TAKSHASHILA UNIVERSITY

(Tamil Nadu State Private University)

ONGUR, TINDIVANAM TK, VILLUPURAM DT

FACULTY OF SCIENCES

SCHOOL OF AGRICULTURAL SCIENCES

Department of Agriculture

REGULATION 2025NEP

CURRICULUM & SYLLABI

B.Sc. (Hons.) Agriculture

Semester – I

VISION AND MISSION OF UNIVERSITY

VISION:

To create change makers and world leaders similar to the ancient Takshashila University

MISSION:

The brightest minds and the best resources are used to nurture and develop the leaders of tomorrow, where they are encouraged to be eternally curious and ethically sound.

DEPARTMENT VISION AND MISSION

VISION:

Focusing on Agricultural research, teaching, and extension to use cutting-edge, sustainable technologies to satisfy human needs.

To become a globally recognized university dedicated to educating the next generation in both rural and urban areas about science-based agriculture.

MISSION:

M1:	Empower future generations through quality educational opportunities in agriculture with forefront farming technology to meet the needs of various stakeholders, including farmers, employers, industries, and society.
M2:	Enhance agricultural higher education to meet worldwide standards for advanced teaching, research, and extension.
M3:	Promote innovative technologies such as artificial intelligence, high-tech agriculture, digital agriculture, and sustainable farming to assure production and productivity.
M4:	Successfully transfer technologies from lab to farm land to assure food and water security, enhance farmers' revenues, and raise the standard of living.
M5:	Stimulating professional behavior and good ethical values to improve the leadership skills and social responsibilities.

PROGRAMME OUTCOMES (POs)

PO 1: Domain Knowledge: Apply fundamental knowledge from several agricultural disciplines to the fields of animal husbandry, agricultural extension, crop improvement, production, and protection, as well as agri-informatics.

PO 2: Problem analysis: To improve agricultural output, identify gaps by examining regular difficulties and challenges in farming.

PO 3: Formulate solution: Design and develop solutions to complicated and specialized agricultura l challenges, with an emphasis on cultural, socioeconomic, and environmental considerations.

PO 4: Conduct surveys and investigations: Evaluate and evaluate the available agricultural inform ation in order to provide sustainable solutions by using research-based knowledge and methods.

PO 5: Use of Contemporary Concepts and Tools: Create, select, and implement suitable methods, materials, and present-day tools to forecast agricultural outcome.

PO 6: Social Role: Determine logic and background information to evaluate and advance environmental safety, livelihood security, and nutrition.

PO 7: Environment and Sustainability: Recognize the effects of regional and global environmental problems and take appropriate action to produce agricultural products in a sustainable manner.

PO 8: Ethics: Put ethical concepts into practice and follow obligations and standards in the field.

PO 9: Teamwork: Contribute well as a leader or an individual in a variety of multidisciplinary, cross-cultural teams.

PO 10: Efficient communication: Understand and compose succinct scientific reports, deliver persuasive speeches, and interact with stakeholders in an efficient manner.

PO 11: Finance and project management: Able to exhibit scientific understanding in their roles as financial managers and entrepreneurs.

PO 12: Life-long learning: Make an initiative to pursue self-sustaining, continuous learning in order to stay updated with emerging technology and maintain your professional proficiency in agriculture.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Industry Leadership

Demonstrate advanced managerial competency and domain expertise to lead teams, drive strategy, and deliver measurable results in dynamic business environments.

PEO2: Research and Development

Identify market opportunities, apply data-driven decision-making, and develop scalable solutions as entrepreneurs or intrapreneurs within established organizations

PEO3: Professional Ethics

Uphold rigorous ethical standards and corporate governance principles while making decisions that balance profitability with social and environmental responsibility

PEO4: Global Citizenship

Operate effectively in multicultural, international business contexts by leveraging global perspectives, cross-cultural intelligence, and awareness of global economic trends.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Domain Knowledge

Demonstrate an in-depth understanding of financial management, banking, investment, financial markets, financial technologies, and digital financial services to analyze complex financial problems and develop innovative solutions in dynamic business environments.

PSO2: Digital Finance and Technology Integration

Apply financial technologies, artificial intelligence, blockchain, data analytics, enterprise resource planning (ERP), digital payment systems, cloud computing, and emerging FinTech solutions to optimize financial operations, support data-driven decision-making, enhance customer experience, and manage financial risks.

PSO3: Professional Competency

Exhibit a high level of professional competence through financial analysis, strategic thinking, ethical decision-making, regulatory compliance, leadership, communication, teamwork, and lifelong learning, enabling successful careers in banking, financial services, FinTech organizations, consulting, entrepreneurship, and global financial ecosystems.

CURRICULUM

School : School of Agricultural Science **Batch** : 2026-2030

Program: B.Sc. (Hons.) Agriculture **Regulation** : R25

SEMESTER I							
Sl. No.	Course code	Course title	Category	Credit hours	Maximum marks		
					CAM	ESM	Total
Program Core							
1.	U25AG01T	Rural Sociology and Educational Psychology	PC	2 (2+0)	50	50	100
2.	U25AG02B	Fundamentals of Agronomy	PC	3 (2+1)	60	40	100
3.	U25AG03B	Fundamentals of Soil Science	PC	3 (2+1)	60	40	100
4.	U25AG04B	Fundamentals of Horticulture	PC	3 (2+1)	60	40	100
Multi- Disciplinary Course							
5.	U25AG05B	Farming Based Livelihood Systems	MDC	3 (2+1)	60	40	100
Ability Enhancement Course							
6.	U25EN04B	Communication Skills	AEC	2 (1+1)	60	40	100
7.	U25AG06P	National Service Scheme – I	AEC	1 (0+1)	100	-	100
	U25AG19P	National Cadet Corps - I					
Skill Enhancement Course							
8.	U25AG07P	Biofertlizer and Biopesticide Production	SEC	2 (0+2)	100	-	100
9.	U25AG08P	Mushroom Production Technology	SEC	2 (0+2)	100	-	100
Value Added Course							
10.	U25VA11P	Introductory Mathematics	VAC	1 (0+1)	100	-	100
Non Gradial course							
11.	U25AG09P	Deeksharambh (Induction cum Foundation course)*	NG	2 (0+2)* 1 week	100	-	100
Total				**22 (11+11)**	**850**	**250**	**1100**

PC – Program Core
SEC – Skill Enhancement Course
DSE – Discipline Elective
GE – Generic Elective
AEC – Ability Enhancement Course
MDC – Multi- Disciplinary Course
VAC – Value Added Course
UM – University Mandatory Course
* - Non Gradial course

U25AG01T	Rural Sociology and Educational Psychology	(2+0)

COURSE OBJECTIVES:

- To develop an understanding of Extension Education, Rural Sociology and Social Groups and their importance in facilitating agricultural extension and rural development.
- To equip students with the knowledge to recognize social stratification and cultural concepts affecting rural development and extension education programmes.
- To acquaint students with the role of social values, institutions, organization social control in maintaining social order and promoting sustainable agricultural and rural development
- To develop students understanding of human behavior, leadership skills and educational psychology for effective personal, professional and organizational performance.
- To make the students to understand the intelligence level and teaching-learning process and to facilitate learning in agricultural education and extension.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Describe the principles of Extension Education, Rural Sociology and Social Groups and their significance in agricultural extension and rural development.
CO2 :	Explain social stratification and cultural concepts and their influence on rural development and extension education programmes.
CO3 :	Analyze the role of social values, institutions, organizations and social control in maintaining social order and promoting sustainable agricultural and rural development.
CO4 :	Students will be able to explain leadership principles and human behaviour and apply them to improve communication, teamwork and organizational effectiveness in agricultural settings.
CO5 :	Understanding the intelligence and teaching–learning processes and apply these to enhance classroom teaching and learning.

UNIT I : Extension, Rural Sociology and Social Groups	**6 Hrs.**
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 in formation and organization of groups, motivation in group formation and role of social groups in Agricultural Extension.	

UNIT II : Social Stratification and Cultural Concepts	6 Hrs.
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 - Cultural Diffusion, Cultural Lag and Ethnocentrism and their role in Agricultural Extension.	

UNIT III : Social Values and Attitudes, Social Institutions, Social Organisation, Social Control, Social Interaction Process and Social Change	6 Hrs.
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 Interaction Process: Aspects and major social processes - Social change: Meaning, definition, nature of social change, dimensions of social change and factors of social change.	

UNIT IV : Leadership and Human Behaviour	7 Hrs.
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; Human Behaviour: Meaning, definition and factors affecting human behavior - Process of human behavior: Sensation, Attention and Perception – their meaning, definitions, factors and errors of perception – Motivation - Psychology and educational psychology: Meaning, definition, scope, and importance of educational psychology in Agricultural Extension.	

UNIT V – Intelligence, Personality and Teaching Learning Process	7 Hrs.
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, theories of learning - Principles of learning and their implication of teaching.	

Lecture Schedule

1. Extension Education and Agricultural Extension: Meaning, definition, scope and importance.
2. Sociology and Rural Sociology: Meaning, definition, scope, importance of rural sociology in Agricultural Extension.
3. Interrelationship between Rural Sociology and Agricultural Extension.
4. Indian Rural Society: important characteristics, differences and relationship between rural and urban societies.
5. Social Groups: Meaning, definition, and classification.
6. Group Formation and Organization: Factors considered in formation and organization of groups, motivation in group formation and role of social groups in Agricultural Extension.
7. Social Stratification: Meaning, definition, functions, basis, functions and forms.
8. Class and Caste System: Characteristics and differences.
9. Culture: Meaning, definition, structure, characteristics, functions and importance.
10. Cultural concepts: customs, folkways, mores, taboos, rituals.
11. Traditions: Meaning, definition and their role in Agricultural Extension
12. Cultural Diffusion, Cultural Lag and Ethnocentrism and their role in Agricultural Extension.
13. Social Values and Attitudes: Meaning, definition, types and role of social values and attitudes in agricultural Extension
14. Social Institutions: Meaning, definition, major institutions in rural society, functions, and their role in agricultural Extension
15. Social Organizations: Meaning, definition, types of organizations and role of social organizations in agricultural Extension
16. Social Control: Meaning, definition, need of social control and means of social control.

