Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Practical Crop Production-I (Kharif Crop)
Course Code	AGRON-312 [P]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Agronomy			**Co-Requisite/s**	Agronomy			
Course Outcomes & Bloom's Level	**CO1-** Describe the basic concepts and principles of crop production, management and protection **(BL1-Remember)** **CO2-** Illustrate the conventional practices and novel technological advances in the field of crop production, seed production and crop protection **(BL2-Understand)** **CO3-** Utilize the conventional and novel technologies in field to achieve high economic return in sustainable manner **(BL3-Apply)** **CO4-** Analyse the impact of various intercultural operation, technological intervention on yield and quality in different kharif crops **(BL4-Analyze)** **CO5-** Assess the sustainability of various crop production technologies for commercial crop production and quality seed production with better cost benefit ratio **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	To study about the field preparation, seed rate and sowing	Field work	BL2-Understand	4
Practical 2	To calculate fertilizer requirement for different kharif crops	Field work	BL2-Understand	4
Practical 3	To study about the time and methods of fertilizer application in kharif Crops	Field work	BL2-Understand	4
Practical 4	To study about the water management in different kharif crops	Field work	BL2-Understand	4
Practical 5	To study about the Weed management in kharif crops	Field work	BL3-Apply	4
Practical 6	To study about the methods of weed control and calculate the weed control efficiency for different kharif crops	Field work	BL3-Apply	4
Practical 7	To study about the Harvesting threshing and storage	Field work	BL4-Analyze	4
Practical 8	Preparation of Balance Sheet Including Cost of Cultivation, Net Returns per Student as well as per Team of a Group of Students	Field work	BL5-Evaluate	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Taunk , S.K., Choudhary, J.L. and Tomar, G.S. (2011). Science of Crop Production Vol 1: Kharif Crops. Kushal Publications and Distributors.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	2	3	-	3	-	-	-	-	-	3	-	-
CO2	-	2	2	2	3	2	3	-	-	-	-	-	1	2	-
CO3	-	-	2	2	3	2	3	-	-	-	-	-	-	2	1
CO4	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO5	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Commercial Plant Breeding
Course Code	ELCT-GPB-311[T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					1	0	2	3
Course Type	Embedded theory and lab							
Course Category	Discipline Electives							
Pre-Requisite/s	Genetics and Plant Breeding			**Co-Requisite/s**	Genetics and Plant Breeding			
Course Outcomes & Bloom's Level	**CO1-** Describe the breeding techniques for commercial production of seed **(BL1-Remember)** **CO2-** Classify the seed production systems through the breeding techniques **(BL2-Understand)** **CO3-** Demonstrate various methods of Commercial breeding techniques at field and laboratory levels **(BL3-Apply)** **CO4-** Analyse various techniques and the effectiveness of breeding techniques utilized at commercial level. **(BL4-Analyze)** **CO5-** Assess the quality of the seed and Judge the performance of high yielding and resistance varieties of different crops **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG10(Reduced inequalities) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production.	Class room Lectures/ Guest lectures, Laboratory/ Field and lab Practicals, Student Seminars/ Presentations, ABL activities, Lab and field Tours/ Demonstrations, Assignments.	3
Unit 2	Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc.	Class room Lectures/ Guest lectures, Laboratory/ Field and lab Practicals, Student Seminars/ Presentations, ABL activities, Lab and field Tours/ Demonstrations, Assignments.	3
Unit 3	Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools.	Class room Lectures/ Guest lectures, Laboratory/ Field and lab Practicals, Student Seminars/ Presentations, ABL activities, Lab and field Tours/ Demonstrations, Assignments.	3
Unit 4	IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India.	Class room Lectures/ Guest lectures, Laboratory/ Field and lab Practicals, Student Seminars/ Presentations, ABL activities, Lab and field Tours/ Demonstrations, Assignments.	3
Unit 5	Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.	Class room Lectures/ Guest lectures, Laboratory/ Field and lab Practicals, Student Seminars/ Presentations, ABL activities, Lab and field Tours/ Demonstrations, Assignments.	3

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production	Experiments	BL2-Understand	2
Practical 2	Floral biology of self and cross pollinated species, selfing and crossing techniques.	Field work	BL2-Understand	2
Practical 3	Techniques of seed production in self and cross pollinated crops using A/B/R and two line system.	Field work	BL3-Apply	2
Practical 4	Role of pollinators in hybrid seed production	Field work	BL3-Apply	2
Practical 5	Learning techniques in hybrid seed production using male-sterility in field crops.	Field work	BL3-Apply	2
Practical 6	Concept of line its multiplication and purification in hybrid seed production	Field work	BL3-Apply	2
Practical 7	Concept of rouging in seed production plot	Field work	BL3-Apply	2
Practical 8	Sampling and analytical procedures for purity testing and detection of spurious seed.	Field work	BL3-Apply	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

Part E

Books	garwal, R.L. (2015). Seed Technology. Oxford and IBH Publication Co., New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	2	2	-	-	-	-	-	-	-	3	1	-
CO2	-	3	2	1	3	-	1	-	-	-	-	1	1	3	-
CO3	3	-	1	2	1	-	-	1	-	-	1	2	-	-	2
CO4	-	3	-	1	-	-	1	-	-	-	1	1	-	1	-
CO5	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Agribusiness and Industrial Management
Course Code	ELP- ABM-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Ag. Economics			**Co-Requisite/s**	Ag. Extension			
Course Outcomes & Bloom's Level	**CO1-** Students will acquire knowledge about various aspects of agribusiness and also understand the structure and working of an enterprise. **(BL1-Remember)** **CO2-** Utilize the knowledge in the fields of project management and entrepreneurship development.**(BL2-Understand)** **CO3-** Analyze the challenges and problem of agroindustry, examining the quality of product of agroindustry and their role in agriculture.**(BL3-Apply)** **CO4-** Evaluate various policies, strategies and decisions relating to marketing that are developed by agribusiness firms.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Structure of Agribusiness- Linkages among sub-sectors of the Agribusiness sector; economic reforms and Indian agriculture; impact of liberalization, privatization and globalization on Agri business sector Emerging trends in production, processing, marketing and exports; policy controls and regulations relating to the industrial sector with specific reference to agro-industries.	Field work	BL2-Understand	20
Module 2	Role of Agribusiness in economy- Role of agriculture in Indian economy; problems and policy changes relating to farm supplies, farm production, agro processing, Evaluation process. agricultural marketing, agricultural finance etc. in the country.	Field work	BL2-Understand	20
Module 3	Financial Management- Introduction to Financial Management, Its meaning and functions, Interface of financial management with other functional areas of a business. Financial Statements and Analysis, Capital Structure, Working Capital Management, Financial planning and Forecasting.	Field work	BL3-Apply	20
Module 4	Quality Management in Agribusiness- Basic concepts of quality management, importance of quality and the role of quality assurance in agribusiness. TQM and business strategy. Quality control process and its relevance. Quality grades and standards	Field work	BL3-Apply	20
Module 5	Agriculture supply chain management- Managing Retail Operations, Managing Retailers' Finances, Merchandise buying and handling, Merchandise Pricing, Logistics, procurement of Food products and Handling Transportation of Food Products.	Field work	BL3-Apply	20
Module 6	Project management and entrepreneurship development- Types of Project, Project lifecycle; Project feasibility; network method; Significance of entrepreneurship in economic development, developing effective business plan, Procedural steps in setting up of an industry.	Field work	BL3-Apply	20
Module 7	Production and operation management-Nature and Scope; Productivity variables and measurement; Product design and development; Quality assurance	Field work	BL4-Analyze	20
Module 8	Agribusiness policy in India- concept and formulation; and new dimensions in Agri business environment and policy; Agricultural price and marketing policies; public distribution system and other policies.	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Barnard, F.L. (2016). Agribusiness Management. Routledge Publisher United Kingdom. Diwase, S. (2017). Indian Agriculture and Agribusiness Management. KRISHI Resource Management Network, New Delhi. Nuthall, P.L. (2011). Farm Business Management: Analysis of farming system. CABI. Khan, M.Y. & Jain, P.K. (2004). Financial Management: Text, Problems and Cases. Tata McGraw Hill.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	-	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	1	-	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	1	-	1	-	1	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Industrial Training On Product Development And Marketing
Course Code	ELP- ABM-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Ag. Economics			**Co-Requisite/s**	Ag. Extension			
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training in the Industrial production and marketing.**(BL1-Remember)** **CO2-** Evaluation of various Industrial products, marketing channel and cost of production.**(BL2-Understand)** **CO3-** Analyze the challenges in cost of production and marketing.**(BL3-Apply)** **CO4-** Evaluate the role of industries and investors.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Basic of industrial marketing Reason for understanding the concept of industrial marketing—Attributes of Marketing Strategy—Concept of Industrial Marketing—Definition of Industrial Marketing—Types of Product —Industrial Product—Industrial Process Exchange—Types of Industrial Customers—Commercial Enterprises—Industrial Distributors and Dealers—Original Equipment Manufacturers (OEMs)—Government Customers—Institutions—Cooperative Societies	Experiments	BL2-Understand	20
Module 2	Understanding industrial markets Industrial versus Consumer Markets—Market Structure —Marketing Perspective — Customer Behaviour—Industrial Marketing landscape—Industrial Development in India— Current trends in Indian Industrial market—Elements of Industrial Development Strategy	Experiments	BL2-Understand	20
Module 3	Economic issues in industrial marketing Derived demand —value chain of derived demand—ripple effect of derived demand— derived demand marketing—fluctuating demand—joint demand —stimulating demand—cross-elasticity of demand—effect of cross elasticity of demand on market—pricing policy—inelastic demand—purchasing / buying orientation—purchasing orientation— buying orientation—procurement orientation—supply management orientation —types of purchasing process	Experiments	BL2-Understand	20
Module 4	Industrial buying behavior: Organizational Buying —Features of Organizational Buying—Types of buying Situation— Straight Rebuy—Modified Rebuy—New task—System buy —Buying Center Concept— The Buying Decision Process—Buying Mode—The Sheth Model—The Webster and Wind Mode—Vendor Analysis —Vendor Performance Rating	Field work	BL3-Apply	20
Module 5	Industrial marketing research: Definition—Uses of Industrial Marketing Research —Studying the business trends —New Product Studies—Sales quota determination and DD forecasting—Market potential and market share analysis—Differences in Industrial and Consumer Marketing Research— Industrial Marketing Research Process— The Sampling Plan—Sampling methods — Probability Sampling Methods—Non-probability Sampling Methods	Field work	BL3-Apply	20
Module 6	Product development strategy: Developing product strategy—Product Policy —New Product Development— Define product—Identify market needs—Identify key issues and approaches—Idea Generation —Idea Screening —Concept development & testing—Business Analysis —Product Development—Marketing Testing— Commercialization —Industrial Product Life Cycle — The Introductory Stage—Growth—The Maturity Stage—The Decline Stage—Product Evaluation —Perceptual Mapping	Field work	BL3-Apply	20
Module 7	Pricing in industrial marketing: Pricing Environment —Characteristics of Price—The Pricing Process in Industrial Marketing—Factors affecting industrial pricing decision —Pricing Objectives—Market Skimming —Market Penetration—Product Differentiation —Other pricing objectives — Demand Conditions —Cost Condition — Pricing Policies —Competitive Analysis — Government Regulations —Pricing Strategy —Introductory Stage — Market Skimming Strategy:—Market Penetration Strategy:—Pricing Strategy at Growth stage —Pricing Strategy at Maturity stage—Pricing Strategy at Decline Stage	Field work	BL3-Apply	20
Module 8	Industrial distribution channel: Marketing channels physical distribution—factors affecting the nature of industrial channels—geographic distribution —channel size—characteristics of intermediaries— mixed system—structure of industrial channel—direct channel—indirect channel—types of industrial middlemen/intermediaries—industrial distributors (dealers)—three main/major categories of industrial distributor: —manufacturers' representatives – brokers—value- added reseller—the channel design process—controlling channel conflicts	Field work	BL3-Apply	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Cherunilam, F. (2015). Industrial Marketing Text & Cases. Himalaya Publishing House. Reeder, (1997). Industrial Marketing: Analysis, Planning and Control. Prentice Hall. Mukerjee, H.S. (2008). Industrial Marketing. Excel Books. Ghosh, P. K. (2005). Industrial Marketing. Oxford University Press.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-
CO3	-	3	2	1	-	-	1	1	1	-	1	1	-	-	2
CO4	-	2	3	1	-	-	-	1	-	-	1	1	-	1	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Agricultural Heritage and Agritourism
Course Code	ELP- ABM-403 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Describe the importance Indian agricultural heritage system**(BL1-Remember)** **CO2-** Explain the importance of agritourism**(BL2-Understand)** **CO3-** Demonstrate various ITKs in the field**(BL3-Apply)** **CO4-** Analyse the challenges while initiating agritourism and possible practical solutions**(BL4-Analyze)** **CO5-** Evaluate the role of heritage systems in developing business**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Globally Important Agricultural Heritage Systems	PBL	BL2-Understand	20
Module 2	Past day agriculture and farmers in society: Indus period, Vedic period and early historic/ Buddhist period	PBL	BL2-Understand	20
Module 3	Crops and its importance and Crop Voyage in India and World	PBL	BL3-Apply	20
Module 4	Plant production and protection through Indigenous Technical Knowledge (ITK)	PBL	BL3-Apply	20
Module 5	Scope of Agricultural heritage in Agritourism	PBL	BL3-Apply	20
Module 6	Visit to ICAR Institute	PBL	BL4-Analyze	20
Module 7	Visit to State Agricultural University	PBL	BL4-Analyze	20
Module 8	Visit to Centre for Agribusiness incubation and entrepreneurship	PBL	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	1. V. Radha Krishna Murthy and M. Sree Rekha, 2019. Agriculture Heritage. B S Publications 2. S. R. Reddy, 2018. Agriculture Heritage. Kalyani Publishers. 3. Y. L. Nene, 2009. Glimpses of the Agricultural Heritage of India. Munshiram Manoharial Publishers 4. Jack Randall, 2012. Agriculture Tourism. Discovery Publishing Pvt. Ltd.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
CO3	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Agricultural waste management
Course Code	ELP- AGRON-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Introduction with agricultural wastes and their utilization.**(BL1-Remember)** **CO2-** Explain different waste management methods, incorporation of crop residues, composting and Biochar**(BL2-Understand)** **CO3-** Analyze and discuss sustainable development and agriculture**(BL3-Apply)** **CO4-** Investigate the benefits of waste management in farms.**(BL4-Analyze)** **CO5-** Evaluate the performance of Biogas plant**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG13(Climate action)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Incorporation of Crop Residues into Soil for Nutrient Cycling and Soil Amendment: Incorporation of different plant residues, Testing of soil after crop residue incorporation	Experiments	BL2-Understand	20
Module 2	Livestock and poultry waste management: Manure handling and storage, Solid manure, Field storage manure	Experiments	BL2-Understand	20
Module 3	Vegetable waste management: Composting of different vegetables, Land spreading & Burial process of vegetables	Experiments	BL3-Apply	20
Module 4	Biodegradable Packaging Material (BDPM) as Planting Medium: plant derived biodegradable packaging EFB, tapioca starch and sugar cane bagasse.	Experiments	BL3-Apply	20
Module 5	Conversion of Agriculture Waste into Bio char: Preparation of biochar at different temperature, preparation of biochar from different crops, Testing of Physical chemical and biological properties of Biochar	Experiments	BL3-Apply	20
Module 6	Biochemical conversion Technology-Biogas (BCCT): Biogas technology, Biogas plant types, Microbiology of biogas production, Size and selection of biogas Plant, Biogas Plant –material and method of construction	Experiments	BL4-Analyze	20
Module 7	Odour management in Barns and storage area: Causes of odour, BMPs for Odour Control in Livestock Facilities, BMPs for Odour Control in Manure Storage	Experiments	BL4-Analyze	20
Module 8	Feedlot management: site selection, Liquid system, Soild System, BMPs for runoff control	Experiments	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	0		100	

