved confidence in group discussions, interviews, and public speaking.

Reference Books

1. Allport, G. W. (1937). *Personality: A Psychological Interpretation*. Holt, New York.
2. Brown, Michele & Brandreth, Gyles. (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. & Lata, Pushpa. (2011). *Communication Skills*. Oxford University Press.
6. Neuliep, James W. (2003). *Intercultural Communication: A Contextual Approach*. Houghton Mifflin Co., Boston.

Fundamentals of Agronomy 3 (2+1) **Course Code: AGUCBG053C**

Course Objectives

1. Understand Agronomy and its scope in agricultural sciences.
2. Learn seed sowing practices and factors affecting crop establishment.
3. Gain knowledge of tillage, crop density, and nutrient management.
4. Explore water management, weed control, and agro-climatic zones.
5. Understand sustainable crop production practices and crop growth factors.

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, f ields crops and classification, importance, ecology and ecosystem. Seeds and sowing: Definitions of crops, variety and seed. Factors affecting crop stands establishment: good quality seed, proper tillage, time of sowing seed rate, depth and method of sowing: broadcasting, drilling, dibbling, transplanting etc. Tillage and tilth: Definition, objectives, types, advantages and disadvantages of tillage including conservation tillage. Crop density and geometry: plant geometry and planting geometry, its effect on growth, 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 bio-fertilizers; 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 manure-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, Soil moisture constants. Weeds: Definition, Importance and basics 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 on 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.

Course Outcome

1. Understand the fundamental concepts of Agronomy and its relation to other agricultural disciplines.
2. Gain practical knowledge of seed sowing methods, tillage, and crop establishment.
3. Develop an understanding of crop nutrition and nutrient management for sustainable production.
4. Apply water management and weed control techniques in diverse agro-climatic zones.
5. Understand sustainable farming practices, including crop growth, development, and resource conservation.

Reference Books

1. Tandon, H. L. S. (2005). *Manures and Fertilizers*. Fertilizer Development and Consultation Organization, New Delhi.
2. Singh, R. (2016). *Principles of Agronomy*. Kalyani Publishers, New Delhi.
3. Chadha, K. L. (2010). *Agronomy: Principles and Practices*. Agrobios (India), Jodhpur.
4. Yadav, S. S. (2008). *Crop Production and Management*. Oxford & IBH Publishing, New Delhi.
5. Bhushan, L. (2012). *Sustainable Agriculture and Crop Production*. National Publishing House, New Delhi.

Farming based livelihood systems 3(2+1) Course Code: AGUCBG052C

Course Objective

1. Understand agriculture and livelihood status in India.
2. Learn livelihood concepts and patterns in rural and urban areas.
3. Study farming systems and their livelihood contributions.
4. Analyze integrated farming and agri-enterprise models.
5. Explore schemes, innovations, and livelihood opportunities in agriculture.

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, Agro--forestry systems, Aqua culture Duck/Poultry cum Fish, Dairy cum Fish, Piggery cum Fish etc., Small-, medium- and large- enterprises including value chains and secondary enterprises as livelihood components for farmers, Factors affecting integration of various enterprises of farming for livelihood. 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 Government, 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 agricultural 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.

Course Outcome

1. Recognize the current status of agriculture and farmer livelihoods in India.
2. Describe livelihood patterns and indicators in rural and urban settings.
3. Identify various farming systems and their role in livelihood enhancement.
4. Evaluate integrated and enterprise-based livelihood models for feasibility and profitability.
5. Apply knowledge of schemes, innovations, and sustainability in farming-based livelihoods.

Reference Books

1. Ashley, C. & Carney, D. (1999). *Sustainable Livelihoods: Lessons from Early Experience*. Department for International Development, London, UK, Volume 7.
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.
3. Carloni, A. (2001). *Global Farming Systems Study: Challenges and Priorities to 2030 – Regional Analysis: Sub-Saharan Africa*. Consultation Document, FAO, Rome, Italy.
4. Dixon, J., Gulliver, A., & Gibbon, D. (2001). *Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World*. FAO & World Bank, Rome, Italy & Washington, DC, USA.
5. Evenson, R. E. (2000). Agricultural Productivity and Production in Developing Countries. In *The State of Food and Agriculture*. FAO, Rome, Italy.