Mid Semester Examination.

17. Social Interaction Process: Aspects and major social processes.
18. Social change: Meaning, definition, nature of social change, dimensions of social change and factors of social change
19. Leadership: Meaning, definition, classification and roles of leader
20. Different methods of selection of professional and lay leaders, Advantages and limitations in use of local leaders in Agricultural Extension
21. Training of Leaders: Meaning, definition and methods of training.
22. Human Behaviour: Meaning, definition and factors affecting human behaviour.
23. Process of human behavior: Sensation, Attention and Perception – their meaning, definitions, factors and errors of perception.

24. Motivation: Meaning, types, Maslow's Theory and importance in Agricultural Extension.
25. Psychology and educational psychology: Meaning, definition, scope, and importance of educational psychology in Agricultural Extension.
26. Intelligence: Meaning, definition, types, measurement, factors affecting intelligence and its importance in Agricultural Extension.
27. Personality: Meaning, definition, types, traits, factors influencing the personality and role of personality in Agricultural Extension.
28. Teaching Learning Process: Meaning and definition of teaching, learning, learning experience and types of learning.
29. Extension Teaching: Meaning, definition and steps in extension teaching.
30. Types and theories of learning
31. Learning Experience and Learning Situation: Meaning and definition; elements of learning situation and its characteristics.
32. Principles of Learning and their Implications in Teaching.

Total Hours: 32

TEXT BOOKS :	
1.	Velusamy R. 2020. "Textbook on Rural Sociology and Educational Psychology" Daya Publishing House.
2.	Chauhan, S.S. 2009. "Advanced Educational Psychology", Vikas Publishing House.
3.	J. B. Chitambar, 1977. "Introductory Rural Sociology", New Age International Publishers, ISBN: 9389802288.
4.	Santrock, J.W. 2020. "Educational Psychology", McGraw-Hill Education.
5.	Desai, A.R. 1977. "Rural Sociology in India", Popular Prakashan.

REFERENCE BOOKS :	
1.	Ray G L. 2017. "Extension Communication and Management", Kalyani Publishers.
2.	Sandhu A S. 2020. "Textbook on Agricultural Communication". (3rd Edn.). Oxford & IBH Publishing Co. Pvt. Ltd.
3.	Ghorpade M B. 1985. "Essential of Psychology. Bombay Himalaya Publishing House", New Delhi.
4.	Reddy A. Adivi. 1978. "Extension Education", Sree Lakshmi Press, Bapatla, Andhra Pradesh.

WEB REFERENCES :	
1.	https://www.scribd.com/document/442380422/A-R-Desai-Rural-Sociology-in-India-pdf
2.	https://dde.pondiuni.edu.in/files/StudyMaterials/UG/BA-Sociology/1year/BASO1912RuralSociology.pdf
3.	https://www.sclc.edu.in/wp-content/uploads/2024/02/Dr.-Renu-Naidu-Rural-Sociology-Of-India.pdf

U25AG02B	Fundamentals of Agronomy	(2+1)

COURSE OBJECTIVES:

- To understand about the basic principles, scope, and importance of agronomy, crop classification, tillage, and crop production practices under different agro-climatic conditions in India.
- To acquire knowledge of seed quality, sowing methods, crop geometry, plant nutrition, nutrient absorption, and factors influencing crop growth and productivity.
- To learn the nature of organic and inorganic nutrient sources, integrated nutrient management, biofertilizers, green manuring, and soil moisture management for sustainable crop production.
- To know about the appropriate weed management practices, resource conservation techniques, and sustainable agricultural principles to improve crop production and productivity while minimizing environmental impacts.
- To study about the different cropping systems, cropping patterns, and future trends in sustainable agriculture practices and climate-resilient crop production.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Summarize the scope and principles of agronomy, classify field crops, describe tillage practices, and relate crop production to different agro-climatic zones.
CO2 :	Demonstrate knowledge of seed quality, sowing methods, crop geometry, essential plant nutrients, nutrient absorption mechanisms, and factors affecting crop growth and establishment.
CO3 :	Evaluate the role of manures, fertilizers, biofertilizers, green manuring, integrated nutrient management, and soil moisture management in enhancing crop productivity and soil health.
CO4 :	Apply appropriate weed management strategies and sustainable agricultural practices to conserve natural resources, reduce agricultural pollution, and improve crop production.
CO5 :	Examine different cropping systems, cropping patterns, and sustainable crop production technologies, and propose suitable approaches to address future challenges in agriculture under changing agro-climatic conditions.
CO6 :	Identify and recognize agricultural crops, seeds, manures, fertilizers, farm tools and implements, and perform basic crop production practices.

UNIT I: Agriculture and tillage	7 Hrs.
Definition, scope, and meaning of agronomy; role in crop production - Relation of agronomy with other disciplines of agricultural science - Classification of field crops and their importance - Ecology and ecosystem concepts in agronomy – Crop production practices in different agro-climatic zones of India - Tillage, Definition, objectives, types, advantages, and disadvantages - Conservation tillage and its significance in sustainable farming.	

UNIT II: Seed sowing and nutrients	6 Hrs.
Seeds and sowing - Seed types, quality, and factors affecting crop establishment – seed rate and Sowing methods - Crop geometry, Definition, importance, and effects on yield - Factors affecting crop production- climatic and edaphic factors, biotic, physiographic and socio-economic factor - Growth stages in crops and their practical importance in farming - Essential nutrients: Definition, criteria, and classification - Nutrient absorption mechanisms: Active and passive absorption.	

UNIT III: Manures and fertilizers	7 Hrs.
Manures and fertilizers: Classification and nutrient use efficiency- Organic manures: Preparation methods and role in crop production - Bio-fertilizers, Types, characteristics, and agricultural applications - Integrated Nutrient Management (INM): Meaning, approaches, and advantages - Green manuring: Definition, objectives, and types - Soil moisture constants: Gravitational, capillary, and hygroscopic water - Soil moisture management practices and their impact on crops.	

UNIT IV: Weed Management and Sustainable Agriculture	6 Hrs.
Weeds - Definition, importance, and classification basics. - Methods of weed control: Cultural, mechanical, chemical, and biological - Allelopathy: Meaning, role, and importance in sustainable cropping systems - Sustainable agriculture, Definition, importance, and resource conservation - Pollution in agriculture, Sources, impact, and control measures.	

UNIT V: Future Trends & Sustainable Agriculture	6 Hrs.
Cropping pattern and cropping system, Intensive cropping, Sustainable agriculture – Major cropping systems and patterns in India and the state - Factors affecting cropping systems and sustainable crop practices - Practical applications of crop production technologies in various agro-climatic zones - Future of sustainable cropping systems: Challenges and solutions.	

Lecture schedule

1. Agronomy: Definition, scope, meaning and role in crop production.
2. Relationship of agronomy with other disciplines of agricultural science.
3. Classification of field crops and their importance.
4. Ecology and ecosystem concepts in agronomy.
5. Crop production practices in different agro-climatic zones of India.
6. Tillage: Definition, objectives, types and advantages and disadvantages
7. Conservation tillage and its significance in sustainable farming.
8. Seeds and sowing: Seed types, seed quality and factors affecting crop establishment.
9. Seed rate, sowing methods and crop geometry: Definition, importance and effect on crop yield.
10. Factors affecting crop production: Climatic, edaphic, biotic, physiographic and socio-economic factors.
11. Crop growth stages and their practical importance in farming.
12. Essential plant nutrients: Definition, criteria and classification.
13. Nutrient absorption mechanisms: Active and passive absorption.
14. Manures and fertilizers: Classification and nutrient use efficiency.
15. Organic manures: Types, preparation methods and role in crop production.
16. Biofertilizers: Types, characteristics and agricultural applications.

Mid Semester Examination.

17. Integrated Nutrient Management (INM): Meaning, approaches and advantages.
18. Green manuring: Definition, objectives, types and importance.
19. Soil moisture constants: Gravitational, capillary and hygroscopic water.
20. Soil moisture management practices and their impact on crop production.
21. Weeds: Definition, importance, classification and crop–weed competition.
22. Methods of weed control: Cultural and Mechanical methods.
23. Methods of weed control: Chemical and Biological methods.
24. Allelopathy: Meaning, role and importance in sustainable cropping systems.
25. Sustainable agriculture: Definition, principles and importance.
26. Agricultural pollution: Sources, impact and control measures.
27. Cropping pattern and cropping system: Concepts and differences.
28. Intensive cropping and sustainable cropping systems.
29. Major cropping systems and cropping patterns in India and Tamil Nadu.

30. Factors affecting cropping systems.

31. Sustainable crop production practices and resource conservation.

32. Future of sustainable cropping systems: Challenges, opportunities and solutions.

Practical Schedule

1. Classification and Identification of crops.
2. Visit to college farm - Wetland, garden land and dry land system of farming.
3. Identification of seeds, manures, fertilizers, green manures
4. Identification of Tools and Implements
5. Acquire skills in primary and secondary tillage implements.
6. Acquire skills in intercultural and special purposes implements.
7. Raising nursery for wetland crops.
8. Raising nursery for garden land crops.
9. Different methods of seed treatment and methods of sowing
10. Working out plant population, seed rate and practicing thinning, gap filling operations for optimum crop stand and intercultural operations.
11. Working out manures and fertilizer requirement of crops.
12. Application methods of manures, fertilizers and incorporation of green manures
13. Identification of weeds, weeding practices and handling of weeding tools and implements
14. Different types of irrigation methods.
15. Practicing harvesting operations and yield estimation in major field crops.
16. Participation in on – going field operations during on campus/ off campus visit

Final Practical Examination.