Part E

Books	Chakrabarthi, S.K. (2010). Seed Production and Quality Control. Kalyani Publisher, New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-	3	1	-
CO3	-	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO4	-	3	-	3	1	-	-	-	-	-	-	-	2	-	3
CO5	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Commercial Beekeeping
Course Code	ELP- ENT-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Entomology			**Co-Requisite/s**	Entomology			
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training in the fields of Beekeeping, Pollination and quality Honey production.**(BL1-Remember)** **CO2-** Evaluation of various Beekeeping tools and develop management strategy**(BL2-Understand)** **CO3-** Analyze the challenges of commercial Beekeeping**(BL3-Apply)** **CO4-** Evaluate the role of quality Honey and their effect on farming society**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG2(Zero hunger) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	THE HONEYBEE AND ITS IMPORTANCE (a) Bee Biology and Behaviour (b) The Importance of Beekeeping. (c) Pollination	Field work	BL2-Understand	54
Module 2	MANAGEMENT OF THE HONEYBEE (a) Beekeeping Systems (b) Beekeeping Equipment (c) Making Beekeeping Equipment (d) Apiary Management (e) The Floral Calendar and Beekeeping (f) Bee Stings and Management (g) Hive Inspection (h) Populating the Hive (i) Catching a Swarm (j) Transferring Bees (h) Dividing and Uniting Colonies (i) Feeding of Bees (j) Bee Pests, Predators and Diseases (k) Making Bio-Pesticides	Field work	BL3-Apply	54
Module 3	HIVE PRODUCTS AND PROCESSING: (a) Hive Products (b) Quality Honey Harvesting (c) Processing Honey (d) Bees wax	Field work	BL4-Analyze	54

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40			100	

Part E

Books	Sammataro, D. and Alphonse. (1978). The Beekeeper's Handbook. Oxford & IBH Publishing Company Pvt Ltd., New Delhi. Abrol, D.P. (2010). Beekeeping: a compressive guide to bees and beekeeping. Scientific Publisher, Jodhpur, Rajasthan.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	3	1	1	3	3	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	1	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Seed Production Technology
Course Code	ELP- GPB-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Genetics and Plant Breeding			**Co-Requisite/s**	Genetics and Plant Breeding			
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training in the fields of crop improvement, plant breeding, and quality seed production.**(BL1-Remember)** **CO2-** Evaluation of various seed diversity on the basis of seed morphology, Biochemical nature and reproductive behavior.**(BL2-Understand)** **CO3-** Analyze the challenges of commercial Seed production **(BL3-Apply)** **CO4-** Evaluate the role of quality seed and their effect on farming society**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG2(Zero hunger)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Selection of seed production area /land: (a) Previous & current year agro-metrological data, (b) soil type, soil sampling & soil profiling. Texture, Nutrition availability, Water holding capacity, Available organic carbon, Selection of crop.	Experiments	BL2-Understand	20
Module 2	Layout preparation /Cultural practices: Net area & gross area calculation, Design of experimentation, isolation distance, field preparation, seed sowing, and calculation of required seeds (seed rate)	Experiments	BL2-Understand	20
Module 3	Agronomical practices: Fertilizer application, irrigation, rouging, weeding, etc.	Field work	BL2-Understand	20
Module 4	Insect, pest & disease management: Identification of disease, diagnosis & procurement & management	Field work	BL4-Analyze	20
Module 5	Crop management: Identification of critical stages for field inspection, 50 % flowering, removal of Off type, plant data observation	Field work	BL3-Apply	20
Module 6	Crop maturity of observation: Observation of characteristics related to plant maturity (leaf characteristics, grain characteristics, BITE test, and laboratory based test).	Field work	BL3-Apply	20
Module 7	Harvesting & threshing: Harvesting techniques, Threshing tech. & equipments/ machines, Seed drying techniques.	Field work	BL3-Apply	20
Module 8	Bagging, packing & storage: Seed treatment (fungal, bacterial, coating & planting) Specific baggage for packaging & prescribed tags (as per seed act 1966) Storage & storage facilities (Gene Bank)	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Agarwal, R.L. (2012). Seed Technology. Oxford & IBH Publishing Company Pvt. Ltd., New Delhi. Chakrabarthi, S.K. (2010). Seed Production and Quality Control. Kalyani Publisher, New Delhi. Mishra, D.K., Khare, D., Bhale, M.S. and Koutu, G.K. (2011). A Handbook of Seed Certification. Agrobios (India).
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Processing of fruits and vegetables for value addition
Course Code	ELP- HORT-403 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training on processed fruits and vegetables product quality.**(BL1-Remember)** **CO2-** Evaluation and maintenance of the processed product quality.**(BL2-Understand)** **CO3-** Analyze the stored products for **(BL3-Apply)** **CO4-** Evaluate the role of food processer for food safety parameters **(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

<4d style="border: 1px solid black;">Experiments

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Studyextractionandpreservationofpulpsandjuices:	Experiments	BL2-Understand	20
Module 2	Preparationofosmoticallydriedproducts,fruitbarandcandy	Experiments	BL2-Understand	20
Module 3	Preparationofjamand jelly	Experiments	BL3-Apply	20
Module 4	Preparationofjamand jelly and Pickles, Chutneys and Fermented Products	Experiments	BL3-Apply	20
Module 5	PreparationofRTS,nectarandsquashfromdifferentkindoffruits.	Experiments	BL3-Apply	20
Module 6	Physico-chemical and sensory quality evaluation of products	Experiments	BL3-Apply	20
Module 7	Planning and execution of a market survey and preparation of processing schedule and formulation of project module based on market information	Experiments	BL3-Apply	20
Module 8	Identification of sources for procurement of raw material, production and quality analysis of fruits and vegetables products at commercial scale.	BL3-Apply	20	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Rathore, N.S., Mathur, G.K., Chasta, S.S. (2012). Post-Harvest Management and Processing of Fruits and Vegetables. The Energy and Resources Institute.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	1	1	-	-	-	-	-	-	3	-	-	-
CO2	-	2	3	2	2	1	-	-	-	-	-	-	-	3	-
CO3	3	-	2	2	2	2	-	-	-	-	-	-	-	1	2
CO4	-	1	-	1	-	-	-	-	-	-	1	1	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Protected Cultivation of High value Horticulture Crops
Course Code	ELP- HORT-405 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Horticulture			**Co-Requisite/s**	Horticulture			
Course Outcomes & Bloom's Level	**CO1-** Students prepare field and make proper use of various techniques in them for crop production**(BL1-Remember)** **CO2-** To boost crop production under various adverse conditions. To observe intercultural operations and new technology. **(BL2-Understand)** **CO3-** Analyze the complete cost of cultivation.**(BL3-Apply)** **CO4-** Evaluate the role of protected cultivation, mulching and vertical farming system.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Project preparation for establishment of various protected structures (Poly house and net house)	Experiments	BL2-Understand	20
Module 2	Practices in preparatory operations, different types of growing media, soil decontamination techniques in polyhouse	Field work	BL2-Understand	20
Module 3	Preparation of beds under the polyhouse for cultivation of cucumber and tomato	Field work	BL2-Understand	20
Module 4	Hands on training on various intercultural operation under the polyhouse (staking, training and pruning, fertigation)	Field work	BL4-Analyze	20
Module 5	Use/application Low Tunnel Technology for off season cultivation of vegetable crops and flower crops	Field work	BL3-Apply	20
Module 6	Practices of hybrid seed production of vegetables under protected condition.	Field work	BL3-Apply	20
Module 7	Estimation of cost of cultivation for cucumber and tomato under the polyhouse condition	Field work	BL3-Apply	20
Module 8	Village survey to study about the major constant faced by the farmers in adopting protected cultivation in gird region.	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Malam, K.V., Malam, V. R. and Kanzaria, D. R. 2024. Hi-Tech Horticulture Parvatha Reddy, P. 2024. Hi-Tech Farming for Enhancing Horticulture Productivity. CRC Press.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	1	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	1	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Agri Warehouse Management
Course Code	ELP-AE-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Acquaintance the fundamentals of agricultural warehouse management.**(BL1-Remember)** **CO2-** Familiarize with techniques to store different types of agricultural products.**(BL2-Understand)** **CO3-** Develop the skills in maintaining and organizing inventories.**(BL3-Apply)** **CO4-** Expertise in legal guidelines and safety measures important for agricultural warehouses.**(BL4-Analyze)** **CO5-** Implement more efficient handling and shipping techniques for agricultural products.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG13(Climate action)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	An overview of Agricultural Warehousing.	Field work	BL2-Understand	20
Module-2	Warehouse Design and Layout.	Experiments	BL2-Understand	20
Module-3	The simulation Techniques; examining the most effective techniques for assembling and organising agricultural products under a variety of environmental factors like temperature, humidity, and ventilation.	Experiments	BL3-Apply	20
Module-4	Inventory Management; Preserve a record of inventory and discuss strategies to prevent losses and maintain proper records.	Experiments	BL3-Apply	20
Module-5	Safety procedures and regulations in agricultural warehouse environments.	Experiments	BL3-Apply	20
Module-6	Logistics management, including route planning and transportation scheduling.	PBL	BL3-Apply	20
Module-7	Visit to Local Warehouse.	Field work	BL4-Analyze	20
Module-8	Visit to Innovative and progressive farmer for storage facilities.	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Gopal Naik, G. Raghuram, Jothsna Rajan, Manu Bansal, Gopi S. Gopikuttan, Prateek Tawri and Ritwik Singh, Institute of Management, Banglore. Warehouse Manual For Operationalizing of Warehousing (Development & amp; Regulation) Act, 2007 by Warehousing Development and Regulatory Authority.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-
CO3	-	1	-	-	-	1	-	-	2	-	-	-	-	-	-
CO4	-	-	-	1	-	-	1	1	-	-	-	-	-	-	-
CO5	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Rural Haat and Market Analysis
Course Code	ELP-AE-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of Agricultural Economics			**Co-Requisite/s**	Fundamentals of Agricultural Extension Education			
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training in the rural market.**(BL1-Remember)** **CO2-** Evaluation of various rural products, marketing channel and cost of production.**(BL2-Understand)** **CO3-** Analyze the challenges in cost of production and marketing.**(BL3-Apply)** **CO4-** Evaluate the role of rural industries and market infrastructure.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Introduction to rural markets	PBL	BL2-Understand	20
Module 2	Rural marketing – concept and scope	PBL	BL2-Understand	20
Module 3	Rural consumers	PBL	BL2-Understand	20
Module 4	Rural vs urban marketing	PBL	BL2-Understand	20
Module 5	Market segmentation	PBL	BL3-Apply	20
Module 6	Product Strategy and Product Mix Decisions	PBL	BL3-Apply	20
Module 7	Product strategies for rural markets	PBL	BL4-Analyze	20
Module 8	Pricing strategy, Distribution,Market infrastructure	PBL	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	-	2	-	2	1	-	-	-	-	-	-
CO2	-	1	-	1	-	2	-	-	-	-	1	-	-	-	-
CO3	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-
CO4	-	-	-	-	-	2	-	-	1	-	1	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Agri-based Software Design
Course Code	ELP-AENG-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Gain knowledge of basic Software methods and practices and their appropriate application.**(BL1-Remember)** **CO2-** Describe software layered technology and Process framework.**(BL2-Understand)** **CO3-** Understanding of software requirements, designing an agri based software.**(BL3-Apply)** **CO4-** Understanding of implementation issues such as modularity and coding standards, software testing approaches.**(BL4-Analyze)** **CO5-** Describe software measurement and software risks, of softwareEvolution, Understanding on quality control and how to ensure good quality software.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Software Quality assurance, Software Metrics, Software Validation,Static and dynamic Analysis, Symbolic Equation. Mutation Analysis, Dynamic Testing, unit Testing, Whitebox and black box testing, Test Case Generation, Integration Testing.	PBL	BL2-Understand	30
Module 2	Bottom-up &Topdown Testing. System Testing, Function Testing,Performance Testing, Acceptance Testing, Installation Testing, theoretical foundation of Testing, Formal verification, Test Tools.	PBL	BL2-Understand	30
Module 3	Software Reliability; Software Complexity.Issues in ProjectManagement - Management Functions, Software Project Management Plan, Software management Structures, Personnel Productivity.	PBL	BL3-Apply	30
Module 4	Software project scheduling and the establishment of relationships among the different tasks.Tasks, dependencies and conflict resolution.Resource management and allocation.	PBL	BL4-Analyze	35
Module 5	Risk assessment and its impact in the planning and scheduling of software projects.	PBL	BL5-Evaluate	35