Rural Sociology and Educational Psychology 2 (2+0)

Course Code: AGUCBG031T

Course Objectives

1. Understand Agricultural Extension and its link to rural sociology.
2. Analyze rural society, social groups, and social stratification.
3. Explore cultural concepts and their role in Agricultural Extension.
4. Study social institutions, organizations, and social control in rural society.
5. Learn about leadership, leader training, and educational psychology in Agricultural Extension.

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.

Course Outcome

1. Understand the role of Agricultural Extension and rural sociology.
2. Identify social groups and stratification in agriculture.
3. Recognize the impact of culture and values on Agricultural Extension.
4. Assess the role of social institutions and organizations in agriculture.
5. Apply leadership and educational psychology in Agricultural Extension.

Reference Books

1. Reddy, P. S. (2010). *Extension Education: Theory and Practice*. Kalyani Publishers, New Delhi.
2. Singh, S., & Singh, R. (2015). *Rural Sociology and Educational Psychology*. I.K. International Publishing House, New Delhi.
3. Narayana, D. (2005). *Sociology and Rural Sociology in Extension*. Oxford & IBH Publishing Co., New Delhi.
4. Sharma, B. L. (2009). *Principles of Extension Education and Management*. Agrobios (India), Jodhpur.
5. Sethi, S. P. (2011). *Introduction to Educational Psychology*. Sterling Publishers, New Delhi.

Fundamentals of Soil Science 3 (2+1) **Course Code: AGUCBG054C**

Course Objective

1. Learn soil formation, properties, and soil concepts.
2. Study soil composition, ion exchange, and soil colloids.
3. Understand soil profile, texture, and physical properties.
4. Explore soil moisture, air, temperature, and consistency.
5. Gain hands-on skills in soil analysis and testing techniques.

Theory

Soil: Pedological and edaphalogical 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.

Course Outcome

1. Understand soil properties, formation processes, and types.
2. Learn about soil colloids, ion exchange, and soil fertility.
3. Gain practical skills in soil testing and analysis.
4. Comprehend the impact of soil moisture, air, and temperature on crops.
5. Apply soil knowledge for sustainable agricultural practices and crop productivity.

Reference Books

1. Brady, N.C. & Weil, R.R. (2007). *The Nature and Properties of Soils*. 14th Edition, Pearson Prentice Hall.
2. Wild, A. (2003). *Soil Solutions: Soil and Fertilizer Management for Sustainable Agriculture*. 3rd Edition, Blackwell Publishing.
3. Hillel, D. (2008). *Environmental Soil Physics: Fundamentals, Applications, and Environmental Considerations*. Academic Press.
4. Keeney, D.R. & Nelson, D.W. (1982). *Soil and Fertilizer Management in Organic Agriculture*. 1st Edition, Springer.

Fundamentals of Horticulture 3 (2+1) **Course Code: AGUCBG055C**

Course Objective

1. Learn the scope and classification of horticulture and its relationship with soil and climate.
2. Understand plant propagation methods and stock-scion relationships.
3. Study orchard establishment, training, pruning, and management of fruit crops.
4. Explore pollination, bio-regulators, irrigation, and fertilizer application in horticultural crops.
5. Gain practical experience in nursery raising, propagation, training, pruning, and post-harvest handling.

Theory

Horticulture: Its different branches, importance and scope, Horticulture and botanical classification, soil and climate for horticultural crops. Plant propagation: methods and propagation 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, importance of bio regulators in horticultural crops, irrigation and its methods, Fertilizer application in horticultural crops.

Practical

Identification and nomenclature of fruit, 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, harvesting, grading, packaging and storage.

Course Outcome

1. Ability to apply horticulture principles in crop cultivation and management.
2. Proficiency in various plant propagation techniques and understanding stock-scion relationships.
3. Skill in orchard layout, training, and pruning for optimized fruit production.
4. Knowledge of pollination, bio-regulators, and efficient irrigation and fertilization practices.
5. Hands-on experience in nursery management, crop propagation, and post-harvest handling.

Reference Books

1. **Kader, A. A.** (2005). *Postharvest Technology of Horticultural Crops*. University of California, Agriculture and Natural Resources.
2. **Halevy, A. H.** (1986). *Handbook of Flowering, Vol. 4*. CRC Press.
3. **Pandey, H. N.** (2017). *Horticulture: Principles and Practices*. New India Publishing Agency.
4. **Bose, T. K., & Yadav, S. S.** (2001). *Tropical and Subtropical Horticulture*. Naya Prokash.
5. **Mitchell, J. D.** (2013). *Principles of Horticulture*. Elsevier.