Total Hours: 64

TEXT BOOKS :	
1.	Reddy, S.R. "Principles of Agronomy". Kalyani Publishers, New Delhi, 1999.
2.	Singh, S.S. 'Principles and Practices of Agronomy'. Kalyani Publishers, NewDelhi, 1998.
3.	Yellamananda Reddy, T. and G. H. Sankara Reddy. "Principles of Agronomy". Kalyani Publishers, New Delhi, 1997.
4.	Chandrasekaran, B., K. Annadurai and E. Somasundaram. "A Textbook of Agronomy". New Age Internationl Publishers, NewDelhi, 2010.
5.	Sankaran, S. and V.T. Subbiah Mudaliar. "Principles of Agronomy". The Bangalore Printing and Publishing, Bangalore, 1997.

REFERENCE BOOKS :	
1.	Balsubramaniyan, P. and SP. Palaniappan. "Principles and Practices of Agronomy". Agrobios. Jodhpur, 2001.
2.	ICAR. "Handbook of Agriculture". Indian Council of Agricultural Research. NewDelhi, 1996.
3.	Morachan, Y.B. "Crop Production and Management". Oxford and IBH Publishing, New Delhi, 1980.
4.	Panda, S.C. "Agronomy". Agrobios (India), Jodhpur, 2005.

WEB REFERENCES :	
1.	https://agrimoon.com/wp-content/uploads/AgriMoon-AAG-111-Fundamentals-of-Agronomy.pdf
2.	https://jru.edu.in/studentcorner/lab-manual/agriculture/1st-sem/Fundamentals%20of%20Agronomy.pdf
3.	https://rvsagri.ac.in/modules/academics/timetable/AGR%20101.pdf
4.	https://nishat2013.wordpress.com/wp-content/uploads/2013/11/agronomy-book.pdf
5.	https://www.bhumipublishing.com/wp-content/uploads/2025/01/A-Practical-Manual-on-Fundamentals-of-Agronomy.pdf

U25AG03B	Fundamentals of Soil Science	(2+1)

COURSE OBJECTIVES:

- To understand the concepts of soil as a natural resource and the role of rocks and minerals in soil formation.
- To evaluate the physical properties of soil.
- To examine the physical properties of soil and their influence on crop growth.
- To analyze the chemical characteristcs and functions of soil colloids.
- To understand the soil organic matter biological components of soil, the role of soil organisms and enzymes and mitigation of soil pollution.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1:	Outline the soil formation
CO2:	Explain the physical properties of soil
CO3:	Interpret the physical properties soil consistence
CO4:	Describe the importance of soil chemical properties
CO5:	Description of importance soil organic matter and soil pollution.
CO6:	Demonstrate proficiency in soil sampling, characterization, and laboratory analysis by determining the physical and physicochemical properties of soils, interpreting soil profiles and maps, and evaluating soil quality for sustainable agricultural land use and management.

UNIT I: Introduction and Soil Formation	**6 Hrs.**
Soil as a natural body, Pedological and edaphological concepts of soil – Components of soil – Soil genesis: Composition of Earth's crust – soil forming rocks and minerals – Primary and secondary minerals – Weathering of rocks and minerals – Factors of soil formation.	

UNIT II: Physical Properties of Soil	**7 Hrs.**
Soil forming processes – Soil Profile –Soil physical properties: Soil texture, structure, density and porosity, soil colour.	

UNIT III: Soil consistence, Soil Temperature	6 Hrs.
Soil consistence and plasticity – Soil water retention, movement and availability.Soil air, composition, gaseous exchange – problem and its effect on crop growth – Source, amount and flow of heat in soil, Soil temperature and crop growth	

UNIT IV: Soil Chemical Properties and Ion Exchange	6 Hrs.
Soil physico chemical and chemical properties: Soil reaction – pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability – Electrical conductivity. Soil colloids – inorganic and organic – Silicate clays: constitution and properties, sources of charge, ion exchange, cation and anion exchange capacity and base saturation	

UNIT V – Soil organic matter, Soil Biology and Soil Pollution	7 Hrs.
Soil organic matter: composition, properties and its influence on soil properties – Humic substances - nature and properties Soil organic matter: composition, properties and its influence on soil properties – Humic substances - nature and properties – Soil Biology: Soil organisms: macro and microorganisms, their beneficial and harmful effects – Soil enzymes – Soil pollution – Types and behaviour of pesticides – Inorganic contaminants – Prevention and mitigation of soil pollution.	

Lecture Schedule

1. Soil: Definition, soil as a three-dimensional natural body, pedological and edaphological concepts. Components of soil, soil as a three-phase system and composition of the Earth's crust.
2. Soil genesis: Soil-forming rocks, definition, formation and classification of igneous, sedimentary and metamorphic rocks.
3. Important soil-forming rocks and their mineralogical composition.
4. Minerals: Definition, occurrence, classification of primary and secondary minerals; silicate and non-silicate minerals; clay and amorphous minerals.
5. Weathering of rocks and minerals: Physical, chemical and biological weathering.
6. Factors of soil formation: Active and passive soil-forming factors.
7. Fundamental soil-forming processes: Simenson's four-fold processes, eluviation and illuviation.
8. Specific soil-forming processes: Podzolization, laterization, salinization, alkalization, calcification, decalcification and pedoturbation.
9. Soil profile: Soil horizons, master and subordinate horizons, subdivisions and lithological discontinuity.
10. Soil texture: Particle-size distribution, textural classes, textural triangle and significance.

11. Soil structure: Classification, genesis, structural stability and significance.
12. Soil bulk density, particle density and porosity: Factors affecting and significance.
13. Soil colour: Causes, Munsell colour chart, factors affecting soil colour and significance.
14. Soil consistence: Cohesion, adhesion, plasticity, Atterberg's limits and significance.
15. Soil water: Forms of water, units of expression and pF scale.
16. Soil water potential, soil moisture constants and soil moisture availability.

Mid Semester Examination

17. Movement of soil water: Saturated and unsaturated flow, infiltration, hydraulic conductivity, percolation, permeability and drainage.
18. Soil air: Composition, gaseous exchange and its effect on crop growth.
19. Soil heat: Source, flow, soil temperature and its influence on crop growth.
20. Soil reaction (pH): Definition, pH scale, soil acidity, alkalinity, buffering, factors affecting pH and nutrient availability.
21. Soil electrical conductivity (EC): Factors affecting EC and its significance.
22. Soil colloids: Inorganic and organic colloids.
23. Silicate clay minerals: Constitution, classification (1:1, 2:1 expanding and non-expanding, 2:2), amorphous minerals and properties.
24. Sources of charge in soil colloids: Isomorphous substitution and pH-dependent charge
25. Ion exchange: Cation exchange capacity (CEC), anion exchange capacity (AEC) and base saturation.
26. Soil organic matter: Composition, properties and influence on soil properties.
27. Humic substances: Fractionation, nature, properties and theories of humus formation.
28. Soil biology: Macro- and microorganisms, beneficial and harmful effects, soil enzymes.
29. Soil carbon sequestration and carbon trading.
30. Soil pollution: Behaviour of pesticides and inorganic contaminants.
31. Prevention and mitigation of soil pollution.
32. Soil health and integrated soil management for sustainable crop production (Revision and application of soil science concepts).

Practical schedule

1. Study of soil sampling tools, collection of representative soil sample, its processing.
2. Study of soil profile in field.
3. Study of soil forming rocks and minerals.
4. Determination of soil density and porosity.
5. Determination of soil colour and moisture content and porosity.

6. Determination of soil texture by feel and Bouyoucos Methods
7. Determination of soil texture by International pipette method.
8. Studies of capillary rise phenomenon of water in soil column and water movement in soil (Infiltration Rate).
9. Studies of capillary rise phenomenon of water in soil column and water movement in soil (Hydraulic conductivity).
10. Determination of soil temperature and demonstration of heat transfer.
11. Preparation and standardization of laboratory reagents, indicators and buffers
12. Determination of soil pH and electrical conductivity.
13. Determination of cation exchange capacity of soil - I.
14. Determination of cation exchange capacity of soil - II
15. Estimation of soil organic carbon.
16. Study of soil map (India and Tamil Nadu)

Final Practical Examination.

Total Hours: 64

References:

TEXT BOOKS:	
1.	Fundamentals of Soil Science. 2009. ISSS Publication, New Delhi.
2.	Sehgal, J. 2005. Pedology concepts and applications, Kalyani Publishers, New Delhi.
3.	Das, D.K. 2013. Introductory Soil science, Kalyani Publishers, New Delhi.

REFERENCE BOOKS:	
1.	Brady, N.C. and Raymond, C. W. (2013). The Nature and Properties of Soils (15th ed.). Pearson Education. pp. 1 - 1035.
2.	Epstein, E. and Bloom, A.J. (2005). Mineral Nutrition of Plants: Principles and perspectives ed.). Sunderland, MA: Sinauer Associates. pp. 1 - 380.
3.	Jackson, M.L. (2012). Soil chemical analysis: Advanced course. Scientific Publisher.
4.	John, L. H., Beaton J.D, Tisdale S.L and Nelson W.L. (2016). Soil Fertility and Fertilizers - An Introduction to Nutrient Management. (2nd ed.). New Delhi: PHL Learning Pvt. Ltd.pp. 1 - 433.
5.	Tan K.H. (2018). Principles of Soil Chemistry, Special Indian edition (4th ed.). Taylor & Francis.

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1.	http://www.sciencedirect.com/science/books
2.	http://www.pedosphere.com/volume01/pdf/Section._01.pdf
3.	http://wfrec.ifas.ufl.edu/landscape_horticulture/PDFdocuments/SoilProp.pdf
4.	http://www.rootsofpeace.org/assets/Soil%Testinq%Manual%20V6%20(Feb%208).pdf
5.	http://www.soils.wisc.edu/courses/SS325/morphology.htm
6.	http://www.soils.wis.edu/courses/SS325/morphology.htm
7.	http://landresources.montana.edu/
8.	http://ftp.wcc.nrcs.usda.goV/H soil Other/soil-USDA-textural-class.pd

U25AG04B	Fundamentals of Horticulture	(2+1)

COURSE OBJECTIVES:

- To learn the history, evolution, scope, importance, and classification of horticultural crops and their role in nutrition and the economy.
- To acquire knowledge of sexual and asexual methods of plant propagation and their applications in horticultural crop production.
- To Understand propagation structures, micropropagation, orchard establishment, and crop regulation practices in horticultural crops.
- To Explain the physiological processes involved in crop growth, flowering, fruiting, and production management practices.
- To Understand post-harvest management, landscape gardening, and recent advances in sustainable horticultural production.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the history, scope, classification, and economic importance of horticulture and identify different groups of horticultural crops.
CO2 :	Demonstrate knowledge of sexual and vegetative propagation techniques used for horticultural crop multiplication.
CO3 :	Apply principles of orchard establishment, propagation structures, micropropagation, and crop regulation practices
CO4 :	Recommend appropriate production technologies including irrigation, nutrient management, plant growth regulators, and off-season cultivation practices.
CO5 :	Design and develop basic layouts for gardens, parks, and herbal gardens by applying the principles of landscape horticulture.
CO6 :	Apply post-harvest management practices and understand landscape gardening concepts and emerging technologies for sustainable horticultural production.