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	• Roger S. Pressman, Software Engineering – A Practitioner's Approach, Mcgraw-Hill, 2004. Bernd Bruegge and Allen H. Dutoit, Object-Oriented Software Engineering: Using UML, Patterns and Java, 2nd Edition, Prentice Hall, 2003Bernd • Bruegge and Allen H. Dutoit, Object-Oriented Software Engineering: Using UML, Patterns and Java, 2nd Edition, Prentice Hall, 2003.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Agriculture Kiosk and Rural Development
Course Code	ELP-AEXT-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of agricultural extension			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Remember the information about NABARD and KIOSK.**(BL1-Remember)** **CO2-** Understand the various advisory expert service of KIOSK for rural area.**(BL2-Understand)** **CO3-** Applying the KIOSK in agriculture and poultry**(BL3-Apply)** **CO4-** Analyzing the different marketing strategies, ups and downs of market.**(BL4-Analyze)** **CO5-** Evaluation of Various rural development programmes for KIOSK development in rural area**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	General information: In this module the students will get details about lands and method need to take to make fertile land, presently available government policies, subsidy rates to crops and pesticides and NABARD rules where it is a National Bank for Agriculture and Rural Development	PBL	BL2-Understand	20
Module 2	Experts Advice: In this module the students will be able to clarify their doubts lively by experts through online video chat and if suppose expert is not available at that time then the that will be directly forwarded to there and they will give the reply to our mail when they see. Live demos are also available to the farmers where they can each and every part in detail. 1. Online video chat 2. Chat info. 3. Live Demos	PBL	BL2-Understand	20
Module 3	Aqua and Poultry information: Here the students will get the details about the Aqua and Poultry farming which includes generation, marketing, exporting and precautions to be taken all these information will be get to Aqua and Poultry farmers. 1. Generation. 2. Marketing. 3. Exporting. 4. Precautions	PBL	BL2-Understand	20
Module 4	Irrigation and Weather information: In this module the farmer will get water resources available in their areas and what steps needs to be taken for irrigation of a particular crop. Four days weather forecasting information is also provided so that the farmer can aware of weather details and they can plan according to it. 1. Water resources. 2. Irrigation 3. Weather forecast	PBL	BL3-Apply	20
Module 5	Agriculture information: Here the information related to the required crop; Seeds, which are to be used, Fertilizers, type of fertilizers to be taken depending on the condition of the crop, type of Precautions to be taken and Time required to cultivate. 1. Crops. 2. Seeds. 3. Pesticides .4. Fertilizers. 5. Precautions	PBL	BL3-Apply	20
Module 6	Market Strategy: Here the students will get the details about the present market trends that means market rates of different crops and seeds and up's and down's in the market from the past 3 months. 1. Market values 2. Ups and down.	PBL	BL4-Analyze	20
Module 7	Connectivity: A sample Idea of placing KIOSK in a state where all villages will be connected through mandal server, all the mandal servers will be connected to district head server and finally all the district servers will be connected to state main server.	PBL	BL4-Analyze	20
Module 8	Rural development e- programmers: e-grama network, promoted by Gramin MahitiParishat (GMP) – an NGO working to establish computer kiosk enterprises in rural area. E-grama offers membership-fee-based access to basic PC-enabled services. A per-family fee allows any person from the member's family to access the kiosk at any time	PBL	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Agriculture In India : Policy And Performance by B Sambasiva Rao • Agricultural Problems of India by C B Mamoria • Handbook of Poverty in India: Perspectives, Policies, and Programmes by R. Radhakrishna, Shovan Ray • Exploring Reading Kiosk Concept: Creating Reading Habit among the Citizen by Nurhayati Abdul. • Rural Development principles and policy by Katar Singh and Anil Shisodiya. • Rural Development planning and management by Gullybaba.
Articles	
References Books	Rural Development principles and policy by Katar Singh and Anil Shisodiya. • Textbook of Rural Development Entrepreneurship & Communication Skillby Sagar mondal • Rural development approaches and strategies by Radhika Kapoor. • E- Governance and rural development empirical study by Rajesh Kumar
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Introduction to Indigenous Technical Knowledge
Course Code	ELP-AEXT-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Fundamentals of indigenous knowledge system			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Identify the concept of Indigenous Technical Knowledge and its importance.**(BL1-Remember)** **CO2-** Explain the need and importance of protecting ITK.**(BL2-Understand)** **CO3-** Illustrate various enactments related to the protection of technical knowledge**(BL3-Apply)** **CO4-** Interpret the concepts of Intellectual property to protect the technical knowledge.**(BL4-Analyze)** **CO5-** Assess the importance of ITK**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG7(Affordable and clean energy) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Introduction to Indigenous Technical Knowledge: Define ITK , nature and characteristics, scope and importance, kinds characteristics, knowledge vis- a-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge	PBL	BL2-Understand	32
Module-2	Protection of Indigenous Technical Knowledge:The need for protecting traditional knowledge Significance of ITK Protection, value of ITK in global economy, Role of Government to harness ITK.	PBL	BL3-Apply	32
Module-3	Legal framework and ITK: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004,.	PBL	BL4-Analyze	32
Module-4	Indigenous Technical Knowledge and intellectual property: Systems of ITK protection, Legal concepts for the protection of ITK, Patents, Strategies to increase protection of ITK	PBL	BL5-Evaluate	32
Module-5	Traditional Knowledge in Different Sectors: Traditional medicine system, ITK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of ITK	PBL	BL6-Create	32

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Organic Production Technology
Course Code	ELP-AGRON-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Students will receive training in the area of organic crop production.**(BL1-Remember)** **CO2-** Enhance the suitability of the crop production through the organic amendments**(BL2-Understand)** **CO3-** Analyse the challenges of crop production and management along with the possible practical solutions**(BL3-Apply)** **CO4-** Evaluate organic farming in terms of profitability and production quality.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Applying the principles of organic farming in in the field	Field work	BL2-Understand	20
Module 2	Production and application of vermicompost and others organics amendments	Field work	BL2-Understand	20
Module 3	Enrichment of vermicompost with various amendments (bio-fertilizers, bio-pesticides)	Field work	BL3-Apply	20
Module 4	PrepaOn field practices on Bio-fumigation and soil solarisation processesration and application of Jeevamrit and Bijamrit	Field work	BL3-Apply	20
Module 5	Preparation of design/layout for organic farm management for various agricultural crops along with suitable conversion plan	Field work	BL3-Apply	20
Module 6	On field application of green manuring	Field work	BL3-Apply	20
Module 7	Nutrient and microbial assessment of various organic various amendments and bio-enhancers	Field work	BL4-Analyze	20
Module 8	To know about the documentation and certification processes for organic products	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Singh, A.K. (2012). Organic Farming. New India Publishing Agency.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	1	1	-	-	-	-	-	-	-	3	-	-
CO2	-	2	3	2	2	1	-	-	-	-	-	-	-	2	-
CO3	3	-	2	2	2	2	-	-	-	-	-	-	-	1	2
CO4	-	1	-	1	-	-	-	-	-	-	1	1	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Commercial Crop Production Technology
Course Code	ELP-AGRON-403 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Crop Production Technology			**Co-Requisite/s**	Practical crop production			
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope of commercial crop production.**(BL1-Remember)** **CO2-** Explain the knowledge regarding various organic matters and synthetic material for commercial productions**(BL2-Understand)** **CO3-** Demonstrate various agronomical crops under different organic & synthetic products contents**(BL3-Apply)** **CO4-** Analyze the challenges of commercial cultivation, establishment and management along with the possible Practical solutions**(BL4-Analyze)** **CO5-** Evaluate the commercial production of agronomical crop under different practices**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Applying the principle of commercial crop production	Field work	BL2-Understand	20
Module 2	Preparation of Field layout	Field work	BL2-Understand	20
Module 3	Hands on training on seed treatment and sowing	Field work	BL3-Apply	20
Module 4	Practices for Nutrient management	Field work	BL3-Apply	20
Module 5	Water and Weed management	Field work	BL3-Apply	20
Module 6	Practices for major insect-pests, diseases of crops and their Management	Field work	BL4-Analyze	20
Module 7	Practices for Harvesting of crop	Field work	BL4-Analyze	20
Module 8	Estimation of cost of cultivationand Marketing of produce	Field work	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	. Shagun, and Jhala, V.S. 2022. Agronomy of Oilseed, Fibre and Sugar Crops. Amiga Press 2. Das, N.R. 2017. Practical Manual on Basic Agronomy (With Theory) 2nd Revised Ed. Scientific Publishers 3. Singh, C. 1983. Modern Techniques of Raising Field Crops. Oxford & IBH 4. U. S. Walia, S.S. Kler, D.S. Singh, D., 1986.ICAR, Science of Agronomy. Scientific Publishers (India) 5. Joshi, M. 2015. Textbook of field crops. PHI Learning 6.Kamburova, V.S. and Kim, S.K. 2018. Fundamentals of Agronomy. Scitus Academics LLC
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-
CO4	-	-	3	1	1	-	-	-	-	-	-	-	-	-	-
CO5	-	2	-	-	1	-	-	1	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Poultry Production Technology
Course Code	ELP-AHS-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Livestock and Poultry Production			**Co-Requisite/s**	Livestock and Poultry Production			
Course Outcomes & Bloom's Level	**CO1-** Describe the role of poultry production in the national economy**(BL1-Remember)** **CO2-** Explain and demonstrate important practices at a poultry farm**(BL2-Understand)** **CO3-** Interpret important Indian and exotic breeds of poultry**(BL3-Apply)** **CO4-** Classification of classes of poultry**(BL4-Analyze)** **CO5-** Evaluate livestock and poultry diseases.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	External body parts of poultry	Field work	BL2-Understand	20
Practical 2	Handling and restraining of birds.	Field work	BL2-Understand	20
Practical 3	Identification methods of poultry.	Field work	BL2-Understand	20
Practical 4	Visit to Industrial Poultry Farm.	Field work	BL3-Apply	20
Practical 5	To study breeds of livestock and poultry and daily routine farm operations and farm records.	Field work	BL3-Apply	20
Practical 6	Judging of poultry.	Field work	BL3-Apply	20
Practical 7	Culling of poultry.	Field work	BL3-Apply	20
Practical 8	Planning and layout of housing for different types of poultry farms.	Field work	BL3-Apply	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Benerjee, G.C. (2019). A Textbook of Animal Husbandry. Oxford. Sastri, N.S.R., Thomas, C.K. and Singh R.A. 2016. Livestock Production and Management. Kalyani Publishers. Singh, R. (2009). Essentials of Animal Production and Management. Kalyani Publishers. ICAR. (2015). A Handbook of Animal Husbandry. ICAR. Verma, D.N. (2005). A Textbook of Livestock Production Management in Tropics. Kalyani Publishers.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	1	-	3	-	-	-	-	-	-	-	3	1	-
CO3	-	-	2	3	-	1	-	-	-	-	-	-	-	-	3
CO4	-	-	-	3	-	-	-	-	-	-	-	2	-	-	-
CO5	-	-	1	-	2	-	2	-	-	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Production Technology for Bio-agents and Bio-fertilizer
Course Code	ELP-ENT-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Entomology			**Co-Requisite/s**	Entomology			
Course Outcomes & Bloom's Level	**CO1-** Describe the importance scope and limitations of bio-agents and bio-fertilizers**(BL1-Remember)** **CO2-** Explain the different types of bio-fertilizers and bio-agents and their mechanism of action**(BL2-Understand)** **CO3-** Demonstrate the procedure for Isolation, identification and purification of different bio-agents and bio-fertilizers**(BL3-Apply)** **CO4-** Explore the various methods of mass multiplication and formulation of bio-agents and bio-fertilizers**(BL4-Analyze)** **CO5-** Develop skill for evaluation and performance of bio-agents and bio-fertilizers in vitro and field application.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours

M

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Introduction, history, Importance and scope of bio-fertilizers and bio-agents.	Experiments	BL2-Understand	20
Module 2	Isolation and identification of fungal bio-control agents i.e. Trichoderma spp, and Beauveriabassiana from rhizosphere	Experiments	BL2-Understand	20
Module 3	Isolation and identification of bacterial bio-control agents i.e. Pseudomonas fluoresces and Bacillus subtilis from soil, Azospirillum from plant roots.	Experiments	BL3-Apply	20
Module 4	Isolation and identification of bio-fertilizer i.e.Rhizobium from root nodules and Azotobacter from soil.	Experiments	BL3-Apply	20
Module 5	Mass production and formulation technology of bio-agent Trichoderma viride and Pseudomonas fluoresces	Field work	BL4-Analyze	20
Module 6	Mass production and formulation technology of bio-fertilizers Rhizobium and Azotobacter spp.	Field work	BL4-Analyze	20
Module 7	Methods of application technology of bio-agents and bio-fertilizer in vitro and field condition	Field work	BL5-Evaluate	20
Module 8	Develop the methods of increase Storage, shelf life, quality control and marketing of bio-agents and bio-fertilizers	Field work	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	SanthaKumari, P. and Vijayasree, V. (2003). Biological Control of Crop Pests in India. Kalyani Publication. Gaur, A.C. (2006). Biofertilizers in Sustainable Agriculture. Indian Council of Agricultural Research Vasantharaj David, B. and Aanatha krishnan, T.N. (2006). General and Applied Entomology. Tata McGraw-Hill. Metcalf, R. L. and Luckman, W.H. (1994). Introduction to Insect Pest Management- Wiley inter science publishing, NewYork.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	1	1	2	3	1	2	-	1	1	-	-	-	2
CO4	3	3	1	1	-	-	1	-	-	1	1	-	-	1	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Storage Entomology
Course Code	ELP-ENT-403 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training in the fields of Stored protection.**(BL1-Remember)** **CO2-** Evaluation of various Storage damage.**(BL2-Understand)** **CO3-** Analyze the challenges of commercial storage insect pests management.**(BL3-Apply)** **CO4-** Evaluate the role of quality farm product stored protection methods.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG2(Zero hunger) SDG8(Decent work and economic growth) SDG13(Climate action)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Identification of stored insect biology	Field work	BL2-Understand	20
Module-2	Understanding biology of field crops insect pest	Experiments	BL3-Apply	20
Module-3	Understanding biology of Pulses insect pest	Experiments	BL3-Apply	20
Module-4	Understanding biology of Oilseeds crops insect pest	Experiments	BL3-Apply	20
Module-5	Understanding biology of fiber crops insect pest	Experiments	BL3-Apply	20
Module-6	Understanding biology of Suger crops insect pest	Experiments	BL3-Apply	20
Module-7	Understanding biology of non insect pest	Experiments	BL3-Apply	20
Module-8	Role of different pests control methods	Field work	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Pruthi HS, Singh M. Pests of stored grain and their control. Special number. Indian Journal of Agricultural Science. 1950;18:1-52 Pimentel D. World resources and food losses to pests. In: Gorham JR, editor. Ecology and Management of Food Industry Pests. Arlington, Virginia: Association of Official Analytical Chemists; 1991. pp. 5-11 Atwal AS, Dhaliwal GS. Agricultural Pests of South Asia and their Management. New Delhi, India: Kalyani Publishers; 2008
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	7	-	-	-	-	-	-	-	-
CO4	-	-	2	1	-	-	1	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Integrated Fish Farming
Course Code	ELP-FSC-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of fisheries			**Co-Requisite/s**	Fish ecology and aquatic Ecosystem			
Course Outcomes & Bloom's Level	**CO1-** Integrate fish farming with other agricultural activities such as crop and livestock production**(BL2-Understand)** **CO2-** Promote sustainability by utilizing agricultural waste for reducing environmental pollution and recourse consumption **(BL2-Understand)** **CO3-** Apply fish farming to benefit multiple income streams providing financial stability **(BL3-Apply)** **CO4-** Analyze the recycling of nutrients from various within systems**(BL4-Analyze)** **CO5-** Evaluate various inputs design to minimize environmental impact by reducing pollution from the ecosystem **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG12(Responsible consuption and production) SDG14(Life below water) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Selection of fish seed(spawn) production area /land: (a) Select a culturable fish species for polyculture .An average depth of 6.5 to 10ft depth should be maintained in the case of six species composite fish culture.	Field work	BL2-Understand	20
Module 2	Layoutpreparation/Culturalpractices:Netgross area & water area .calculation,Designofexperimentation,isolationdistance,Pondpreparation,fish seedstocking,and calculationofrequiredfish seeds (seedrate) Pre -stocking practices: Ploughing,Fertilizing the Pond ,Liming , Adding minerals etc.	Field work	BL2-Understand	20
Module 3	Fish farming cum Horticulture : Pond banks provide a suitable place which can be economically used for raising fruit and plants like banana ,papaya and vegetables.	Field work	BL2-Understand	20
Module 4	Fish farming with Livestock: In this practice excreta of Animals (poultry	Field work	BL3-Apply	20
Module 5	Fish cum duck Farming: Pond manuring, Aeration , weed removing and provide supplementary feed.	Field work	BL3-Apply	20
Module 6	Stocking size:Thesurvivaloftheﬁngerlingsintroducedintoaparticularponddependsverymuchontheirsize:biggerthesize greater will be the survival rate and vice versa. The fingerlings stocked should have a size of 10 to 40 gm. Water Quality Management : Regular sampling of Physical and chemical water quality parameters	Field work	BL3-Apply	20
Module 7	Growth Promoter and medicines: Various growth promoter and medicines are being used for the growth and production of fish seed.	Field work	BL4-Analyze	20
Module 8	Post stocking Practice on Feed management: Natural feeding is being Provided for the growth of fish seed and using the Bag feeding method for polyculture species.	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO4	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Seed Testing and Quality Assessment
Course Code	ELP-GPB-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Assess the actual planting value of the seed in terms of its germination capacity**(BL1-Remember)** **CO2-** Evaluation of seed quality attributes of the seed lots which have to be offered for sale.**(BL2-Understand)** **CO3-** Analyze the quality maintenance challenges of commercial Seed.**(BL3-Apply)** **CO4-** Evaluate the role of quality seed and their effect on farming society & seed industry.**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG6(Clean water and sanitation)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Seed sampling techniques	Field work	BL2-Understand	20
Module 2	Physical purity test:	Field work	BL2-Understand	20
Module 3	Germination Test:	Field work	BL3-Apply	20
Module 4	Seed Viability Test:	Field work	BL3-Apply	20
Module 5	Seed Vigour test:	Field work	BL3-Apply	20
Module 6	Electrophoresis test/ Test Weight & Seed Index:	Field work	BL3-Apply	20
Module 7	Seed moisture Test:	Field work	BL3-Apply	20
Module 8	Seed Treatment for quality enhancement:	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Agarwal, R.L. (2012). Seed Technology. Oxford & IBH Publishing Company Pvt. Ltd., New Delhi. Chakrabarthi, S.K. (2010). Seed Production and Quality Control. Kalyani Publisher, New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	1	1	-	-	-	-	-	-	-	3	-	-
CO2	-	2	3	2	2	1	-	-	-	-	-	-	-	3	-
CO3	3	-	2	2	2	2	-	-	-	-	-	-	-	1	2
CO4	-	1	-	1	-	-	-	-	-	-	1	1	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Commercial Horticulture (Vegetable and Spices Crop Production)
Course Code	ELP-HORT-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope of vegetable and spices cultivation.**(BL1-Remember)** **CO2-** Explain the knowledge regarding various crop productions under commercial Horticultural.**(BL2-Understand)** **CO3-** Demonstrate various vegetable and spices crops.**(BL3-Apply)** **CO4-** Analyse the challenges of cultivation establishment and management along with the possible practical solutions.**(BL4-Analyze)** **CO5-** Evaluate the hybrid seed production of vegetables and spices. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Project preparation for establishment of various vegetable and spices crops.	PBL	BL2-Understand	20
Module 2	Practices in preparatory operations, different types of growing media, soil decontamination techniques	PBL	BL2-Understand	20
Module 3	Preparation of field for cultivation of brinjal and tomato	PBL	BL2-Understand	20
Module 4	Hands on training of various intercultural operations under the brinjal and tomato cultivation	PBL	BL3-Apply	20
Module 5	Use/application drip irrigation system in vegetable and spices crops.	PBL	BL3-Apply	20
Module 6	Practices of hybrid seed production of vegetables and spices	PBL	BL3-Apply	20
Module 7	Estimation of cost of cultivation for brinjal and tomato.	PBL	BL4-Analyze	20
Module 8	Village survey to study about the major constant faced by the farmers in adopting drip irrigation system in cultivation under gird region	PBL	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Hazra, P. (2011). Modern Technology in Vegetable Production. New India Publishing Agency, New Delhi. Hazra, P. (2006). Vegetable science. Kalyani Publishers, Ludhiana. Pruthi J.S., (1993). Major Spices of India- Crop Management Postharvest Technology. ICAR, New Delhi. Pruthi, J.S. (2001). Minor Spices and Condiments-Crop Management Post Harvest Technology. ICAR, New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	-	1	-	3	-	-	-	-	-	-	-	-	3	2	-
CO3	-	2	3	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	2	-	-	-
CO5	-	-	1	-	2	-	2	-	-	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Floriculture and landscaping
Course Code	ELP-HORT-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Horticulture			**Co-Requisite/s**	Horticulture			
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope Floriculture and Landscape designing**(BL1-Remember)** **CO2-** Explain the basic concept of landscape architecture**(BL2-Understand)** **CO3-** Demonstrate various Software for landscape architecture**(BL3-Apply)** **CO4-** Analyse the challenges of value addition of commercial floriculture crops**(BL4-Analyze)** **CO5-** Evaluate the role of value addition and essential oil extraction in floriculture industry**(BL5-Evaluate)** **CO6-** Design landscape layout by utilizing Software and Create value added products from waste.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Introduction to Floriculture and Landscaping Objective: • To understand the basic concept of floriculture • To study the present scenario of Ornamental crops and landscape designing	Field work	BL2-Understand	20
Module 2	Identification of Ornamental Crops Objective: • To identify the major ornamental crops in locality • To understand the crop morphology and characters	Field work	BL2-Understand	20
Module 3	Propagation of Ornamental Crops Objective: • To understand the propagation methods for flower crops • To identify the major propagation techniques of ornamental crops in locality	Field work	BL3-Apply	20
Module 4	Landscape design and planning Objective: • To learn about the landscape architecture and planning • To understand the 2D and 3D design concept • To use Software like 5D Planner, Sketchup and AutoCAD for landscape designing	Field work	BL3-Apply	20
Module 5	Specialized Garden design Objective: • To learn about the landscape architecture and planning • To understand the concept of UPH • To use Software like 5D Planner, Sketchup and AutoCAD for landscape designing	Field work	BL3-Apply	20
Module 6	Production of cut/loose flower Objective: • To learn about the package and practices of major flower crops. • To understand the propagation and nursery management techniques of flower crops. • Cost of cultivation of production technology.	Field work	BL3-Apply	20
Module 7	Dry flower production technology of flower crops Objectives: • To learn about the various drying methods • To practice the dry flower products • To analyse the cost of dry flower products	Field work	BL4-Analyze	20
Module 8	Post harvest handling of Flower crops Objective: •To inculcate the knowledge about the preservative technology •To study the post-harvest handling of flower crops •To practice the vase life study of major cut flower	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Bose, T. K. and Chowdhury, B. (1991). Tropical Garden Plants in colour. Horticulture and allied publishers, 3D Madhab Chatterjee Street Kolkata. Peter, K.V. (2009). Ornamental plants. New India publishing agency, Pitampura, New Delhi. 24 Bird, R. (2002). Flowering trees and shrubs. Printed in Singapore by Star Standard Industries pvt. Ltd. Chowdhury, B.D. and Jana, B. L. (2014). Flowering Garden trees. Pointer publishers, Jaipur. India. Arora, J.S. (2006). Introductory Ornamental Horticulture. Kalyani Publishers, Ludhiana Randhawa, G.S. and Mukhopadhyay, A. (2004). Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi. Bose, T.K. and Mukherjee, D. (2004). Gardening in India. Oxford & IBH Publishers.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	1	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	1	-
CO5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Commercial Nursery _____ Horticultural Crops
Course Code	ELP-HORT-404 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Horticulture			**Co-Requisite/s**	Horticulture			
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope Commercial Nursery in horticultural Crops**(BL1-Remember)** **CO2-** Explain the suitability of Multiplication methods in different horticultural crops**(BL2-Understand)** **CO3-** Demonstrate various plant propagation techniques in the field**(BL3-Apply)** **CO4-** Analyse the challenges of commercial nursery establishment and management along with the possible practical solutions**(BL4-Analyze)** **CO5-** Evaluate the role of PGR and media in mass multiplication of horticultural crops**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-01	Design/layout of commercial nursery and preparation of nursery beds	Field work	BL2-Understand	20
Module-02	Preparation of various growing medias	Field work	BL2-Understand	20
Module-03	Enrichment of growing medias with various amendments	Field work	BL3-Apply	20
Module-04	Nursery raising of various horticultural crops	Field work	BL3-Apply	20
Module-05	Mass multiplication of various horticultural crops through cuttings	Field work	BL3-Apply	20
Module-06	Hands on practices on layering and stooling	Field work	BL3-Apply	20
Module-07	Hands on practices on various methods of budding and grafting	Field work	BL4-Analyze	20
Module-08	Marketing of nursery plants and seedlings	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Singh, J. (2012). Basic Horticulture. Kalyani Publishers. New Delhi. Kumar, N. (1997). Introduction to Horticulture. Rajyalakshmi Publications, Nagorcoil, Tamil Nadu. Randhawa, G.S. and Mukhopadhyaya, A. (1994). Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi Chadha, K.L. (2019). Handbook of Horticulture (Vol-I). ICAR, New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	1	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	1	-
CO5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Organic Vegetable Production
Course Code	ELP-HORT-406 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Horticulture			**Co-Requisite/s**	Horticulture			
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope of organic vegetable cultivation.**(BL1-Remember)** **CO2-** Explain the knowledge regarding various organic matters for vegetable productions.**(BL2-Understand)** **CO3-** Demonstrate various vegetable crops under different organic contents.**(BL3-Apply)** **CO4-** Analyse the challenges of organic cultivation, establishment and management along with the possible practical solutions.**(BL4-Analyze)** **CO5-** Evaluate the organic production of vegetables under different organic contents.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Project preparation for establishment of various organic vegetable crops.	Experiments	BL2-Understand	20
Module 2	Practices in preparatory operations and different types of growing media.	Field work	BL2-Understand	20
Module 3	Preparation of field for cultivation of vegetables	Field work	BL2-Understand	20
Module 4	Hands on training of various intercultural operations.	Field work	BL3-Apply	20
Module 5	Use/application of various irrigation systems in vegetable crops.	Field work	BL3-Apply	20
Module 6	Practices for organically plant protection.	Field work	BL3-Apply	20
Module 7	Estimation of cost of cultivation for vegetable production	Field work	BL4-Analyze	20
Module 8	Village survey to study about the major constant faced by the farmers in adopting organic vegetable cultivation under gird region.	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Hazra, P. (2011). Modern Technology in Vegetable Production. New India Publishing Agency, New Delhi. Dhaliwal, (M.S). 2020. Handbook of Vegetable Crops. Kalyani Publishers.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	1	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	3	-	-	1	1	-	1	-
CO5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Hydroponics
Course Code	ELP-HORT-407 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of Horticulture			**Co-Requisite/s**	Production technology of vegetables and spices			
Course Outcomes & Bloom's Level	**CO1-** CO-1. Describe the importance and scope Soil-less Cultivation practices and production technology for Exotic horticultural crops**(BL1-Remember)** **CO2-** CO-2. Explain the basic concept of Growing media and Nutrient solution under protected cultivation**(BL2-Understand)** **CO3-** CO-3. Demonstrate various technologies and management practices under Hydroponics**(BL3-Apply)** **CO4-** CO-4. Analyze the challenges of Nutrient management under Hydroponics/protected cultivation**(BL4-Analyze)** **CO5-** CO-5. Evaluate the role of AI technology and marketing strategies under Hydroponic cultivation of horticultural crops**(BL5-Evaluate)** **CO6-** CO-6. Create a model layout plan with proper marketing approaches for exotic horticultural crops under advance hydroponics Schemes**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG8(Decent work and economic growth) SDG12(Responsible consuption and production) SDG13(Climate action)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Plant Nutrition and its Management in Hydroponics	Field work	BL2-Understand	20
Module-2	Plant Protection in Soil-less practices	Field work	BL3-Apply	20
Module-3	Various Models under hydroponic system	Field work	BL5-Evaluate	20
Module-4	Aquaponics Model and practices	Field work	BL3-Apply	20
Module-5	Aeroponics Model and practices	Field work	BL3-Apply	20
Module-6	Vegetable and Spices Crops production under Hydroponics	Field work	BL4-Analyze	20
Module-7	Ornamental Crops production under Hydroponics	Field work	BL5-Evaluate	20
Module-8	Economics and Government Regulations in Soil-less cultivation	Field work	BL6-Create	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Hydroponics: The Essential Hydroponics Guide: A Step-By-Step Hydroponic Gardening Guide to Grow Fruit, Vegetables, and Herbs at Home Hydroponics: A Practical Guide for the Soilless Grower (2nd Edition), by Dr. J. Benton Jones Commercial Hydroponics by John Mason
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-
CO3	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-
CO4	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Processing, Preservation and Value Addition in OMA Plants
Course Code	ELP-HORT-408 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of Horticulture			**Co-Requisite/s**	Post-harvest and value addition of fruits and vegetable			
Course Outcomes & Bloom's Level	**CO1-** Comprehends various processing techniques applicable to ornamental medicinal and aromatic plants.**(BL1-Remember)** **CO2-** Acquire proficiency in preservation methods enabling effective quality assurance and extended shelf life.**(BL2-Understand)** **CO3-** Apply value addition strategies enabling to capitalize on the diverse applications and market opportunities.**(BL3-Apply)** **CO4-** Develop competence in accessing the quality of processed and preserved products**(BL4-Analyze)** **CO5-** Analyze market dynamics with respect to consumer preference.**(BL5-Evaluate)** **CO6-** Creation of preserve, processed and value-added products sustainably**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Effect of Drying Methods on Aromatic Plant Quality Compare the impact of air-drying, oven-drying, and freeze-drying on the aroma, color, and chemical composition of aromatic plants like lavender or mint.	Experiments	BL2-Understand	20
Module-2	Preservation Techniques for Ornamental Plants Investigate the efficacy of different preservation methods (such as drying, glycerine preservation, and silica gel drying) on maintaining the color and texture of ornamental plants like roses or orchids.	Experiments	BL2-Understand	20
Module-3	Biochemical Analysis of Medicinal Plant Extracts Analyze the biochemical composition of extracts from medicinal plants like ginseng or echinacea using techniques like chromatography and spectrophotometry to determine their medicinal value.	Experiments	BL3-Apply	20
Module-4	Comparative Study of Preservation Methods for Aromatic Herbs Compare traditional preservation methods (e.g., drying, salt curing) with modern techniques (e.g., vacuum sealing, freeze-drying) to determine their impact on the aroma and flavor retention of herbs like basil or thyme.	Experiments	BL3-Apply	20
Module-5	Enhancing Medicinal Plant Properties through Fermentation Study the effects of fermentation on the bioactivity and bioavailability of compounds in medicinal plants such as garlic or aloe vera, exploring changes in chemical composition and potential health benefits.	Experiments	BL4-Analyze	20
Module-6	Value Addition through Herbal Tea Blending Experiment with blending different dried aromatic and medicinal herbs to create unique herbal tea blends, assessing their sensory qualities and potential health benefits through taste tests and chemical analysis.	Experiments	BL4-Analyze	20
Module-7	Preservation Techniques for Fresh-cut Ornamental Flowers Investigate the effectiveness of preservatives, hydration solutions, and storage conditions in prolonging the vase life of fresh-cut ornamental flowers like roses or carnations	Experiments	BL5-Evaluate	20
Module-8	Assessment of Antioxidant Activity in Aromatic Plants Measure the antioxidant activity of aromatic plants such as sage or oregano using assays like DPPH radical scavenging or ORAC (oxygen radical absorbance capacity) to quantify their potential health benefits.	Experiments	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Bose, T. K. and Chowdhury, B. 1991.Tropical Garden Plants in colour. Horticulture and allied publishers, 3D Madhab Chatterjee street Kolkata. K.V.Peter.2009.Ornamental plants. New India publishing agency, Pitampura, New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO4	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Multimedia and Graphic Designing & Production of Information Materials
Course Code	ELP-JMC-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	fundamentals of computer application			**Co-Requisite/s**	Tools and techniques of information generation and representation			
Course Outcomes & Bloom's Level	**CO1-** Remembering the information about the multimedia and Software design.**(BL1-Remember)** **CO2-** To understand the different types of sounds, editing and mixing in sound.**(BL2-Understand)** **CO3-** Appling the different types of graphics in multimedia and various images format.**(BL3-Apply)** **CO4-** Analyze the different video and animation in multimedia and different file format and their use in multimedia.**(BL4-Analyze)** **CO5-** Evaluation of multimedia application and multimedia in different industries.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Introduction to multimedia, multimedia definition and concepts, need of multimedia, Areas of use, development platform for multimedia, identify multimedia elements text, images, sound, animation and video, multimedia hardware and software requirement, making simple multimedia with power point, text as a component of multimedia, concept of plain and formation text, RTF and HTML text, object linking and embedding concept, fonts- needs and types.	PBL	BL2-Understand	32
Module-2	Sound in Multimedia , Importance of Sound in Multimedia, Sound and its attributes – tone, intensity, frequency, wavelength , pitch etc . Mono v/s Stereo sound , sound channel, effects in sound , analog v/s digital sound, overview of various sound file formats on PC WAVE, MP3, concept of MIDI, software for sound editing and mixing, 3D sound .	PBL	BL3-Apply	32
Module-3	Graphics in Multimedia, importance of graphics in multimedia, vector and raster graphics, image capturing methods, scanner, digital camera etc. Various attributes of images- Size, color, bit depth, resolution etc., Various image file formats- BMP, DIB,EPS, PIC and TIF formats and their features and limitations .	PBL	BL4-Analyze	32
Module-4	Video and animation in multimedia, impact of video in multimedia, basics of videos, analog and digital video, how to use video on PC, brief note on various video standard, PAL, NTSE, different file format and their use in multimedia, MPEG, AVI, MJPG, name of video editing software, basics of animation, types of animation and use of animation, software for creating animations	PBL	BL5-Evaluate	32
Module-5	Application of multimedia and its future, application og multimedia in different industries Education, Entertainment, Journalism etc. Future of Multimedia, Carrier in multimedia production, virtual reality as new technology in multimedia, application of VR, introduction to HMD, Boom cave, introduction to various types authoring tools.	PBL	BL5-Evaluate	32