National Cadet Corps (NCC-1)/ National Service Scheme (NSS-2) 1(0+1)

Course Code: AGUCBG033P

National Cadet Corps-

- As per government guidelines, for getting B and C certificate in NCC, minimum years of requirement is 2 and 3 years along with 1-2 annual camps
- 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, honors, 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 defense 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.

National Service Scheme (NSS)

Evoking social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skilful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society. All the activities related to the National Service Scheme are distributed under four different courses viz., National Service Scheme I, National Service Scheme II, National Service Scheme III and National Service Scheme IV; each having one credit load. T he entire four courses should be offered continuously for two years. A student enrolled in NSS course should put in at least 60 hours of social work in different activities in a semester other than five regular one-day camp in a year and one special camp for duration of 7 days at any semester break period in the two years. Different activities will include orientation lectures and practical works. Activities

directed by the Central and State Government have to be performed by all the volunteers of NSS as per direction

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, analyzing 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 rights to information. Family and society. Concept of family, community (PRIs and other community based organizations) and society.

Introductory Mathematics (Non-gradial) 1 (1+0)

Course Code:

Course Objectives

1. Study arithmetic, geometric, and harmonic progressions.
2. Learn matrix operations and properties of determinants.
3. Understand differentiation and its applications in economics.
4. Explore partial differentiation and optimization techniques.
5. Learn integration methods and their applications.

Theory:

Algebra: Progressions- Arithmetic, Geometric and Harmonic Progressions. Matrices: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3rd order by adjoint method, Properties of determinants up to 3rd order and their evaluation. Differential Calculus: Definition - Differentiation of function using first principle, Derivatives of sum, difference, product and quotient of two functions, Methods, Increasing and Decreasing Functions. Application of Differentiation- Growth rate, Average Cost, and Marginal cost, Marginal Cost, Marginal Revenue. Partial differentiation: Homogeneous function, Euler's theorem, Maxima and Minima of the functions of the form $y = f(x)$ and $y = f(x1, x2)$. Integral Calculus: Integration -Definite and Indefinite Integrals-Methods- Integration by substitution, Integration by parts. Area under simple well-known curves. Mathematical Models: Agricultural systems - Mathematical models - classification of mathematical models- Fitting of Linear, quadratic and exponential models to experimental data.

Course Outcome

1. Apply mathematical concepts like progressions, matrices, and calculus to solve real-world problems.
2. Use differentiation for analyzing growth rates, costs, and revenues in agricultural economics.
3. Apply partial differentiation for optimization and analyzing maxima and minima in agricultural systems.
4. Solve integral problems related to areas under curves and economic models.
5. Develop mathematical models to represent and analyze agricultural systems.

Reference Books

1. Thomas' Calculus by George B. Thomas, Maurice D. Weir, Joel R. Hass
2. Advanced Engineering Mathematics by Erwin Kreyszig
3. Mathematics for Economics and Finance by Martin Anthony and Norman Biggs
4. Agricultural Systems Modeling and Simulation by M. J. K. S. Sundararajan and P. R. S. S. Murthy

5. Mathematical Methods for Economics by Michael Hoy, John Livernois, and Chris McKenna

Introductory Biology 1 (1+0)

Course Code: AGUCBG111T

Theory: Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division. Morphology of flowing plants. Seed and seed germination. Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture

Practical: Morphology of flowering plants – root, stem and leaf and their modifications. Inflorence, flower and fruits. Cell, tissues & cell division. Internal structure of root, stem and leaf. Study of specimens and slides. Description of plants - Brassicaceae, Fabaceae and Poaceae.

Reference Books

1. Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., Reece, J. B., & Campbell, N. A. (2017). *Campbell biology* (11th ed.). Pearson Education.
2. Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K., & Walter, P. (2022). *Molecular biology of the cell* (7th ed.). W. W. Norton & CompanyIn-text citation (parenthetical): (Urry et al., 2017)
3. Nelson, D. L., & Cox, M. M. (2021). *Lehninger principles of biochemistry* (8th ed.). W. H. Freeman

SUBJECT NAME: Agricultural mathematics and Professional Communication 1 (1+0)

SUBJECT CODE: PTSPPBG12T

COURSE OUTCOMES

1. Better representation of himself/ herself in terms of communication skills, overall personality development and aptitude building required for Government & Non-government jobs.
2. This program will help students employable and ready for Seed Company, Fertilizer Company, Agro-Industries/ Dairy & Poultry based Industries /Corporate/ CSR project and other Public and Private Sector, Non -Governmental Organization jobs.