UNIT I: History, evolution and scope of horticulture	**6 Hrs.**
Origin of horticulture – history – evolution – definitions – scope and importance of horticulture – division and botanical classification of horticultural crops – fruits, vegetables, spices and plantation crops, floriculture, landscaping, ornamental gardening, medicinal and aromatic crops – soil and climate for horticultural crops - nutritive value and global and national scenario of horticultural crops	

UNIT II: Sexual and Asexual propagation	7 Hrs.
Sexual propagation – importance, advantages and disadvantages – methods of enhancement of seed viability – types of dormancy – seed germination – seed treatments - Asexual propagation, importance, advantages and disadvantages - Asexual propagation types viz., Types of cutting, layering, grafting and budding - Use of specialized plant parts in propagation	

UNIT III: Propagation Techniques and Orchard Establishment	7 Hrs.
Propagation structures and their role - Rootstock influence – stock / scion relationship in fruit crops - Scope and importance of micro propagation in horticultural crops - Direct and indirect organogenesis – media for micro propagation and hardening- Principles of orchard establishment - Methods of planting systems including HDP and UHDP in horticultural crops- Crop regulatory practices for horticultural crops – training, pruning, special operations in horticultural crops	

UNIT IV: Growth, Development and Production Management of Horticultural Crops	6 Hrs.
Off season production of horticultural crops - Flowering, pollination, fruit set, fruit drop, parthenocarpy, fruit ripening and senescence – Unfruitfulness and its causes- importance of bio regulators in horticultural crops - irrigation and its methods – PGR, fertilizer and manure application in horticultural crops	

UNIT V: Post-Harvest Management, Garden Design and Emerging Trends in Horticulture	6 Hrs.
Maturity studies, harvesting, grading, packing, packaging and storage - Principles and types of garden – principles and types of parks – principles of herbal garden - Recent advances and emerging trends in horticulture-Sustainable horticulture, precision horticulture and climate-resilient horticultural production.	

Lecture schedule

1. Origin, history, evolution, definition and branches of horticulture.
2. Scope, importance and present status of horticulture in India and the world.
3. Soil and climatic requirements for horticultural crops.
4. Division and botanical classification of horticultural crops.
5. Fruit, vegetable, plantation, spice, medicinal, aromatic, ornamental, floriculture and landscape crops.
6. Nutritive value and global and national scenario of horticultural crops.
7. Sexual propagation: Importance, advantages, disadvantages and seed viability enhancement.

8. Seed dormancy, seed germination and seed treatment methods.
9. Asexual propagation: Importance, advantages, disadvantages and types.
10. Vegetative propagation by cuttings.
11. Vegetative propagation by layering.
12. Vegetative propagation by grafting.
13. Vegetative propagation by budding and specialized plant parts.
14. Propagation structures and their role in horticultural crop production.
15. Rootstocks and stock–scion relationship in fruit crops.
16. Scope and importance of micropropagation in horticultural crops.

Mid Semester Examination

17. Organogenesis, tissue culture media and hardening of plantlets.
18. Principles of orchard establishment and layout.
19. Methods of planting systems, including High Density Planting (HDP) and Ultra High Density Planting (UHDP) .
20. Crop regulation practices: Training, pruning and special horticultural operations.
21. Off-season production of horticultural crops and protected cultivation concepts.
22. Flowering, pollination, fruit set, fruit drop, parthenocarpy, fruit ripening, senescence and unfruitfulness.
23. Plant bio-regulators: Importance and role in horticultural crops.
24. Irrigation methods for horticultural crops.
25. Plant growth regulator (PGR) applications in horticultural crops.
26. Fertilizer and manure application in horticultural crops.
27. Maturity indices and harvesting of horticultural crops.
28. Packing, packaging, storage and post-harvest handling of horticultural produce.
29. Principles and types of gardens and parks
30. Principles, planning and maintenance of herbal gardens.
31. Recent advances and emerging trends in horticulture.
32. Sustainable horticulture, precision horticulture and climate-resilient horticultural production.

Practical schedule

1. Visit to orchard and identifying its components.
2. Identification of garden tools, implements and machineries.
3. Identification of horticultural crops and herbarium making.

4. Preparation of pot mixture, potting and repotting.
5. Preparation of nursery beds for raising rootstocks and seedlings.
6. Practicing asexual methods of propagation- cutting and layering.
7. Practicing asexual methods of propagation – budding and grafting.
8. Plant propagation structures and specialized plant parts for propagation.
9. Layout and planting of fruit trees.
10. Training and pruning of fruit trees.
11. Transplanting and care of vegetable seedlings.
12. Layout of different irrigation system.
13. Practicing irrigation, fertilizer and manures application in different crops.
14. Preparation and application of Plant Growth Regulators.
15. Visit to tissue culture lab.
16. Visit to commercial nurseries / garden.

Final Practical Examination

Total Hours: 64

TEXT BOOKS :	
1.	George Acquaah. "Horticulture – principles and practices". Prentice Hall of India, New Delhi, 2002
2.	Sadhu, M.K. "Plant Propagation". Wiley Eastern, Ansari Road, Daryaganj, New Delhi, 1989.
3.	Bose, T.K., S.K. Mitra, M. K. Sadhu and B. Mitra. "Propagation of Tropical and Subtropical Horticultural Crops". Bidhan Sarani, Calcutta, 1991.
4.	Hartmann, H.T., D.E. Kester, F.T. Davies and R.L. Greneve. "Plant Propagation - Principles and Practices". Prentice Hall of India, New Delhi, 1997.
5.	Nanda, K.K and V.K. Kochhar."Vegetative Propagation of Plants". Kalyani Publishers, Ludhiana, 1995.
6.	Hartman, H.T. and Kester, D.E. "Plant propagation – Principles and Practices". Prentice Hall of India, New Delhi, 1986.
7.	Jules Janick. "Horticultural Science. Surjeet Publications". New Delhi, 1979.
8.	Kumar, N. "Introduction to Horticulture". Oxford IBH Publications, New Delhi, 2014.

REFERENCE BOOKS :	
1.	Bakshi, P. "Fundamentals of Horticulture Crops (2nd Edition)". New India Publishing House, 2020.
2.	Das, B. C., Naik, B., Tarai, R. K. and Sethy, B. K. "Fundamentals of Horticulture". Kalyani publisher, New India, 2020.
3.	Misra, K. K. and Kumar, R. "Fundamentals of Horticulture". Biotech Books, New Delhi, 2020.
4.	Jithendra Singh . "Fundamentals of Horticulture". Kalyani publisher, New India, 2026.

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1.	https://www.agrimoon.com/wp-content/uploads/Fundamentals-of-Horticulture.pdf
2.	https://www.agricolbikaner.org/wp-content/uploads/2020/10/Hort-111-.pdf
3.	https://agritech.tnau.ac.in/horticulture/horti_index.html
4.	https://eternaluniversity.edu.in/docs/FundamentalsofHorticulture.pdf

U25AG05B	Farming Based Livelihood Systems	(2+1)

COURSE OBJECTIVES:

- To understand the concept of agricultural livelihood systems, farming systems, and their contribution to rural development, food security, and the national economy.
- To acquire knowledge of various farming-based livelihood systems, including crop production, livestock, horticulture, agroforestry, aquaculture, and integrated farming models.
- To develop an understanding of farm enterprise development, value chains, market linkages, and opportunities for entrepreneurship in agriculture.
- To gain awareness about the role of government policies, institutional support, digital technologies, and financial services in strengthening farming-based livelihoods and enhancing farmers' resilience.
- To learn the principles of sustainable agriculture, climate-smart farming, and circular economy approaches to improve farm productivity, income, and long-term livelihood security.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Summarize the concepts, components, and significance of agricultural livelihood systems, farming systems, and their adaptation to different agro-climatic regions.
CO2 :	Compare and evaluate different farming-based livelihood systems, including cropping, livestock, horticulture, agroforestry, aquaculture, and integrated farming, for improving farm income and sustainability.
CO3 :	Analyze agricultural enterprises, value chains, market linkages, farmer producer organizations (FPOs), and enterprise integration strategies to promote rural entrepreneurship and income generation.
CO4 :	Assess the role of government schemes, financial institutions, cooperatives, digital technologies, and extension services in supporting farming-based livelihood systems and managing production risks.
CO5 :	Recommend sustainable and climate-resilient farming practices by integrating circular economy principles, resource conservation technologies, and innovative agricultural approaches for future farming systems
CO6 :	Classify and evaluate different farming systems, agri-based enterprises, sustainable farming practices, and farming-based livelihood models through field visits, surveys, and basic economic analysis.

UNIT I: Introduction to Agricultural Livelihood Systems (ALS)	6 Hrs.
Overview of Agriculture in India – Status, role in the economy, and regional variations - Income and Livelihood Patterns – Urban vs. rural livelihood patterns and income sources - Understanding Livelihood Systems – Definition, concepts, and key livelihood indicators - Agricultural Livelihood Systems (ALS) – Meaning, approaches, and framework. Farming Systems & Livelihood Models – Traditional vs. modern farming systems - Agro-Climatic Zones& Farming Suitability – Adaptation to different regions.	