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	How to use graphic design to sell things, explain things, make things look better, make people laugh, make people cry, and (every once in a while) change the world' by Michael Bierut
Articles	
References Books	The honest guide to creativity and logo design by James martin.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Mushroom Cultivation Technology
Course Code	ELP-PP-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Plant pathology			**Co-Requisite/s**	Plant pathology			
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope mushroom cultivation**(BL1-Remember)** **CO2-** Explain the different types of mushrooms and their nutritional content**(BL2-Understand)** **CO3-** Demonstrate the spawn production and cultivation of various types of mushrooms**(BL3-Apply)** **CO4-** Explore various cultivation methods, such as indoor and outdoor cultivation**(BL4-Analyze)** **CO5-** Develop skills to identify and prevent contamination issues during mushroom cultivation**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG2(Zero hunger) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Introduction to mushrooms -Taxonomical rank -History and Scope of mushroom cultivation - Edible and Poisonous Mushrooms-Vegetative characters	Field work	BL2-Understand	20
Module 2	Identification of common edible, medicinal and poisonous mushroom	Field work	BL2-Understand	20
Module 3	Health benefits of mushrooms, Nutritional and medicinal values of mushrooms. Therapeutic aspects- antitumor effect	Field work	BL2-Understand	20
Module 4	Spawn production - Culture media preparation- production of pure culture, mother spawn preparation	Field work	BL3-Apply	20
Module 5	Sterilization and sanitation of mushroom house, Selection of substrate for mushroom cultivation, Composting technology, mushroom bed preparation	Field work	BL4-Analyze	20
Module 6	Spawning, spawn running, Cultivation technology of oyster, milky and paddy straw mushroom and harvesting.	Field work	BL4-Analyze	20
Module 7	Problems in mushroom cultivation - diseases, pests and nematodes, moulds and their management strategies	Field work	BL5-Evaluate	20
Module 8	Post-harvest technology: Preservation of mushrooms - freezing, dry freezing, drying, canning, quality assurance and entrepreneurship	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Suman, B.C. and Sharma, V.P. (2007). Mushroom Cultivation in India, Daya Publishing House, New Delhi. Cotter, T. (2014). Organic Mushroom Farming and Mycoremediation: Simple to Advanced and Experimental Techniques for Indoor and Outdoor Cultivation. Chelsea Green Publishing. Chang, S. T. and Hayes, W. A. (1978). The Biology and Cultivation of Edible Mushrooms. Academic Press. New York. 230 P. Chang, S.T. and Miles, P. G. (2004). Mushrooms: Cultivation, Nutritional Value, Medicinal Effect, and Environmental Impact. CRC Press. 480 P. Fletcher, J. T., White, P. F. and Gaze, R. H. (1994). Mushrooms: Pest & Disease Control. 2nd. Ed. Intercept Andover, Hants. Great Britain. 174 P. Krieger, L. C. (2010). The Mushroom Handbook. Sufi Press. 578 P.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	1	1	2	3	1	2	-	1	1	1	-	-	2
CO4	3	3	1	1	-	-	1	-	-	1	1	1	-	1	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Plant Health Diagnosis and Management
Course Code	ELP-PP-402 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope Plant Health Diagnosis and Management.**(BL1-Remember)** **CO2-** Explain the identifications of different plant diseases and their relation to the weather parameters.**(BL2-Understand)** **CO3-** Demonstrate the isolation of plant pathogen and Koch postulate.**(BL3-Apply)** **CO4-** Analysing and exploring the different isolated pathogens from the field.**(BL4-Analyze)** **CO5-** Evaluating the management practices of different pathogens using bio control agents, botanicals and chemical fungicides.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Identification of different plant diseases through regular field visit.	PBL	BL2-Understand	20
Module-2	Study on occurrence of the disease and their relations with the weather parameters. Selected disease will be observed on weekly interval (Standard Meteorological Weeks) and disease scoring will be done. Data handling in excel (Microsoft Office) and correlation matrix analysis study will be carried out. Area under disease progress curve (AUDPC) will be computed. Graph designing.	PBL	BL3-Apply	20
Module-3	Symptomatological studies of plant diseases on natural conditions.	PBL	BL4-Analyze	20
Module-4	Isolation of the plant pathogen. Preparation of the media.	PBL	BL3-Apply	20
Module-5	Steps of Koch Postulates: a) The microorganism or other pathogen must be present in all cases of the disease. b) The pathogen can be isolated from the diseased host and grown in pure culture. c) The pathogen from the pure culture must cause the disease when inoculated into a healthy, susceptible host. The pathogen must be reisolated from the new host and shown to be the same as the originally inoculated pathogen	PBL	BL4-Analyze	20
Module-6	Morphological studies of the pathogens and their preservation in agar slants.	PBL	BL5-Evaluate	20
Module-7	In-vitro management of the pathogen through different plant extracts and chemical pesticides.	PBL	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Dube, H. C. (2013). An Introduction to Fungi. 4 th (Ed). Scientific Publishers, Jodhpur, India. Agrios, G.N. (2004). Plant Pathology. (5th Ed.). Elsevier Academic Press. 882p. Alexopoulos, C.J., Mims, C.W. and Blackwell, M. (2014). Introductory Mycology (4th Ed.)Wiley India Pvt Ltd. 833p Ravichandra, N.G. (2013). Fundamentals of Plant Pathology. PHI Learning Pvt Ltd. 639p Walkey, D. G. (1991). Applied Plant Virology (2nd Ed.) Springer, 352
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	1	1	-	-	-	-	-	-	-	3	-	-
CO2	-	2	3	2	2	1	-	-	-	-	-	-	-	3	-
CO3	3	-	2	2	2	2	-	-	-	-	-	-	-	1	2
CO4	-	1	-	1	-	-	-	-	-	-	1	1	1	-	-
CO5	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Seed Pathology
Course Code	ELP-PP-403 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of Plant Pathology			**Co-Requisite/s**	Principles of Integrated Pest and Disease Management			
Course Outcomes & Bloom's Level	**CO1-** Describe the History and economic importance of seed health in seed industry and plant quarantine**(BL1-Remember)** **CO2-** Explain the important seed borne and seed transmitted pathogens**(BL2-Understand)** **CO3-** Demonstrate the procedure for Isolation, identification and purification of different seed borne pathogens**(BL3-Apply)** **CO4-** Explore the various methods of seed health testing methods**(BL4-Analyze)** **CO5-** Develop skill for detection methods, estimation of storage losses and Integrated management practices for seed borne pathogens**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	History and economic importance of seed health in seed industry and plant quarantine – important seed borne and seed transmitted pathogens	PBL	BL2-Understand	20
Module 2	Morphology and anatomy of typical monocotyledonous and dicotyledonous infected seeds	PBL	BL2-Understand	20
Module 3	Localization and mechanism of seed transmission in relation to seed infection, seed to plant transmission of pathogens	PBL	BL3-Apply	20
Module 4	Method for isolation and purification of Seed borne plant pathogens	PBL	BL3-Apply	20
Module 5	Conventional and advanced techniques in the detection and identification of seed-borne fungi, bacteria and viruses.	PBL	BL3-Apply	20
Module 6	Detect the Production of toxic metabolites produced by seed borne pathogens affecting seed quality and its impact on human, animal and plant health	PBL	BL4-Analyze	20
Module 7	Production of disease-free seeds in agricultural and horticultural crops; management of seed borne pathogens	PBL	BL5-Evaluate	20
Module 8	Develop the Integrated Disease Management Strategies for Seed-borne Diseases	PBL	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	• Agarwal VK and Sinclair JB. 1993. Principles of Seed Pathology. Vols. I & II, CBS Publ., New Delhi. • Hutchins JD and Reeves JE. (Eds.). 1997. Seed Health Testing: Progress Towards the 21st Century. CABI,Wallington. • Paul Neergaard. 1988. Seed Pathology. • McMillan, London. Suryanarayana D. 1978. Seed Pathology. Vikash Publ., New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	-	-	-	2	-	-	-	-	-	-	-	-
CO2	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-
CO4	-	-	2	1	2	-	-	-	-	-	-	-	-	-	-
CO5	-	-	1	1	2	-	2	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Soil, Plant, Water and Seed Testing
Course Code	ELP-SS-401 [P]

Part A

Year	4th	**Semester**	8th	**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Students will acquire knowledge in the field of soil testing for crop and soil health improvement**(BL1-Remember)** **CO2-** Evaluation of various type of Soil Indexes seed diversity on the basis of seed morphology, Biochemical nature and reproductive behavior.**(BL2-Understand)** **CO3-** Evaluate the challenges of commercial Seed production**(BL3-Apply)** **CO4-** Evaluate the role of quality soil, seed & water availability and their effect on farming society 5**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG7(Affordable and clean energy) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Soil sampling and soil testing procedure:	Field work	BL2-Understand	20
Module 2	Quality enhancement of soil:	Field work	BL2-Understand	20
Module 3	Water sampling and water testing:	Field work	BL3-Apply	20
Module 4	Soil quality enhancement:	Field work	BL3-Apply	20
Module 5	Evaluate of GIS and RS based soil mapping	Field work	BL3-Apply	20
Module 6	Development of soil and plant testing laboratory	Field work	BL4-Analyze	20
Module 7	Development of irrigation water testing laboratory	Field work	BL4-Analyze	20
Module 8	Development of Soil Salinity management center	Field work	BL4-Analyze	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	3
CO2	-	1	-	3	-	-	-	-	-	-	-	-	3	1	-
CO3	-	2	3	-	1	-	-	-	-	-	-	-	-	-	3
CO4	-	-	3	-	-	-	-	-	-	-	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Subtropical and Temperate Fruit Production
Course Code	FSC-502[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	3	1	6
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** State structure, nature and importance of horticultural varieties**(BL1-Remember)** **CO2-** Describe Planting and Orchard Floor Management**(BL2-Understand)** **CO3-** Discuss about the importance of use of bio-fertilizers, role of bio-regulators,**(BL3-Apply)** **CO4-** Describe about quality improvement by management practices; maturity indices, harvesting, grading, packing, storage**(BL4-Analyze)** **CO5-** Identification of physiological disorders- causes and remedies**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
1	Importance and Background: Origin, distribution and importance, major species, rootstocks and commercial varieties of regional, national and international importance, eco-physiological requirements.	Fieldwork and outdoor learning, Stimulus activities, Cooperative Learning Strategies, Brainstorming	2
2	Propagation, Planting and Orchard Floor Management: Asexual and sexual methods of propagation.	Fieldwork and outdoor learning, Stimulus activities, Cooperative Learning Strategies, Brainstorming	2
3	Planting and Orchard Floor Management: Propagation, planting systems and densities, training and pruning, rejuvenation and replanting, intercropping, nutrient management, water management, fertigation, use of bio-fertilizers, role of bio-regulators, abiotic factors limiting fruit production.	Fieldwork and outdoor learning, Stimulus activities, Cooperative Learning Strategies, Brainstorming	2
4	Flowering, Fruit-Set and Harvesting: Physiology of flowering, pollination management, fruit set and development, physiological disorders – causes and remedies.	Fieldwork and outdoor learning, Stimulus activities, Cooperative Learning Strategies, Brainstorming	2
5	crop regulation, quality improvement by management practices; maturity indices, harvesting, grading, packing, storage and ripening techniques; insect and disease management.	Fieldwork and outdoor learning, Stimulus activities, Cooperative Learning Strategies, Brainstorming	2