Hard skill includes Basic Grammar, Vocabulary, Articles, Tenses, Construction of Sentences and Reading Comprehension etc.

Efforts should be made to overcome the initial hesitation of speaking English of students and hence improve their fluency in English. Suggested methods include:

- Follow only English language in the class.
- Class should be interactive and students should always be engaged in some kind of conversation.
- Each student should speak 5 minutes, 3-4 times in 1st semester on topics of his choice selected from Social, Global Warming & Climate Change, Environment & Disaster Management, Agricultural Issues, Agri- Entrepreneurship and Agri- Economics, Dairy, Poultry and Agro-Industries, Agriculture Journalism, Politics, World Affairs and Religion etc.

In the above process students should be regulated towards better Vocabulary and Pronunciation.

Aptitude Building

Quantitative

Aptitude

Basic Calculations: BODMASS rule, Square and square root, Cube and cube root, Different types of numbers, Divisibility rule, Fraction and comparison of fraction. Number System: Multiples, Factors Remainder, Remainder Theorem, Unit Place, Number formation, Factorial, LCM and HCF Finding and its application. Percentage: Basics of percentage and it's calculation, Comparison of percentage, How to use in data interpretation, Venn diagram. Logical Reasoning, Coding and decoding Number Series Blood Relation.

SUBJECT NAME: Skill Enhancement course – I* 2 (0+2)

(**Seed Production Technology**)

SUBJECT CODE: AGUCBG031P

Course Objective:

Upon completion of this course, student will be able to:

1. **Apply scientific principles to produce high-quality seeds of various crops.**
2. **Master seed processing, testing, and storage techniques to maintain seed viability.**
3. **Understand national and international seed quality standards and certification procedures.**
4. **Navigate the legal and regulatory frameworks of the seed industry.**
5. **Develop a viable business plan for a seed production enterprise.**

Practical: Seed Biology and Development, Difference between Grain and Quality Seed, Genetic Purity and Isolation Distance, Classes of Seed (Breeder, Foundation, Certified), Field Selection and Preparation for Seed Crop, Roguing Techniques, Pollination Biology of Crops (Self, Cross, Vegetatively Propagated), Seed Crop-Specific Production Technologies, Hybrid Seed Production in Rice and Maize, Planting Ratios and Pollination Control Methods, Detasseling and Parental Line Handling, Identification of Physiological Maturity, Post-Harvest Handling and Seed Processing, Seed Cleaning and Grading Machinery, Seed Testing Laboratory (Purity, Germination, Moisture, Viability Tests), Seed Certification Procedures, Seed Legislation and Regulatory Framework, Role of National Seed Corporation (NSC), Seed Marketing and Distribution, Branding and Marketing Strategies, and Intellectual Property Rights (PVP & FR Act).

Outcome: The ability to navigate the legal landscape and effectively market seed products. Participants will develop a complete business plan for a seed production enterprise. Market analysis and demand forecasting. Detailed production plan for a chosen crop. Financial projections (costs, returns, and profitability). A strategy for quality control and marketing

SUBJECT NAME: Skill Enhancement course – II* **2 (0+2)**

(**Mushroom production technology**)

SUBJECT CODE: AGUCBG032P

2 (0+2)

Course Objective: On successful completion of this course the student should be able to understand:

1. Recalling various types and categories of mushrooms.

2. Demonstrating various types of mushroom cultivating technologies.

3. Examining various types of food technologies associated with mushroom industry.

4. Valuing the economic factors associated with mushroom cultivation.

5. To device new methods and strategies to contribute to mushroom production

Theory:

History, Nutritional and medicinal value of edible mushrooms, Poisonous mushrooms, Types of edible mushrooms available in India - Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus. Cultivation Technology: Infrastructure: substrates (locally available) Polythene bag, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Pure culture: Medium, Sterilization, preparations of spawn, multiplication. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed Preparation-Low cost technology, Composting technology in mushroom production. Storage and nutrition: Short-term storage (Refrigeration – up to 24 hours) Long term Storage (canning, pickels, papads), drying, storage in salt solutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content – Vitamins. Food Preparation: Types of foods prepared from mushroom. Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

Course Outcomes: On successful completion of this course the students will be able to:

1. Know history and nutritional values of mushroom.

2. Cultivate mushroom.

3. Store mushroom in the form of various edible items.

Suggested Readings:

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.

2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.

3. Tewari, Pankaj and Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.

4. Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.