UNIT II: Farming – Based livelihood systems	7 Hrs.
Cropping Systems – Types, importance, and regional variations. Livestock Farming Systems – Dairy, piggery, goatry, and poultry farming - Agroforestry Systems – Types, benefits, and integration with farming - Horticultural Crops & Farming – Fruits, vegetables, and floriculture - Aquaculture-Based Livelihood Systems – Duck/Poultry cum Fish, Dairy cum Fish, Piggery cum Fish - Commercial farming based livelihoods – Large scale enterprises and practices - Challenges in farming based livelihood systems – socio – economic and technological barriers.	

UNIT III: Enterprise development in farming	6 Hrs.
Small, Medium, and Large Farming Enterprises – Classification and importance - Value Chains in Agriculture – Role of processing, storage, and marketing. Secondary Enterprises in Farming – Handicrafts, agro-processing, and byproducts - Market Linkages & Supply Chain Management – Role of cooperatives and FPOs. Factors Affecting Enterprise Integration – Financial, infrastructural, and social factors - Case Studies of Successful Farming Enterprises – Lessons from different regions.	

UNIT IV: Policies, technologies and support systems	6 Hrs.
Government Schemes for Farmers – Central and State-level programs - Public & Private Sector Involvement in Agriculture – Collaboration for rural development - Institutional Support for Farmers – Role of banks, cooperatives, and NGOs. Risk & Success Factors in Farming Enterprises – Managing financial and climatic risks - Technology & Digitalization in Agriculture – Use of AI, IoT, and mobile applications - NABARD & ICAR Farming-Based Models – Key initiatives and success stories	

UNIT V: Future Trends & Sustainable Agriculture	7 Hrs.
Circular Economy in Agriculture – Waste management and resource efficiency - Green Economy & Sustainable Agriculture – Climate-friendly farming practices. Climate Change & Agriculture – Mitigation and adaptation strategies - Changing Lifestyles & Consumer Trends – Impact on farming and food demand - Future of Farming-Based Livelihoods in the 21st Century – Innovation and policy roadmap.	

Lecture schedule

1. Overview of Agriculture in India: Status, role in the economy and regional variations.
2. Income and livelihood patterns: Urban and rural livelihood systems and income sources.
3. Livelihood systems: Definition, concepts and key livelihood indicators.
4. Agricultural Livelihood Systems (ALS): Meaning, approaches and framework.
5. Farming systems: Concepts, classification and components, Traditional and modern farming systems: Features, advantages and limitations.
6. Agro-climatic zones of India and farming suitability.
7. Cropping systems: Types, importance and regional variations.
8. Livestock farming systems: Dairy, goat, sheep, piggery and poultry enterprises.
9. Agroforestry systems: Types, benefits and integration with farming.
10. Horticulture-based livelihood systems: Fruits, vegetables, flowers, spices and plantation crops.
11. Aquaculture-based livelihood systems: Fish farming, integrated fish farming and allied enterprises.
12. Commercial farming-based livelihood systems: Large-scale enterprises and commercial production practices.
13. Challenges in farming-based livelihood systems: Socio-economic, technological and environmental constraints.
14. Small, medium and large farming enterprises: Classification, characteristics and importance.
15. Agricultural value chains: Production, processing, storage and marketing.
16. Secondary enterprises in farming: Agro-processing, handicrafts and value addition.

Mid Semester Examination.

17. Market linkages and supply chain management: Role of cooperatives, FPOs and agribusiness organizations.
18. Factors affecting enterprise integration: Financial, infrastructural, institutional and social factors.
19. Case studies of successful farming enterprises and integrated farming systems.
20. Government schemes for farmers: Central and State programmes for livelihood development.
21. Public and private sector participation in agriculture and rural development.
22. Institutional support for farmers: Role of banks, cooperatives, NABARD, NGOs and extension agencies.
23. Risk management in farming enterprises: Financial, production, market and climatic risks.
24. Technology and digital agriculture: Artificial Intelligence (AI), Internet of Things (IoT), drones and mobile applications.
25. NABARD and ICAR farming-based livelihood models and success stories.

26. Circular economy in agriculture: Waste recycling, by-product utilization and resource efficiency.
27. Green economy and sustainable agriculture: Climate-smart and eco-friendly farming practices.
28. Climate change and agriculture: Impacts, mitigation and adaptation strategies.
29. Changing lifestyles, consumer preferences and market demand for agricultural products.
30. Entrepreneurship opportunities in farming-based livelihood systems.
31. Emerging innovations in farming-based livelihood systems: Precision farming, smart agriculture and agritech startups.
32. Future of farming-based livelihood systems in the 21st century: Challenges, opportunities and policy roadmap.

Practical Schedule

1. Conduct a survey of different farming systems in the locality and document observations.
2. Identify different agro-climatic zones and analyze the suitability of various farming-based livelihood models.
3. Compare crop-based, livestock-based, and integrated farming models based on production efficiency.
4. Calculate the cost, net return, and gross return for different farming systems.
5. Field Visit to an Integrated Farming System.
6. Visit to an Agri-Based Enterprise.
7. Study of Value Chain Models on agricultural commodity, including processing and market linkage.
8. Startup Case Study in Agriculture, its business model, challenges, and success factors.
9. Crop Production Assessment – calculate yield parameters.
10. Analyze a dairy, poultry, or piggery farm and prepare a management report.
11. Visit a food processing unit.
12. Study on organic farming techniques and their impact on soil health and productivity.
13. Develop a business plan for a small-scale agricultural enterprise.
14. Cost-Benefit Analysis of an Agri-Enterprise.
15. Draft a detailed farming-based livelihood project, including objectives, budget, and execution plan.
16. Identify sustainable farming techniques and their role in mitigating climate change.

Final Practical Examination.

Total Hours: 64

TEXT BOOKS :	
1.	Reddy, S. R. "Farming system and sustainable agriculture". Kalyani publishers, New Delhi, 2016.
2.	Zaman and Hedayetullah. "Farming Based Livelihood System". New Delhi Publishers, New Delhi, 2026.
3.	Raju Lal Dhakar, Piyush Saras, Rohit Kumar. "Farming Based Livelihood System". Bhavya Book. New Delhi, 2026.

REFERENCE BOOKS:	
1.	Ashley, C. and Carney, D. "Sustainable Livelihoods: Lessons from Early Experience" Department for International Development: London, UK, 1999.
2.	Dixon, J. and A. Gulliver with D. Gibbon. "Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World". FAO & World Bank, Rome, Italy & Washington, 2001.
3.	FAO. "Global Farming Systems Study: Challenges and Priorities to 2030". Regional Analysis: Sub-Saharan Africa, Consultation Document, Rome, Italy, 2006.
4.	Agarwal, A. and Narain, S. "Towards Green Villages: A strategy for Environmentally, Sound and Participatory Rural Development". Center for Science and Environment, New Delhi, India, 1989.
5.	Jayadeva, H. M. and K. Ramachandrappa. "Integrated farming system". Brillion publishers, New Delhi, 2021.

WEB REFERENCES :	
1.	https://agromind.in/wp-content/bsc-agri/Sem-1-notes/6th-dean/MDC-111%20NOTES%201%20@AgroMind.pdf
2.	https://nirdpr.org.in/nird_docs/rss/Farm-based-Sustainable-Livelihood-Practices-under-MKSP.pdf
3.	https://www.studocu.com/in/document/dr-panjabrao-deshmukh-krishi-vidyapeeth/farming-based-livelihood-system/farming-based-livelihood-systems-241111-114957/116525193?sid=264fa3b9-72bc-4a39-8eef-5543eddf232d1783619990
4.	https://jru.edu.in/studentcorner/lab-manual/agriculture/1st-sem/Farming%20Based%20Livelihood%20Systems%20Practical%20Manual%201st%20Sem.pdf

U25EN04B	Communication Skills	(1+1)

COURSE OBJECTIVES:

- To understand the fundamentals, process, models and types of communication.
- To develop effective listening and speaking skills for professional communication.
- To enhance reading, writing and technical communication skills.
- To improve vocabulary, sentence construction and correct usage of grammar.
- To apply communication skills effectively in academic and professional contexts.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the communication process, models, types and barriers affecting effective communication.
CO2 :	Demonstrate effective listening and speaking skills using the principles of effective communication.
CO3 :	Develop reading, writing, summarizing and resume writing skills for academic and professional purposes.
CO4 :	Apply appropriate vocabulary, sentence structure and correct usage of nouns, pronouns, and modifiers in communication.
CO5 :	Demonstrate proficiency in grammar and construct clear, accurate and effective written and oral communication.
CO6 :	Demonstrate effective communication, presentation, interpersonal and professional skills for academic, extension and agricultural career settings.

UNIT I: Communication process, models and types	**3 Hrs.**
Concept and definitions of communication; types of communication; nature and significance of communication process; elements of communication process - Models of communication – Verbal and non-verbal communication; linguistic and non-linguistic barriers to communication and reasons behind communication gap / miscommunication.	

UNIT II: Magic of effective communication, listening and speaking skills	3 Hrs.
Effective Communication – Meaning, characteristics of effective communication, 7 C's and 4 S's of communication; building self-esteem and overcoming fears – Listening skill: elements, importance and methods for improving speaking skills – Speaking skill: elements, importance and methods for improving speaking skills.	

UNIT III: Reading and Writing Skills	3 Hrs.
Reading and Writing Skills; Precise writing/ Abstracting/Summarizing; Style of technical communication Curriculum vitae/resume writing; Innovative methods to enhance vocabulary, analogy questions.	

UNIT IV: Vocabulary Development, Sentence Structure and Nouns	3 Hrs.
Innovative methods to enhance vocabulary, analogy questions - Sentence Structure: Modifiers, connecting words, verbal, phrases, clauses, effective sentence construction and sentence faults - Correct usage of nouns and pronouns: Subjective, possessive and objective cases; antecedents.	

UNIT V: Grammar, Application and Review of communication skill	4 Hrs.
Adjectives, adverbs and articles; Agreement of verb with the subject: tense, mood, voice; Writing effective sentences; Basic sentence faults.	