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Distinguished features of tropical fruit species, cultivars and rootstocks.	PBL		
Practical 2	Demonstration of planting systems, training and pruning	PBL		
Practical 3	Hands on practices on pollination and crop regulation	PBL		
Practical 4	Leaf sampling and nutrient analysis	PBL		
Practical 5	Physiological disorders-malady diagnosis	PBL		
Practical 6	Physico-chemical analysis of fruit quality attributes	PBL		
Practical 7	Field/ Exposure visits to tropical orchards	PBL		
Practical 8	Project preparation for establishing commercial orchards	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. Chadha KL and Awasthi RP. 2005. The Apple. Malhotra Publishing House, New Delhi. 2. Chadha TR. 2011. A Text Book of Temperate Fruits. ICAR, New Delhi 3. Childers NF, Morris JR and Sibbett GS. 1995. Modern Fruit Science: Orchard and Small Fruit Culture. Horticultural Publications, USA. 4. Creasy G and Creasy L. 2018. Grapes. CAB International. 5. Davies FS and Albrigo LG. 1994. Citrus. CAB International. 6. Dhillon WS. 2013. Fruit Production in India. Narendra Publishing House, New Delhi. 7. Jackson D, Thiele G, Looney NE and Morley-Bunker M. 2011. Temperate and Subtropical Fruit Production. CAB International. 8. Ladanyia M. 2010. Citrus Fruit: Biology, Technology and Evaluation. Academic Press. 9. Layne DR and Bassi D. 2008. The Peach: Botany, Production and Uses. CABI. 10. Menzel CM and Waite GK. 2005. Litchi and Longan: Botany, Production and Uses. CAB International. 11. Pandey RM and Randey SN. 1996. The Grape in India. ICAR, New Delhi. 12. Rajput CBS, and Haribabu RS. 2006. Citriculture, Kalyani Publishers, New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	3	2	3	-	2	-	-	3	2	1	-
CO2	3	2	1	2	2	2	2	-	2	1	-	2	1	1	-
CO3	2	2	-	2	1	-	2	-	-	-	-	2	1	-	-
CO4	1	-	1	1	1	1	1	-	1	1	-	1	1	1	-
CO5	1	1	-	-	1	1	1	-	1	1	-	1	1	1	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Nutrition of Fruit Crops
Course Code	FSC-508[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Describe the basic concepts and principles of Nutrition in fruit crops **(BL1-Remember)** **CO2-** Understand the importance and various types of nutrients and their uptake mechanisms**(BL2-Understand)** **CO3-** Apply the corrective measures to overcome deficiency or toxicity**(BL3-Apply)** **CO4-** Analyse soil and plant status with respect to various nutrients**(BL4-Analyze)** **CO5-** Evaluate the role various nutrients on yield and quality of fruit crops **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
1	General Concepts and Principles: Importance and history of nutrition in fruit crops, essential plant nutrients, factors affecting plant nutrition; nutrient uptake and their removal from soil.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
2	Diagnostics, Estimation and Application: Nutrient requirements, root distribution in fruit crops, soil and foliar application of nutrients in major fruit crops, fertilizer use efficiency.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
3	Methods and techniques for evaluating the requirement of macro- and micro-elements, Diagnostic and interpretation techniques including DRIS	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
4	: Role of different macro and micro-nutrients, their deficiency and toxicity disorders, corrective measures to overcome deficiency and toxicity disorders.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
5	Integrated Nutrient Management (INM): Fertigation in fruit crops, biofertilizers and their use in INM systems.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Visual identification of nutrient deficiency symptoms in fruit crops	PBL		
Practical 2	Identification and application of organic, inorganic and bio- fertilizers	PBL		
Practical 3	Soil/ tissue collection and preparation for macro- and micro- nutrient analysis	PBL		
Practical 4	Analysis of soil physical and chemical properties- pH, EC, Organic carbon	PBL		
Practical 5	Determination of N,P,K and other macro- and micronutrients	PBL		
Practical 6	Fertigation in glasshouse and field grown horticultural crops	PBL		
Practical 7	Preparation of micro-nutrient solutions, their spray and soil applications	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	• Atkinson D, Jackson JE and Sharples RO. 1980. Mineral Nutrition of Fruit Trees. Butterworth – Heinemann. • Bould C, Hewitt EJ and Needham P. 1983. Diagnosis of Mineral Disorders in Plants Vol.1 Principles. Her Majesty's Stationery Office, London. • Cooke GW. 1972. Fertilizers for maximizing yield. Grenada Publishing Ltd, London. • Epstein E. 1972. Mineral Nutrition of Plants: Principles and Perspectives. Wiley Eastern Ltd. • Kanwar JS. 1976. Soil Fertility-Theory and Practice. ICAR, New Delhi. • Marchner Horst. 1995. Mineral Nutrition of Higher Plants, 2nd Ed. Marschner, Academic Press Inc. San Diego, CA. • Mengel K and Kirkby EA. 1987. Principles of Plant Nutrition. 4th Ed. International Potash Institute, Worblaufen-Bern, Switzerland. • Prakash M. 2013. Nutritional Disorders in Fruit Crops: Diagnosis and Management. NIPA, New Delhi. • Tandon HLS. 1992. Management of Nutrient Interactions in Agriculture. Fertilizer Development and Consultation Organization, New Delhi. • Westerman RL. 1990. Soil Testing and Plant Analysis, 3rd Ed. Soil Science Society of America, Inc., Madison, WI. • Yawalkar KS, Agarwal JP and Bokde S. 1972. Manures and Fertilizers. 3rd Ed. Agri Horticultural Publishing House, Nagpur.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	2	-	-	-	1	-	-	-	-	2	-	-	-
CO3	-	1	1	-	-	1	2	-	-	-	-	-	-	-	-
CO4	1	1	-	-	-	-	1	-	1	-	-	1	-	-	-
CO5	1	1	1	-	-	1	1	-	1	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Principles of Seed Technology
Course Code	GPB- 221[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					1	0	2	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	GPB-221			**Co-Requisite/s**	GPB-221			
Course Outcomes & Bloom's Level	**CO1-** Describe role of quality seed, basic principles and concepts of seed production technology, seed storage, certification and marketing **(BL1-Remember)** **CO2-** Classify different categories of seed and dormancy and discuss the importance of various field operation used in seed production **(BL2-Understand)** **CO3-** Demonstrate seed production technology in cereals, oilseed and pulses crop and seed certification process and laws associated with seed legislation **(BL3-Apply)** **CO4-** Analyze seed health (Purity, viability, germination) and examine the causes and treatment to break dormancy of seed and marketing potential of seed **(BL4-Analyze)** **CO5-** Assess the process seed production of various agricultural crops in different seed production systems and seed quality testing and marketing process **(BL5-Evaluate)** **CO6-** Formulate the seed production, storage, certification and marketing strategies for various agricultural crops under the different ecosystems **(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Seed and seed technology introduction, definition and importance. Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed, Deterioration causes of crop varieties and their control.	Classroom lecture, ABL, Fieldwork and Solution based learning	3
Unit 2	Seed production: Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables, GM crops and organic seed production.	Classroom lecture, ABL, Fieldwork and Solution based learning	3
Unit 3	Seed certification: Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops.	Classroom lecture, ABL, Fieldwork and Solution based learning	3
Unit 4	Seed Processing & Storage Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage.	Classroom lecture, ABL, Fieldwork and Solution based learning	4
Unit 5	Seed marketing: structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies	Classroom lecture, ABL, Fieldwork and Solution based learning	3

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi.	PBL	BL2-Understand	2
Practical 2	Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea.	PBL	BL3-Apply	2
Practical 3	Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard.	PBL	BL3-Apply	2
Practical 4	Seed production in important vegetable crops.	PBL	BL4-Analyze	2
Practical 5	Seed sampling and testing: Physical purity, germination, viability, etc.	Experiments	BL4-Analyze	2
Practical 6	Seed and seedling vigour test. Genetic purity test: Grow out test and electrophoresis.	Experiments	BL4-Analyze	2
Practical 7	Seed certification: Procedure, Field inspection, Preparation of field inspection report.	Field work	BL6-Create	2
Practical 8	Visit to seed production farms, seed testing laboratories and seed processing plant.	Field work	BL6-Create	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

Part E

Books	Agarwal, R.L. (2012). Seed Technology. Oxford & IBH Publishing Company Pvt. Ltd., New Delhi.
Articles	
References Books	Ramamoorthy. K., Sivasubramaniam, K. and Kannan, M. (2006). Principles of Seed Certification and Testing. Allied Publishers, New Delhi.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	-	-	-	3	1	-
CO2	-	2	-	-	1	-	1	1	-	-	-	1	1	2	-
CO3	3	-	1	1	2	-	1	-	1	-	-	2	-	-	1
CO4	-	1	-	1	-	-	-	1	-	-	-	1	-	1	-
CO5	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Crop Improvement-II (Rabi Crops)
Course Code	GPB-321[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					1	0	1	2
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Genetics and Plant Breeding			**Co-Requisite/s**	Genetics and Plant Breeding			
Course Outcomes & Bloom's Level	**CO1-** To recognize the techniques of crop improvements**(BL1-Remember)** **CO2-** To understand the implementation of different crop improvement techniques.**(BL2-Understand)** **CO3-** To apply various techniques for improving the crops.**(BL3-Apply)** **CO4-** To analyses different crop improvement techniques for finding definite goals.**(BL4-Analyze)** **CO5-** To evaluate the improvement in the crops.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Cereals (Wheat, oat and barley) and Pulses (Chickpea)- Centers of origin, Distribution of species, wild relatives, Floral biology, Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, abiotic and biotic stress tolerance and quality.	Thematic teaching, learning by design, ABL and Brain Storming	3
Unit 2	Oilseeds (Linseed, Rapeseed, Sunflower and Mustard) and Vegetable (Potato)- Centers of origin, Distribution of species, wild relatives, Floral biology, Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional). . Hybrid seed production technology.	Thematic teaching, learning by design, ABL and Brain Storming	3
Unit 3	Fodders (Lucern and Berseem) and Cash crop (Sugarcane)- Centers of origin, Distribution of species, wild relatives, Floral biology, Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional)	Thematic teaching, learning by design, ABL and Brain Storming	3
Unit 4	Vegetable-(Tomato, Brinjal, Chilli, Onion)- Centers of origin, Distribution of species, wild relatives, Floral biology, Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional)	Thematic teaching, learning by design, ABL and Brain Storming	3
Unit 5	Horticultural crops (Mango, Aonla and Guava)- Centers of origin, Distribution of species, wild relatives, Floral biology, Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional). Plant genetic resources, its utilization and conservation. Adaptability and stability. Ideotype concept and climate resilient crop varieties for futureWheat, Rice, Maize, Sorghum and Cotton.	Thematic teaching, learning by design, ABL and Brain Storming	4

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Floral biology, emasculation and pollination techniques in wheat.	Field work	BL2-Understand	2
Practical 2	Floral biology, emasculation and pollination techniques in chickpea.	Field work	BL2-Understand	2
Practical 3	Floral biology, emasculation and pollination techniques in mustard.	Field work	BL3-Apply	2
Practical 4	Floral biology, emasculation and pollination techniques in sunflower. Floral	Field work	BL3-Apply	2
Practical 5	biology, emasculation and pollination techniques in potato.	Field work	BL3-Apply	2
Practical 6	Floral biology, emasculation and pollination techniques in sugarcane.	Field work	BL4-Analyze	2
Practical 7	Study of field techniques for hybrid seed production.	Field work	BL4-Analyze	2
Practical 8	Estimation of heterosis, inbreeding depression and heritability.	Field work	BL4-Analyze	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

Part E

Books	Singh, B.D. (2018). Plant Breeding Principles and Methods. Kalyani Publishers. New Delhi. Ram, H. (2019). Crop Breeding and Biotechnology. Kalyani Publishers. New Delhi.
Articles	
References Books	Yadav R.K. (2022). Practical Manual on Crop Improvement-II (Rabi crops). Bhavya Books. Kumar, A., Singh, S.P., Nirala, R.B.P., Singh, P.K. (2018). BAU, Sabour.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	2	2	-	-	-	-	-	-	-	3	1	-
CO2	-	3	2	1	3	-	1	-	-	-	-	1	1	3	-
CO3	3	-	1	2	1	-	-	1	-	-	1	2	-	-	2
CO4	-	3	-	1	-	-	1	-	-	-	1	1	-	1	-
CO5	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Production Technology for Ornamental Crops, MAP and Landscaping
Course Code	HORT- 221[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					1	0	1	2
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Fundamentals of Horticulture			**Co-Requisite/s**	Production Technology for Vegetables and Spices			
Course Outcomes & Bloom's Level	**CO1-** Identify the different ornamental, medicinal and aromatic plants with their respective uses **(BL1-Remember)** **CO2-** Understand the basic principles of landscaping used for planning and layout of gardens. **(BL2-Understand)** **CO3-** Demonstrate various intercultural operations and postharvest practices used in ornamental, medicinal and aromatic crops **(BL3-Apply)** **CO4-** Analyse the challenges and opportunities in marketing of ornamental, medicinal and aromatic crops produces **(BL4-Analyze)** **CO5-** Determine the cost of cultivation of different ornamental, medicinal and aromatic crops **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3
Unit 2	Production technology, of important cur-flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3
Unit 3	Package of practices for loose flowers like marigold and jasmine under open conditions.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3
Unit 4	Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	4
Unit 5	Processing and value addition in ornamental crops and MAPs produce	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Identification of Ornamental and MAP plants.	PBL	BL2-Understand	2
Practical 2	Nursery bed preparation and seed sowing	Field work	BL2-Understand	2
Practical 3	Training and pruning of Ornamental plants	Field work	BL2-Understand	2
Practical 4	Planning and layout of garden.	Field work	BL3-Apply	2
Practical 5	Bed preparation and planting of MAP.	Field work	BL3-Apply	2
Practical 6	Protected structures care and maintenance	Field work	BL4-Analyze	2
Practical 7	Intercultural operations in flowers and MAP	Field work	BL4-Analyze	2
Practical 8	Harvesting and post-harvest handling of cut and loose flowers. Processing of MAP.	Field work	BL5-Evaluate	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