Lecture Schedule

1. Communication: Meaning, definitions, types, functions and importance in Agricultural Extension.
2. Communication Process: Meaning, nature, significance, elements and models of communication (Aristotle, Shannon & Weaver, Schramm, Berlo, Leagans, Roger & Shoemaker).
3. Verbal and Non-verbal Communication: Meaning, types, components, importance and communication barriers.
4. Effective Communication, Characteristics, 7 C's and 4 S's; Building self-esteem and overcoming communication fears.
5. Listening Skills: Meaning, hearing vs. listening, types, listening process, barriers and techniques for effective listening.
6. Speaking Skills: Meaning, elements, importance and methods for improving speaking skills.
7. Reading Skills: Meaning, importance, components, techniques, types, reading strategies and readability index.
8. Writing Skills: Meaning, importance, components, writing process and common grammatical errors.

Mid Semester Examination.

9. Technical and Scientific Writing: Style, forms, structure, proofreading, curriculum vitae (CV) and résumé writing.
10. Vocabulary Development: Innovative methods, analogy questions and language enrichment.
11. Sentence Structure: Modifiers, connecting words, verbal, phrases, clauses, effective sentence construction and sentence faults.
12. Correct usage of nouns and pronouns: Subjective, possessive and objective cases; antecedents.
13. Parts of Speech: Adjectives, adverbs, articles and agreement of verbs with the subject.
14. Tense, mood and voice.
15. Application of communication skills in professional and agricultural extension settings.
16. Review of communication skills, grammar and professional communication practices.

Practical Schedule

1. Listening skills and note-taking techniques.
2. Writing skills: Precis writing.
3. Writing skills: Abstract writing.
4. Writing skills: Summarizing technical and general articles.
5. Reading comprehension of general articles (written and oral).
6. Reading comprehension of technical articles (written and oral).
7. Micro-presentations on assigned topics.
8. Impromptu presentations and feedback session.
9. Stage manners: Grooming and professional etiquette.
10. Stage manners: Body language and non-verbal communication.
11. Stage manners: Voice modulation, pronunciation, pace and clarity.
12. Group discussion on current agricultural and social issues.
13. Public speaking exercises.
14. Vocabulary building and language enrichment exercises.
15. Interview techniques: Mock interviews and personal interviews.
16. Planning and organization of academic/professional events.

Final Practical Examination.

Total Hours: 48

TEXT BOOKS :	
1.	Varinder Kumar and Bodh Raj, 2025. "Communication Skills", Kalyani Publisher, ISBN: 978-93-6440-886-8.
2.	Laxmi Lal Somani, 2020. "Textbook of Communication and Soft Skills Development", AGROTEC Publishing Academy. ISBN: 978-81-8321-517-6.

REFERENCE BOOKS :	
1.	Francis Peter, S. J. 2012. "Soft Skills and Professional Communication", Tata McGraw Hill, New Delhi.
2.	Kumar, S. and Pushpalata, 2011. "Communication Skills" Oxford University Press.
3.	Carnegie Dale. 1997. "The Quick and Easy Way to Effective Speaking", Pocket Books, New York.
4.	Pease, Allan. 1998. "Body Language", Sudha Publications, Delhi.
5.	Reddy A. Adivi. 1978. "Extension Education", Sree Lakshmi Press, Bapatla, Andhra Pradesh.

WEB REFERENCES :	
1.	https://rvsagri.ac.in/modules/academics/timetable/AEX%20201.pdf
2.	https://agriculture.institute/funding-monitoring-evaluation-capacity-building/essential-elements-communication-extension-work/
3.	https://nptel.ac.in

U25AG06P	National Service Scheme - I	(0+1)

COURSE OBJECTIVES:

- To develop social consciousness, community service attitude, and civic responsibility among students through constructive and creative social work.
- To develop leadership, communication, teamwork, and organizational skills through participation in democratic and community development programmes.
- To promote volunteerism, national integration, self-reliance, and awareness of social issues while encouraging active participation in rural and community development.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the objectives, organization, and activities of the National Service Scheme (NSS).
CO2 :	Demonstrate leadership, teamwork, communication, and volunteer skills through community service.
CO3 :	Conduct community surveys and participate in planning and implementing social development programmes.
CO4 :	Promote health, hygiene, environmental awareness, social harmony, and national integration.
CO5 :	Demonstrate civic responsibility by applying constitutional values, human rights, and community participation in nation-building.

Practical / Awareness Activities

1. Orientation to NSS: History, objectives, principles, motto, symbol, badge and regular NSS programmes.
2. Organizational structure of NSS, code of conduct for NSS volunteers and volunteer responsibilities.
3. Health awareness, personal hygiene, sanitation and healthy lifestyle practices.
4. NSS programme activities: Regular activities, special camping and day camps.
5. Village/slum adoption, community survey techniques and need assessment.
6. Survey analysis, programme planning, financial patterns of NSS and maintenance of NSS diary.
7. Youth development: Definition, profile, categories, issues, challenges and opportunities.
8. Community mobilization: Stakeholder mapping, communication strategies and youth–adult partnership.

9. Social harmony, national integration and communal harmony programmes.
10. Indian history, culture and the role of youth in nation building.
11. Conflict resolution, peace building, volunteerism and Shramdaan activities.
12. Citizenship: Constitution of India, Fundamental Rights and Fundamental Duties.
13. Human rights, consumer rights and Right to Information (RTI) awareness.
14. Family, community, Panchayati Raj Institutions (PRIs) and Community-Based Organizations (CBOs).
15. Observation and participation in NSS community service activities.
16. Submission of activity report, reflective diary and presentation on NSS experiences.

Total Hours: 32

TEXT BOOKS :	
1.	Government of India, Ministry of Youth Affairs and Sports. (2021). National Service Scheme Manual (Revised ed.). Department of Youth Affairs, Government of India.
2.	Government of India, Ministry of Youth Affairs and Sports. (2020). Handbook for NSS Programme Officers. Department of Youth Affairs, Government of India.
3.	National Service Scheme Cell, Tamil Nadu. (Latest ed.). National Service Scheme: Handbook for NSS Volunteers. Department of Youth Welfare and Sports Development, Government of Tamil Nadu.

REFERENCE BOOKS :	
1.	Basu, D. D. (2022). Introduction to the Constitution of India (26th ed.). LexisNexis.
2.	Khanna, V. N. (2020). India and the Contemporary World. Vikas Publishing House.
3.	Singh, K. (2018). Rural Development: Principles, Policies and Management. Sage Publications.

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1.	https://nss.gov.in/
2.	https://yas.nic.in/
3.	https://swayam.gov.in/
4.	https://ndl.iitkgp.ac.in/

U25AG19P	National Cadet Corps - I	(0+1)

COURSE OBJECTIVES:

• To develop discipline, leadership, courage, character, and a spirit of selfless service among students.
• To provide basic military training in drill, weapon handling, map reading, and field craft.
• To foster patriotism, teamwork, and preparedness for community service and national development through NCC activities.
• To develop discipline, leadership, courage, character, and a spirit of selfless service among students.
• To promote social responsibility, environmental awareness, healthy lifestyle practices, and active participation in community service and nation-building activities.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Develop discipline, drill skills, and knowledge of NCC organization.
CO2 :	Enhance leadership, personality, and sense of national integration.
CO3 :	Apply social service, health, and environmental awareness in community.
CO4 :	Demonstrate appropriate responses during emergencies through the application of civil defense, disaster management, firefighting, and first aid principles.
CO5 :	Participate effectively in community service, environmental conservation, health awareness, and nation-building activities while exhibiting responsible citizenship.

Practical / Awareness Activities

Practical Schedule:

1. Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.
2. Drill – aim, general words of command, attention, stand at ease, stand easy and turning.
3. Sizing, numbering, forming in three ranks, open and close order march, and dressing.
4. Saluting at the halt, getting on parade, dismissing, and falling out.
5. Marching, length of pace, and time of marching in quick/slow time and halt.
6. Side pace, pace forward and to the rear.
7. Turning on the march and wheeling.
8. Saluting on the march.

9. Marking time, forward march, and halt.
10. Changing step, formation of squad and squad drill.
11. Command and control, organization, badges of rank, honors, and awards.
12. Nation Building – cultural heritage, religions, traditions, and customs of India. National integration.
13. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizens.
14. Leadership traits, types of leadership, character/personality development.
15. Civil defense organization, types of emergencies, firefighting, protection, maintenance of essential services, disaster management, aid during development projects.
16. Basics of social service, weaker sections of society and their needs, NGOs 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.

Total Hours: 32

TEXT BOOKS :	
1.	Director General, National Cadet Corps. NCC Handbook (Revised Edition). Ministry of Defence, Government of India, New Delhi.
2.	Director General, National Cadet Corps. Common Subject Training Manual (SD/SW & JD/JW Cadets). Ministry of Defence, Government of India, New Delhi.
3.	Director General, National Cadet Corps. Drill Manual for NCC Cadets. Ministry of Defence, Government of India, New Delhi.

REFERENCE BOOKS :	
1.	Gupta, R. K., "Handbook of NCC Cadets for 'A', 'B' and 'C' Certificate Examinations", Ramesh Publishing House. ISBN: 978-9387918573, 2020.
2.	St. Joseph's College of Engineering and Technology. "Cadet's Handbook (Common Subjects for All Wings)". SJBIT Publication. 2022.

WEB REFERENCES :	
1.	https://indiancc.nic.in
2.	https://mod.gov.in
3.	https://dccp.indiancc.nic.in
4.	https://pib.gov.in
5.	https://indiancc.nic.in

U25AG07P	Biofertilizer and Biopesticide Production	(0+2)

COURSE OBJECTIVES:

- Understand the different types of biofertilizers, their classification, functions, mechanisms, and importance in sustainable agriculture.
- Develop practical skills in the isolation, purification, characterization, screening, and mass production of bacterial, fungal, and algal biofertilizers.
- Learn the methods of quality control, storage, packaging, certification, commercialization, and application of biofertilizers according to BIS/FCO standards.
- Understand the production and application of microbial biocontrol agents, including their isolation, characterization, mass production, formulation, and quality control.
- Understand the role of biofertilizers and biocontrol agents in sustainable agriculture and develop basic knowledge of their commercial production, field application, and entrepreneurship.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the types, characteristics, and importance of biofertilizers and biocontrol agents.
CO2 :	Demonstrate the isolation, purification, characterization, and screening of biofertilizers and biocontrol agents.
CO3 :	Apply techniques for the mass production, formulation, storage, and quality control of bio-inoculants.
CO4 :	Evaluate the quality standards, certification, and application methods of biofertilizers and biocontrol agents.
CO5 :	Apply biofertilizers and biocontrol agents for sustainable agriculture and develop basic entrepreneurial skills in their production and commercialization.