Part E

Books	Lal, L. (2020). Textbook of Production Technology for Ornamental Crops, MAPs & Landscaping. ATPA.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	1	2	-	-	-	-	-	-	-	3	1	-
CO2	-	2	2	-	1	-	1	-	-	-	1	-	-	3	-
CO3	1	-	1	2	1	-	2	-	-	-	-	2	-	-	3
CO4	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	-	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Production Technology for Fruit and Plantation Crops
Course Code	HORT- 222[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					1	0	1	2
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Describe the status and scope of fruit and plantation crops and national and international level**(BL1-Remember)** **CO2-** Understand the climatic requirement of various fruit and plantation crops.**(BL2-Understand)** **CO3-** Demonstrate the various intercultural operations practiced in horticultural crops**(BL3-Apply)** **CO4-** Analyze the role of canopy management for maximising the yield and quality of fruit and plantation crops produces**(BL4-Analyze)** **CO5-** Evaluate the impact of various technologies on fruit and plantation production**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Importance and scope of fruit crops - High density planting - Canopy management- Use of rootstocks in fruit crops. Production technologies of Mango - Botanical name - Family Origin Introduction - Varieties Climate Soil- Propagation - Planting - Manuring- Irrigation Inter Cultivation Harvesting Yield Pests - Stem borer - Nut weevil Fruit fly - Leaf webber - Diseases - Powdery mildew - Anthracnose - Sooty mould - Mango malformation - Physiological disorders-Fruit drop-Alternate bearing- Spongy tissue. Production technology of Banana - Botanical name - Family Origin - Importance- Varieties Climate Soil - Propagation- Planting Manuring - Irrigation Inter Cultivation practices Harvesting Yield Pests - Rhizome weevil - Pseudo Stem weevil- diseases - Sigatoka leaf spot - Panama wilt - Rhizome rot - Bunchy top.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3
Unit 2	Production technology of Citrus (Big Lemon & Malta)- Botanical name Family - Origin- Introduction - Varieties Climate Soil - Propagation - Planting - Manuring - Irrigation Inter Cultivation Harvesting Yield Pests -Butter fly - Fruit sucking moth Citrus leaf miner - Diseases Gummosis Canker - Tristeza - Physiological disorders - Fruit drop Granulation. Production technology of Grape- Botanical name- Family- Origin- Introduction - Varieties Climate Soil - Propagation- Planting- Manuring- Irrigation Inter Cultivation Harvesting Yield Pests-Flea beetles Mealy bug - Stem girdler Diseases- Powdery mildew - Downy Mildew Anthracnose Physiological disorders- Pink berries. Production technology of Guava and Litchi - Botanical name- Family- Origin- Introduction - Varieties Climate Soil- Propagation - Planting- Manuring- Irrigation Inter Cultivation Harvesting Yield Pests of Guava - Tea mosquito bug - Mealybug - Diseases of Guava Wilt.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3
Unit 3	Production technology of Papaya - Botanical name - Family- Origin- Introduction- Varieties Climate Soil Propagation Planting Manuring - Irrigation Inter Cultivation Harvesting Yield Pests Nematodes - diseases - Powdery mildew - Foot rot Mosaic. Production technology of Apple, Pear, Peach - Botanical name Family Origin Importance Varieties Climate Soil Propagation - Planting- Manuring- Irrigation Inter Cultivation Harvesting Yield Pests of Apple - Wooly aphid, Codling moth - Pests of Peach - Fruit Fly - Diseases of Apple- Scab Powdery mildew- Physiological disorder in apple - Bitterpit - Diseases of Pear- Fruit spot - Diseases of Peach- Leaf curl. Production technology of Minor fruits-, Pomegranate - Botanical name- Family- Origin- Importance- Varieties Climate Soil- Propagation- Planting- Manuring- Irrigation Inter cultivation Harvesting Yield, Pests of pomegranate- Butterfly -Fruit sucking moth; Diseases of pomegranate - Anthracnose and bacterial leaf spot - Physiological disorders of pomegranate - Fruit cracking.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	4
Unit 4	Production technology of Jackfruit, Strawberry, Nut crops (Almond & Walnut) - Botanical name- Family- Origin- Importance- Varieties Climate Soil- Propagation- Planting- Manuring- Irrigation Inter cultivation Harvesting Yield Pests of Jackfruit - Spittle bug - Fruit borer Diseases of Jackfruit - Rhizopus rot - Die back.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3
Unit 5	Plantation crops- Scope and Importance; Production technology of Tea - Botanical name- Family- Origin- Importance- Varieties Climate Soil- Propagation- Planting- Manuring- Irrigation Inter cultivation Harvesting Yield - Processing- Pests of Tea - Tea mosquito bug- Red spider mite - Diseases of Tea - Algal leaf spot- Blister blight.	Classroom lecture, ABL, Fieldwork, Solution based learning and PBL	3

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Seed propagation-Scarification and stratification of seeds	PBL	BL2-Understand	2
Practical 2	Propagation methods for fruit and plantation crops	PBL	BL2-Understand	2
Practical 3	Micro-propagation	PBL	BL3-Apply	2
Practical 4	Description and identification of fruit crops	PBL	BL3-Apply	2
Practical 5	Preparation of plant bio regulators and their uses	PBL	BL3-Apply	2
Practical 6	Pests and diseases of Mango, Banana, Citrus	PBL	BL4-Analyze	2
Practical 7	Pests and diseases of Grape, Papaya, guava	PBL	BL4-Analyze	2
Practical 8	Pests and diseases of Apple, Pear, Peach	PBL	BL4-Analyze	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10	0		30	

Part E

Books	Bose, T.K. and Mitra, S.K. (1990). Fruits Tropical and Sub-tropical. Naya Prakashan, Calcutta.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	1	2	-	-	-	-	-	-	-	3	1	-
CO2	-	2	2	-	1	-	1	-	-	-	1	-	1	2	-
CO3	1	-	1	2	1	-	1	-	-	-	-	2	-	3	1
CO4	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	-	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Post Harvest Management and Value Addition of Fruit and Vegetables
Course Code	HORT-321[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					1	0	1	2
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Horticulture			**Co-Requisite/s**	Horticulture			
Course Outcomes & Bloom's Level	**CO1-** Understand the causes of postharvest loss and changes in fruits and vegetables. **(BL1-Remember)** **CO2-** Illustrate the maturity and ripening process. **(BL2-Understand)** **CO3-** Describe different storage techniques for horticultural produce. **(BL3-Apply)** **CO4-** Discuss principle and methods of processing or value addition. **(BL4-Analyze)** **CO5-** Prepare value added product from fruit and vegetable **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Introduction: importance of post-harvest processing of fruits and vegetables, extent and possible causes of post-harvest losses.	Interpretive trials, critical reading & writing, Guided learning, Talk and Presentation	3
Unit 2	Postharvest changes: Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening, respiration and factors affecting respiration rate.	Interpretive trials, critical reading & writing, Guided learning, Talk and Presentation	3
Unit 3	Harvesting and Storage methods: harvesting and field handling, ZECC, cold storage, CA, MA, and hypobaric storage.	Interpretive trials, critical reading & writing, Guided learning, Talk and Presentation	3
Unit 4	Value addition-I: principles and methods of preservation, intermediate moisture food-jam, jelly, marmalade, preserve, candy concepts and standards, fermented and non-fermented beverages	Interpretive trials, critical reading & writing, Guided learning, Talk and Presentation	3
Unit 5	Value addition-II: tomato products- concepts and standards; drying or dehydration of fruits and vegetables concept and methods, osmotic drying; canning - concepts and standards, packaging of products.	Interpretive trials, critical reading & writing, Guided learning, Talk and Presentation	4

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	To study packaging and use of containers for shelf life extension	Experiments	BL2-Understand	2
Practical 2	To study effect of temperature on shelf life and quality of produce.	Experiments	BL2-Understand	2
Practical 3	To study chilling and freezing injury in vegetables and fruits.	Experiments	BL2-Understand	2
Practical 4	To study extraction and preservation of pulps and juices.	Experiments	BL3-Apply	2
Practical 5	To study preparation of osmotically dried products, fruit bar and candy.	Experiments	BL3-Apply	2
Practical 6	To study preparation of jam and jelly.	Experiments	BL3-Apply	2
Practical 7	To prepare RTS, nectar and squash from different kind of fruits.	Experiments	BL3-Apply	2
Practical 8	To prepare different tomato products.	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

Part E

Books	Sudheer, K.P. and Indira, V. (2007). Post-Harvest Management of Horticulture crops. New India Publishing Sharma, S.K. (2010). Postharvest Management and Processing Of Fruits And Vegetables. New India Publishing Agency, Delhi. Sudheer, K. P. And Indira, V. (2007). Postharvest Technology of Horticultural Crops (Vol-7). New India Publishing Agency. Rathore, N.S., Mathur, G. K. and Chasta, S. S. (2012). Post-Harvest Management and Processing Of Fruits And Vegetables. The Energy And Resources Institute. Srivastava, R. P. and Kumar, S. (2017). Fruit Vegetable Preservation. CBS Publishing.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	1	1	-	-	-	-	-	-	-	3	1	-
CO2	-	1	1	-	1	-	-	-	-	-	1	-	1	2	-
CO3	1	-	1	1	2	-	-	-	-	-	-	1	-	1	3
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CO5	-	2	2	1	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Intellectual Property and Its Management in Agriculture
Course Code	PGS-503[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of IPR.**(BL1-Remember)** **CO2-** Elaborate scope of various types of IPRs in agriculture.**(BL2-Understand)** **CO3-** Understand the significance of various national and international initiatives for biodiversity protection.**(BL3-Apply)** **CO4-** Apply the approach of IPRs for protection.**(BL4-Analyze)** **CO5-** CO-5 Equip the students/scholars with skills to apply for IPR. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
1	History of IPR: Historical perspectives and need for the introduction of Intellectual Property Right regime. TRIPs and various provisions in TRIPS Agreement.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
2	Introduction to IPR: Intellectual Property and Intellectual Property Rights (IPR), benefits of securing IPRs.Indian Legislations for the protection of various types of Intellectual Properties.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
3	Fundamentals of IPRs: Fundamentals of patents, copyrights. Geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks, protection of plant varieties and farmers' rights and biodiversity protection.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
4	: Protection of IPR: Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
5	National and International initiatives: National Biodiversity protection initiatives; Convention on Biological Diversity.International Treaty on Plant Genetic Resources for Food and Agriculture.Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. Erbisch FH and Maredia K.1998. Intellectual Property Rights in Agricultural Biotechnology. CABI. 2. Ganguli P. 2001. Intellectual Property Rights: Unleashing Knowledge Economy. McGraw-Hill. 3. Intellectual Property Rights: Key to New Wealth Generation. 2001. NRDC and Aesthetic Technologies. 4. Ministry of Agriculture, Government of India. 2004. State of Indian Farmer. Vol. V. Technology Generation and IPR Issues. Academic Foundation. 5. Rothschild M and Scott N. (Ed.). 2003. Intellectual Property Rights in Animal Breeding and Genetics. CABI. 6. Saha R. (Ed.). 2006. Intellectual Property Rights in NAM and Other Developing Countries: A Compendium on Law and Policies. Daya Publ. House.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	1	-	-	-	2	-	-	-	2	-	-	-
CO3	2	-	3	-	-	-	-	-	-	-	-	1	-	-	-
CO4	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
CO5	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Postharvest Management of Horticulture Produce
Course Code	PHM-501[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** State structure, nature and importance of horticultural produce **(BL1-Remember)** **CO2-** Describe regulation of ripening by use of chemicals and growth regulators**(BL2-Understand)** **CO3-** Operate pre and Postharvest treatments for extending storage life/ vase life**(BL3-Apply)** **CO4-** Examine standards and specifications for fresh produce**(BL4-Analyze)** **CO5-** Judge handling system and marketing of horticultural crops**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
1	Importance and scope History, Importance and scope of Postharvest technology of horticultural produce. Nature and structure of horticultural produce. Pre and Postharvest losses and their causes.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
2	Regulation of ripening Climacteric and non-climacteric fruits. Regulation of ripening by use of chemicals and growth regulators. Control of sprouting, rooting and discoloration in vegetables.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
3	Treatments for extending shelf life Maturity indices for harvest. Harvesting and harvesting tools. Curing in roots and tubers. Pre-package Operation: Pre-cooling, washing,sorting, grading of horticultural perishables for local markets andexport. Postharvest handling of spices, plantation crops, medicinaland aromatic plants. Equipment for washing, sizing, grading.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
4	Handling system and marketing of horticultural crops Pre and Postharvest treatments for extending storage life/ vase life. VHT, irradiation treatment, skin coating, de-greening, etc. Pre-packaging, Packaging techniques for local market and export. Standards and specifications for fresh produce	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2
5	Handling system and marketing of horticultural crops Postharvest handling system for horticulture crops of regional importance. Principles of transport, modes of transportation, types of vehicles and transit requirements for different horticultural produce. Marketing: Factors influencing marketing of perishable crops, marketing systems and organizations.	Guided learning Fieldwork and outdoor learning Cooperative Learning Strategies Brainstorming Problem-based learning	2

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Study of maturity indices for harvest of fruits, vegetables, spices and plantation crops;	PBL		
Practical 2	Protective skin coating with wax emulsion and pre and Postharvest treatment with fungicides and chemicals	PBL		
Practical 3	Pre-packaging of perishables	PBL		
Practical-4	Extension of vase life of cut flowers by use of chemicals and growth regulators;	PBL		
Practical-5	Control of sprouting of potato and onion by using growth regulators	PBL		
Practical-6	Study of effect of pre-cooling on shelf-life and quality of fresh fruits, vegetables and flowers;	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. Bhattacharjee SK and Dee LC. 2005. Postharvest technology of flowers and ornamental plants. Pointer publishers, Jaipur. 2. Chattopadhyay SK. 2007. Handling, transportation and storage of fruit and vegetables. GeneTech books, New Delhi 3. FAO. 2007. Handing and Preservation of Fruits and Vegetables by Combined methods for Rural Areas-Technical Manual. FAO Agr.Ser.Bull., 149. 4. Kader AA. 1992. Postharvest technology of horticultural crops. 2nd ed university of California. 5. Paliyath G, Murr DP, Handa AK and Lurie S. 2008. Postharvest Biology and Technology of Fruits, Vegetables and Flowers, Wiley-Blackwell, ISBN: 9780813804088. 6. Pruthi JS. 2001 (Reprint). Major spices of India crop management and Postharvest technology. ICAR, New Delhi 7. Stawley J Kays. 1998. Postharvest physiology of perishable plant products. CBS publishers. 8. Sudheer KP, Indira V. 2007. Postharvest Technology of Horticultural Crops, Peter K.V. (Ed.), New India Publishing Agency, ISBN 9788189422431. 9. Sunil Pareek (Ed.) 2016. Postharvest Ripening Physiology of Crops, CRC Press, ISBN 9781498703802. 10. Thompson AK. (Ed.) 2014. Fruit and Vegetables: Harvesting, Handling and Storage (Vol. 1 & 2) Blackwell Publishing Ltd, Oxford, UK. ISBN: 9781118654040.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO2	2	-	2	-	2	-	2	-	-	-	-	2	-	-	-
CO3	-	1	-	-	1	1	1	-	-	-	-	1	-	-	-
CO4	1	-	1	-	-	1	-	-	1	-	-	-	-	-	-
CO5	1	1	1	-	-	-	1	-	1	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Village Attachment
Course Code	RAWE-401