Practical
Establishment of biocontrol production units—infrastructure and operational requirements; mass production and quality control of microbial biocontrol agents; mass production of host insects, predators and parasitoids (Corcyra cephalonica, Trichogramma spp., Chelonus blackburnii, Bracon spp., Goniozus nephantidis, Nesolynx thymus, Cryptolaemus montrouzieri and Chrysoperla carnea);
Biofertilizers: Definition, history, scope, types, production and demand in India - Importance and contribution of biofertilizers in agriculture and allied sectors - Classification and characteristics of

biofertilizers - Nitrogen-fixing biofertilizers: Rhizobium, Azotobacter, Azospirillum, Gluconoacetobacter, Azolla and Blue Green Algae (BGA) - Isolation, purification, characterization, screening and mechanisms of biological nitrogen fixation - Phosphate-solubilizing, potassium-releasing (silicate-solubilizing), sulphur-oxidizing and zinc-solubilizing microorganisms - Mechanisms of nutrient solubilization and mobilization. Arbuscular Mycorrhizal (AM) fungi and their role in plant nutrition - Plant Growth Promoting Rhizobacteria (PGPR), Pink Pigmented Facultative Methylotrophs (PPFM) and their mechanisms of plant growth promotion. Media preparation and carrier materials for biofertilizer production. Laboratory, pilot-scale, and commercial-scale production technologies. Liquid and carrier-based biofertilizers. Preservation of microbial cultures. Advanced production technologies including Tangential Flow Filtration (TFF), lyophilization, and automatic packaging systems. Quality control standards (BIS and Fertilizer Control Order), quality assurance, shelf life, storage, packaging, and labeling of biofertilizers. Organic certification, licensing procedures, and quality control laboratories. Economics of biofertilizer production, cost estimation, financing, credit facilities, preparation of bankable projects, and commercialization of biofertilizers. Concept and importance of biological control in plant disease management - Isolation, purification and characterization of fungal and bacterial antagonists including Trichoderma, Chaetomium, Beauveria, Pseudomonas fluorescens and Bacillus subtilis - Screening methods, mode of action, fermentation systems and formulation technologies - Establishment of biocontrol production units. Mass production and quality control of microbial biocontrol agents - Mass production of host insects, predators and parasitoids including Corcyra cephalonica, Trichogramma spp., Chelonus blackburnii, Bracon spp., Goniozus nephantidis, Nesolynx thymus, Cryptolaemus montrouzieri and Chrysoperla carnea – Mass production of entomopathogenic fungi (Metarhizium anisopliae, Beauveria bassiana and Verticillium lecanii) and NPV of Helicoverpa armigera and Spodoptera litura; processing, formulation, quality standardization and commercialization of microbial biopesticides; application techniques, field evaluation and future prospects of biocontrol agents and biofertilizers in sustainable agriculture.

Practical Schedule

1. Study of equipment, glassware, raw materials and carrier materials used in biofertilizer production.
2. Isolation, purification and characterization of Azotobacter and Azospirillum.
3. Isolation, purification and characterization of Rhizobium and Gluconoacetobacter.
4. Isolation, purification and characterization of Azolla and Blue Green Algae (BGA).
5. Isolation, purification and characterization of phosphate-solubilizing, potassium-releasing (silicate-solubilizing), sulphur-oxidizing and zinc-solubilizing microorganisms.
6. Isolation and characterization of arbuscular mycorrhizal (AM) fungi and assessment of plant infection.
7. Isolation, purification and characterization of Plant Growth Promoting Bacteria (PPFM).
8. Preparation of culture media and carrier materials for mass production of biofertilizers.
9. Mass production of Nitrogen fixing Biofertilizers – Azospirillum, Azotobacter, Rhizobium and Gluconoacetobacter.

10. Mass production of phosphate-solubilizing microorganisms.
11. Mass production of potassium-releasing bacteria.
12. Mass production of PPFM
13. Mass production of AM fungi.
14. Mass production of Azolla and Blue Green Algae.
15. Quality control of biofertilizers: BIS/FCO standards, shelf life, storage and preservation of microbial cultures.
16. Organic certification, quality assurance and quality control laboratories for biofertilizers.

Mid Semester Examination.

17. Application methods, dosage and timing of biofertilizer inoculation for different crops.
18. Exposure to advanced biofertilizer production technologies and visit to biofertilizer-inoculated fields.
19. Evaluation of crop response to biofertilizer application under field conditions.
20. Economics of biofertilizer production, financing, licensing and preparation of a bankable project.
21. Handling of laboratory equipment, sterilization techniques and preparation of media for biocontrol agents.
22. Collection of soil samples and isolation of *Trichoderma, Chaetomium, Beauveria, Pseudomonas fluorescens* and *Bacillus subtilis.*
23. Maintenance of pure cultures and morphological and molecular characterization of antagonistic microorganisms.
24. Identification of laboratory contaminants, assessment of antagonistic efficacy, fermentation systems and formulation techniques.
25. Establishment of Biocontrol Production Units: Infrastructure, Facilities and Requirements
26. Mass Production and Quality Control of Microbial Biocontrol Agents
27. Mass Production of Host Insects and Egg Parasitoids (*Corcyra cephalonica*, *Trichogramma* spp.)
28. Mass Production of Larval Parasitoids and Predators (*Chelonus blackburnii*, *Bracon* spp., *Goniozus nephantidis*, *Nesolynx thymus*, *Cryptolaemus montrouzieri* and *Chrysoperla carnea*)
29. Production Technologies for Entomopathogenic Fungi (*Metarhizium anisopliae*, *Beauveria bassiana* and *Verticillium lecanii*)
30. Mass Production of Nuclear Polyhedrosis Viruses (NPV) of *Helicoverpa armigera* and *Spodoptera litura*
31. Processing, Formulation, Quality Standardization and Commercialization of Microbial Biopesticides
32. Application Techniques, Field Evaluation and Future Prospects of Biocontrol Agents and Biofertilizers in Sustainable Agriculture

Final Practical Examination.

Total Hours: 64

TEXT BOOKS :	
1.	Subba Rao, N.S. (2017). Biofertilizers in Agriculture and Forestry (4th Ed.). Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2.	Maheshwari, D.K. (Ed.) (2011). Bacteria in Agrobiology: Plant Nutrient Management. Springer, Berlin.
3.	Kannaiyan, S. (2002). Biofertilizers for Sustainable Crop Production. Scientific Publishers, Jodhpur.
4.	Somani, L.L. and Totawat, K.L. (Eds.) (2006). Biofertilizers and Bioagents for Sustainable Agriculture. Agrotech Publishing Academy, Udaipur.
5.	Dubey, R.C. (2022). A Textbook of Biotechnology (Latest Edition). S. Chand & Company, New Delhi.

REFERENCE BOOKS :	
1.	Hegde, D.M., Dwivedi, B.S. and Sudhakara Babu, S.N. (Eds.) (2014). Biofertilizers for Sustainable Agriculture. New India Publishing Agency, New Delhi.
2.	Glick, B.R. (2012). Plant Growth-Promoting Bacteria: Mechanisms and Applications. Scientific Publishers.
3.	Lugtenberg, B. (Ed.) (2015). Principles of Plant-Microbe Interactions: Microbes for Sustainable Agriculture. Springer International Publishing.
4.	Harman, G.E. and Kubicek, C.P. (Eds.) (2002). Trichoderma and Gliocladium, Volume 2: Enzymes, Biological Control and Commercial Applications. Taylor & Francis.
5.	Burges, H.D. (Ed.) (1998). Formulation of Microbial Biopesticides: Beneficial Microorganisms, Nematodes and Seed Treatments. Springer.

WEB REFERENCES :	
1.	https://icar.org.in/en/crop-science/biofertilizers
2.	https://www.iari.res.in
3.	https://dwr.org.in/Downloads/Books_and_Other_publications/TrainingManual.pdf

U25AG08P	Mushroom Production Technology	(0+2)

COURSE OBJECTIVES:

- To study the biology, morphology, taxonomy, nutritional importance, and laboratory safety practices related to edible, medicinal, and poisonous mushrooms.
- To acquire knowledge of mushroom ecology, compost preparation, substrate selection, culture media preparation, sterilization techniques, and mushroom production unit design.
- To develop practical skills in pure culture maintenance, spawn production, spawning techniques, and commercial cultivation of button, oyster, and paddy straw mushrooms.
- To gain competency in advanced cultivation techniques including milky mushroom cultivation, casing, environmental management, identification and management of diseases and insect pests affecting mushrooms.
- To know the harvesting, post-harvest handling, value addition, preservation, packaging, economics, project preparation, and entrepreneurship opportunities in mushroom cultivation.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Identify edible, medicinal, and poisonous mushrooms, explain their morphology, life cycle, nutritional significance, and demonstrate safe laboratory practices.
CO2 :	Prepare suitable composts, culture media, and sterile substrates, and design an efficient mushroom production unit based on ecological requirements.
CO3 :	Perform pure culture isolation, spawn production, spawning, and successfully cultivate commercially important mushroom species such as button, oyster, and paddy straw mushrooms.
CO4 :	Apply advanced cultivation techniques including casing, environmental regulation, and implement integrated management practices for mushroom diseases and insect pests..
CO5 :	Demonstrate proficiency in harvesting, grading, preservation, value addition, packaging, economic analysis, project report preparation, and evaluate the feasibility of commercial mushroom enterprises.

Practical

Introduction to Mushroom Cultivation Laboratory and Safety Practices - Identification of Edible Mushroom Species - Identification of Medicinal Mushrooms - Study of Poisonous Mushrooms – Study of Mushroom Morphology and Anatomy - Nutritional and Medicinal Importance of Mushrooms - Study of Mushroom Ecology and Life Cycle - Layout and Design of a Mushroom Production Unit - Composting Materials and Substrate Selection - Preparation of Compost by Long Method – Preparation of Compost by Short Method - Preparation of Culture Media and Sterilization Techniques - Pure Culture Isolation and Maintenance - Spawn Production Techniques - Spawning and Spawn Running - Cultivation of Button Mushroom - Cultivation of Oyster Mushroom - Cultivation of Paddy Straw Mushroom - Cultivation of Milky Mushroom - Casing Materials and Preparation of Casing Mixture Casing – Application Techniques and Crop Management - Environmental Regulation during Mushroom Cultivation - Identification of Mushroom Diseases - Identification and Management of Insect Pests. Harvesting Techniques and Grading of Mushrooms - Post-harvest Handling and Packaging – Mushroom Preservation Techniques - Preparation of Mushroom Pickle - Preparation of Mushroom Powder and Dehydrated Products - Economics of Mushroom Cultivation and Cost Analysis - Preparation of a Mushroom Enterprise Project Report -Visit to a Commercial Mushroom Production Unit, Submission of Field Report.

Lecture Schedule

1. Introduction to Mushroom Cultivation Laboratory and Safety Practices.
2. Identification of Edible Mushroom Species
3. Identification of Medicinal Mushrooms.
4. Study of Poisonous Mushrooms.
5. Study of Mushroom Morphology and Anatomy.
6. Nutritional and Medicinal Importance of Mushrooms.
7. Study of Mushroom Ecology and Life Cycle.
8. Layout and Design of a Mushroom Production Unit.
9. Composting Materials and Substrate Selection.
10. Preparation of Compost by Long Method.
11. Preparation of Compost by Short Method.
12. Preparation of Culture Media and Sterilization Techniques.
13. Pure Culture Isolation and Maintenance.
14. Spawn Production Techniques.
15. Spawning and Spawn Running.
16. Cultivation of Button Mushroom

Mid-Semester Practical Examination.

17. Cultivation of Oyster Mushroom.
18. Cultivation of Paddy Straw Mushroom.
19. Cultivation of Milky Mushroom.
20. Casing Materials and Preparation of Casing Mixture.
21. Casing Application Techniques and Crop Management.
22. Environmental Regulation during Mushroom Cultivation.
23. Identification of Mushroom Diseases.
24. Identification and Management of Insect Pests.
25. Harvesting Techniques and Grading of Mushrooms
26. Post-harvest Handling and Packaging.
27. Mushroom Preservation Techniques.
28. Preparation of Mushroom Pickle
29. Preparation of Mushroom Powder and Dehydrated Products
30. Economics of Mushroom Cultivation and Cost Analysis
31. Preparation of a Mushroom Enterprise Project Report
32. Visit to a Commercial Mushroom Production Unit. Submission of Field Report.

Final Practical Examination.

Total Hours: 64

TEXT BOOKS :	
1.	Tewari P Kapoor S C, "Mushrooms: Cultivation, Marketing and Consumption", Directorate of Extension, Punjab Agricultural University, Ludhiana, 1988.
2.	Pathak Y, Yadav N and Gaur M, "Handbook of Mushrooms", Oxford Book Company,New Delhi, 2010.
3.	Nita Bahl, "Mushroom Cultivation", Wiley Eastern Ltd, New Delhi, 1984.
4.	Singh R P, Chaube H S and Singh U S,"Mushroom Cultivation: India's Wealth",National Research Centre for Mushroom ICAR, New Delhi, Latest edition.

REFERENCE BOOKS :	
1.	Chang S T and Hayes WA,"The Biology and Cultivation of Edible Mushrooms", Academic Press, New York , 1978.
2.	Stamets P, "Growing Gourmet and Medicinal Mushrooms", Ten Speed Press, Berkeley, USA, 2000.

3.	Chang S T and Miles P G, "Mushrooms: Cultivation, Nutritional Value, Medicinal Effect, and Environmental Impact" (2nd Edition), CRC Press, 2004.
4.	"Mushroom Growers Handbook 1: Oyster Mushroom Cultivation", MushWorld, Korea.
5.	Vijay B, Sharma S R and Suman B C," Mushroom Production and Processing Technology" ICAR-Directorate of Mushroom Research, Solan.
6.	"Manual on Mushroom Cultivation", ICAR-Directorate of Mushroom Research, Solan.
7.	Sharma V P, "Handbook of Mushrooms and Their Cultivation", Scientific Publishers, Jodhpur.

WEB REFERENCES :	
1.	https://dmr.icar.gov.in
2.	https://ekrishishiksha.icar.gov.in
3.	https://kvk.icar.gov.in
4.	https://krishikosh.egranth.ac.in/

U25VA11P	Introductory Mathematics	(0+1)

COURSE OBJECTIVES:

- To develop logical and mathematical reasoning skills.
- To understand the basic concepts of coordinate geometry, calculus, and matrices.
- To apply mathematical techniques to solve simple problems.
- To enhance analytical and computational skills through mathematical methods.
- To use mathematics to solve real-life and agricultural problems.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the concepts of straight lines and solve problems involving distance, section formula, and equations of lines.
CO2 :	Apply differentiation techniques to solve problems involving algebraic, exponential, logarithmic, and trigonometric functions.
CO3 :	Demonstrate the concepts of partial differentiation and apply Euler's theorem to homogeneous functions.
CO4 :	Apply integration techniques to solve simple mathematical problems involving standard functions.
CO5 :	Perform matrix operations and evaluate determinants to solve basic mathematical problems relevant to agriculture and allied sciences.

Practical

Distance formula, section formula – Equation of co- ordinate axes, Equation of lines parallel to axes - Problems on distance between the lines. General form of equation of line, Point of intersection of two st. lines- Angles between two st. lines, Parallel lines, Perpendicular lines - Simple problems - Differentiation of xn, ex, sin x & cos x - Derivatives of sum, difference, product and quotient of two functions, Differentiation of functions of functions - Logarithmic Differentiation Simple problems - Partial differentiation, homogeneous functions - Examples and problems on partial differentiation- Euler 's theorem and its Applications - Simple problems - Integration of simple functions - Integration of Product of two functions, Integration by substitution method - Simple problems - Definition of Matrices, Addition, Subtraction and Determinants of Matrices - Multiplication, Transpose of matrices - Properties of determinants up to 3rd order and their Evaluation - Simple problems.

Practical Schedule

1. Problems on distance formula and section formula.
2. Problems on equations of coordinate axes, parallel and perpendicular lines.
3. Problems on the general equation of a straight line, point of intersection, and angles between two lines.
4. Problems on differentiation of algebraic, exponential, and trigonometric functions.
5. Problems on differentiation using sum, product, quotient, and chain rules.
6. Problems on logarithmic differentiation.
7. Problems on partial differentiation of functions of two variables.
8. Problems on Euler's theorem and its applications.

   Mid-semester Examination.
9. Problems on integration of simple functions.
10. Problems on integration by substitution method.
11. Problems on integration by parts (product of two functions).
12. Matrix operations: addition, subtraction, multiplication, and transpose.
13. Evaluation of determinants up to the third order.
14. Applications of matrices
15. Determinants in solving simple problems.
16. Comprehensive problem-solving exercises covering all five units.

    Final Practical Examination.

Total Hours: 32

TEXT BOOKS :	
1.	Narayanan, S. and Manickavachagom Pillay, T.K. (1995). Calculus (Volumes I & II). S. Viswanathan Publishers, Chennai.
2.	Pillay, T.K. Manickavachagom, et al. (2004). Analytical Geometry (Two and Three Dimensions). S. Viswanathan Printers & Publishers Pvt. Ltd., Chennai.
3.	Vittal, P.R. (2000). Mathematical Foundations. Margham Publications, Chennai.

REFERENCE BOOKS :	
1.	Sharma, A.K. (2004). Text Book of Matrix. Discovery Publishing House, New Delhi.
2.	Batte, Michael. Essential Engineering Mathematics. Ventus Publishing ApS (e-book).
3.	Grewal, B.S. (Latest Edition). Higher Engineering Mathematics. Khanna Publishers, New Delhi.

U25AG09P	Deeksharambh (Induction cum Foundation course)	(0+2)

COURSE OBJECTIVES:

• To give a broad view and application areas of the subject of study
• Helping students from different backgrounds for cultural Integration
• Knowing about the operational framework of the academic process in the university
• Instilling life and social skills, leadership qualities, team working spirit
• Developing social awareness, ethics and values, creativity
• Helping students to identify the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the academic framework, regulations, and student support systems of the university.
CO2 :	Describe the scope, applications, and career opportunities of their chosen discipline.
CO3 :	Demonstrate effective communication, teamwork, leadership, and interpersonal skills.
CO4 :	Appreciate Indian culture, ethics, traditional knowledge, and social responsibilities.
CO5 :	Apply experiential learning gained through field visits and community engagement to personal and professional development.

Activities

The details of activities/ schedules will be decided by the parent universities. The structure shall include, but not restricted to:

i. Discussions on operational framework of academic process in university, as well as interactions with academic and research managers of the University

ii. Creating awareness on the subject of study, and the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario

iii. Interaction with alumni, business leaders, perspective employers, outstanding achievers in related fields, and people with inspiring life experiences

iv. 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

v. Field visits to related fields/ establishments

REFERENCES:	
1.	University Grants Commission (UGC). (2019). Deeksharambh: A Guide to Student Induction Programme (SIP). New Delhi: University Grants Commission. This is the primary guideline for planning and implementing induction programmes in Higher Education Institutions.
2.	Ministry of Education, Government of India. (2020). National Education Policy (NEP) 2020. New Delhi: Government of India. The policy emphasizes holistic, multidisciplinary education, student well-being, value-based education, and induction programmes.
3.	University Grants Commission (UGC). (2021). Quality Mandate for Higher Education Institutions. New Delhi: University Grants Commission. The document includes Student Induction Programme as one of the quality initiatives for higher education institutions.