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					0	0	8	8
Course Type	Embedded theory and field work							
Course Category	Discipline Core							
Pre-Requisite/s	Agriculture extension			**Co-Requisite/s**	Agriculture extension			
Course Outcomes & Bloom's Level	**CO1-** To provide an opportunity to the students to understand the rural setting in relation to agriculture and allied activities**(BL1-Remember)** **CO2-** To make the students familiar with socio-economic conditions of the farmers and their problems.**(BL2-Understand)** **CO3-** To impart diagnostic and remedial knowledge to the students relevant to real field situations through practical training**(BL3-Apply)** **CO4-** To develop communication skills in students using extension teaching methods in transfer of technology.**(BL4-Analyze)** **CO5-** To acquaint students with on-going extension and rural development programmes.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Survey of Village	Field work	BL4-Analyze	16
Module-2	Agronomical Interventions	Field work	BL3-Apply	16
Module-3	Plant Protection Interventions:	Field work	BL3-Apply	16
Module-4	Soil Improvement Interventions:	Field work	BL3-Apply	16
Module-5	Fruit and Vegetable production interventions	Field work	BL3-Apply	16
Module-6	Food Processing and Storage interventions	Field work	BL3-Apply	16
Module-7	Animal Production Interventions	Field work	BL3-Apply	16
Module-8	Extension and Transfer of Technology activities	Field work	BL5-Evaluate	16

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	41				
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	ICAR. (2016). Student READY: Rural Entrepreneurship Awareness Development Yojana. Krishi Anusandhan Bhawan-II, New Delhi
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-
CO3	-	3	2	1	-	-	1	1	1	-	1	1	-	-	2
CO4	-	2	3	1	-	-	-	1	-	-	1	1	-	1	-
CO5	-	2	2	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Unit Attachment
Course Code	RAWE-402

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					0	0	6	6
Course Type	Embedded theory and field work							
Course Category	Discipline Core							
Pre-Requisite/s	Agriculture extension			**Co-Requisite/s**	Agriculture extension			
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training in the field/lab work activities**(BL1-Remember)** **CO2-** Evaluation of various practical exposure in the industry/ firm, institutions**(BL2-Understand)** **CO3-** Analyze the challenges of concerned institutions, industry **(BL3-Apply)** **CO4-** Evaluate the quality materials & marketing channels effects to the product**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG8(Decent work and economic growth) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	. Identification of Agricultural problems of the village and training needs of the farmers.	PBL		
Practical 2	Conducting method demonstrations of improved practices.	Field work	BL2-Understand	20
Practical 3	Organization of short duration farmers training, campus, field visits and agricultural exhibitions.	Field work	BL3-Apply	20
Practical 4	Study of the on-going extension programmes in the villages.	Field work	BL4-Analyze	20
Practical 5	Arrange farmers meeting to discuss Agricultural aspects.	Field work	BL4-Analyze	20
Practical 6	Visit to village institutions and study their role in development programmes and extension activities.	Field work	BL5-Evaluate	20
Practical 7	Documentation of success stories.	Field work	BL5-Evaluate	20
Practical 8	Reporting the Village Attachment activities.	Field work	BL6-Create	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	41				
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Ojha, P.K., Mishra, D., Gupta, B.K., Verma, A.P. and Mishra B.P. (2022). Mannual, Rural Agricultural Work Experience (RAWE) Programme. Banda University of Agriculture and Technology, Banda. RWEP (2004), Rural Work Experience Programme, Revised Manual, Agricultural College, GKVK, UAS, Bangalore.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	1	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	1	-
CO5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Agro- Industrial attachment
Course Code	RAWE-403

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					0	0	4	4
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Agriculture extension			**Co-Requisite/s**	Agriculture extension			
Course Outcomes & Bloom's Level	**CO1-** To expose the students to Industrial environment, this cannot be simulated in the university**(BL1-Remember)** **CO2-** To introduce the students to a variety of Materials, Machines, Processes, Products, and their applications in addition to pertinent shop management topics.**(BL2-Understand)** **CO3-** To impart to the pupils an understanding of the manufacturing processes, problem-solving techniques, and worker psychology.**(BL3-Apply)** **CO4-** Evaluate the various aspects of entrepreneurship during the programme period**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Identification of plant clinics and agro-industries in the localities.	PBL		
Practical 2	Management of plant clinics and agro-industries in the localities	Field work	BL2-Understand	20
Practical 3	Learning the working of the plant clinics and agro-industries.	Field work	BL3-Apply	20
Practical 4	Day to day operations of plant clinics and agro-industries.	Field work	BL4-Analyze	20
Practical 5	Handling Day to day problems at plant clinics and agro-industries.	Field work	BL5-Evaluate	20
Practical 6	Association of farmers with the plant clinics and agro-industries.	Field work	BL5-Evaluate	20
Practical 7	Development of entrepreneurship in plant clinics and agro-industries.	Field work	BL5-Evaluate	20
Practical 8	Documentation of success stories.	Field work	BL5-Evaluate	30

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	41				
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	Waller, J., Ritchie, B., Holderness, M. (1997). Plant Clinic Handbook. CABI Publishing. Das, G., Biswas, A., Bisht, D., Saha, N., Yasmin, S., Priyadarshinee, S. and Sardar, K. (2022). A manual on Rural Agriculture Work Experience and Agro Industrial Attachment. Notion Press.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	1	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	1	-
CO5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Plant Clinic Attachment
Course Code	RAWE-404

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Agriculture extension			**Co-Requisite/s**	Agriculture extension			
Course Outcomes & Bloom's Level	**CO1-** Students will acquire training in the fields plant protection techniques**(BL1-Remember)** **CO2-** Evaluation of various plant diseases **(BL2-Understand)** **CO3-** Analyze the challenges regarding the implementation of suggested plant protection measures to the farmers**(BL3-Apply)** **CO4-** Evaluate the frequency of various diseases, and the presence of insect pests on various crops & corrective actions to control**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Plant Clinic Attachment	Field work	BL3-Apply	32

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	41				
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41			100	

Part E

Books	ICAR. (2016). Student READY: Rural Entrepreneurship Awareness Development Yojana. Krishi Anusandhan Bhawan-II, New Delhi
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	2	2	1	-	3	-	1	1	1	1	2	-
CO3	-	3	3	1	1	3	2	1	2	-	1	1	-	-	2
CO4	-	3	3	1	1	-	-	1	-	-	1	1	-	1	-
CO5	-	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Genetics_and_Plant_Breeding

Title of the Course	Seed Production Principles and Techniques in Field Crops
Course Code	SST-503[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Seed Technology Fundamentals			**Co-Requisite/s**	Entomology Basics			
Course Outcomes & Bloom's Level	**CO1-** Understand about role of pollinator in quality seed production **(BL1-Remember)** **CO2-** Describe the concept of IPM during seed production and storage **(BL2-Understand)** **CO3-** Understand the classes of pesticides and its use during production and storage of seed **(BL3-Apply)** **CO4-** Conceptualize the detection and loss estimation due to pests in seed storage. **(BL4-Analyze)** **CO5-** Learning about Process of fumigation and its effect **(BL5-Evaluate)** **CO6-** Learning about Process of safe seed storage **(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕			**SDG (Goals)**	SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education)			

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Principles of seed entomology; pollinator insects, insect pests and their classification based on mode of infestation etc.	Cooperative, Interpretive Trails, Critical reading and Writing, ABL	6
Unit 2	Principles of insect pollination, role of pollinators in seed production. Augmenting quality seed production through honeybee pollination incrucifers and forage legumes. Plant protection measures in bee pollinated crops. Management of pollinators for hybrid seed production.	Cooperative, Interpretive Trails, Critical reading and Writing, ABL	6
Unit 3	Major insect pests of principal crops and their management practices. Methods of insect pest control. Classes of pesticides, their handling and safe use on seed crops.	Cooperative, Interpretive Trails, Critical reading and Writing, ABL	6
Unit 4	Storage insect pests infecting seeds, their development and economic importance. Storage losses due to pests, control of storage pests, management of storage insects pests, mites and rodents, seed sampling and loss estimation.	Cooperative, Interpretive Trails, Critical reading and Writing, ABL	6
Unit 5	Principles of fumigation and their use, effect of different fumigants; preservatives and seed protectants on seed quality; Type of storage structures domestic and commercial.	Cooperative, Interpretive Trails, Critical reading and Writing, ABL	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Collection and identification of insect-pollinators, collection and identification of important pests of stored seeds.	Field work	BL2-Understand	2
Practical 2	Detection and estimation of pest infestation vis- a- vis loss of seed quality	Field work	BL3-Apply	2
Practical 3	Safe handing and use of fumigants and insecticides.	Field work	BL3-Apply	2
Practical 4	Safety measures in fumigating and disinfecting , exposure period, aeration etc. the storage structures.	Field work	BL4-Analyze	2
Practical 5	Plant protection equipments, their operation and maintenance.	Field work	BL5-Evaluate	2
Practical 6	Pesticides, its dose determination, preparation of solution and its application.	Field work	BL6-Create	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	19	0			

Part E

Books	Agarwal, N.A., & Girish, G.K. (1977). An Introduction to Action Programme to Regress on Farm Storage Losses in India. FAO/NORAD Seminar on Farm Storage Grain in India, Nov. 29-Dec. 8, 1977. Anderson, J.A. & Aleock, A.W. (1954). Storage of Cereal Grain & theirProducts. American Assoc. Cereal Chemists, St. Pauls, Minn. Cottong, R.T. (1963). Insect Pests of Stored Grain and Grain Products. Burgess Publ. Co., Minneopolis, Minn., USA. Monro, (1969). Manual of Fumigation for Insect Control. FAO Rome Agril. Studies No. 79. Subramanyam, B. & Hagstrum, D.W. (1995). Interrelated Management of Insects in Stored Products. Marcel Dekker.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	3	-	-	-	-	-	-	-	-	3	1	-
CO2	-	-	-	-	-	1	-	-	-	-	-	-	1	2	-
CO3	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
CO4	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
CO5	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Production of Cool Season Vegetable Crops
Course Code	VSC-501[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Enlist the varietal strength of cool season vegetable crops.**(BL1-Remember)** **CO2-** Explain the production technology of temperate vegetable crops.**(BL2-Understand)** **CO3-** Demonstrate the intercultural operations in cool season vegetable crops.**(BL3-Apply)** **CO4-** Analyze the difference between cool season and warm season vegetable crops.**(BL4-Analyze)** **CO5-** Apply knowledge of intercultural practices for improving yield of vegetable crops.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction, commercial and nutritional importance, origin and distribution, botany and taxonomy, area, production, productivity and constraints, soil requirements, climatic factors for yield and quality, commercial varieties/ hybrids, seed rate and seed treatment, raising of nursery, sowing/ planting time and methods, hydroponics and aeroponics, precision farming, cropping system, nutritional including micronutrients and irrigation requirements, intercultural operations, special horticultural practices, weed control, mulching, role of plant growth regulators, physiological disorders, maturity indices, harvesting, yield, post-harvest management (grading, packaging and marketing), pest and disease management and production economics of crops. UNIT I Bulb and tuber crops: Onion, garlic and potato.	Cooperative Learning Strategies, Brainstorming, Problem-based learning, Guided Questioning, Fieldwork and outdoor learning, Stimulus activities	2
2	Cole crops: Cabbage, cauliflower, kohlrabi, broccoli, Brussels sprouts and kale.	Cooperative Learning Strategies, Brainstorming, Problem-based learning, Guided Questioning, Fieldwork and outdoor learning, Stimulus activities	2
3	Root crops: carrot, radish, turnip and beetroot	Cooperative Learning Strategies, Brainstorming, Problem-based learning, Guided Questioning, Fieldwork and outdoor learning, Stimulus activities	2
4	Peas and beans: Garden peas and broad bean.	Cooperative Learning Strategies, Brainstorming, Problem-based learning, Guided Questioning, Fieldwork and outdoor learning, Stimulus activities	2
5	Leafy vegetables: Beet leaf, fenugreek, coriander and lettuce.	Cooperative Learning Strategies, Brainstorming, Problem-based learning, Guided Questioning, Fieldwork and outdoor learning, Stimulus activities	2

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Scientific raising of nursery and seed treatment	PBL		
Practical 2	Sowing and transplanting	PBL		
Practical 3	Description of commercial varieties and hybrids	PBL		
Practical 4	Demonstration on methods of irrigation, fertilizers and micronutrients application	PBL		
Practical 5	Mulching practices, weed management	PBL		
Practical 6	Use of plant growth substances in cool season vegetable crops;	PBL		
Practical 7	Study of nutritional and physiological disorders	PBL		
Practical 8	Studies on hydroponics, aeroponics and other soilless culture	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	1. Bose TK, Kabir J, Maity TK, Parthasarathy VA &Som MG. 2003. Vegetable Crops. Vols. I-III. NayaUdyog. 2. Bose TK, Som MG &Kabir J. (Eds.). 2002. Vegetable Crops. NayaProkash. 3. Chadha KL &Kalloo G. (Eds.). 1993-94. Advances in Horticulture. Vols. V-X. Malhotra Publ. House. 4. Fageria MS, Choudhary BR & Dhaka RS. 2000. Vegetable Crops: Production Technology. Vol. II. Kalyani. 5. Gopalakrishanan TR. 2007. Vegetable Crops. New India Publ. Agency. 6. Rana MK. 2008. Olericulture in India. Kalyani. 7. Rana MK. 2008. Scientific Cultivation of Vegetables. Kalyani. 8. Shanmugavelu KG. 1989. Production Technology of Vegetable Crops. Oxford & IBH. 9. Singh DK. 2007. Modern Vegetable Varieties and Production Technology. International Book Distributing Co. 10. Singh NP, Bharadwaj AK, Kumar A & Singh KM. 2004. Modern Technology on Vegetable Production. International Book Distributing Co. 11. Singh SP. (Ed.). 1989. Production Technology of Vegetable Crops. Agril. Comm. Res. Centre. 12. Thamburaj S & Singh N. 2004. Vegetables, Tuber Crops and Spices. ICAR.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	-	-	1	-	-	-	2	-	1	-	-	-	-	-	-
CO4	1	1	1	-	-	-	1	-	-	-	1	-	-	-	-
CO5	1	-	1	-	-	-	1	-	1	1	-	-	1	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Production Technology Of Warm Season Vegetable Crops
Course Code	VSC-502[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	3	1	6
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Enlist the varietal strength of warm season vegetable crops.**(BL1-Remember)** **CO2-** Explain the production technology of warm season vegetable crops.**(BL2-Understand)** **CO3-** Demonstrate the intercultural operations in warm season vegetable crops.**(BL3-Apply)** **CO4-** Analyze the difference between warm season and cool season vegetable crops.**(BL4-Analyze)** **CO5-** Apply knowledge of intercultural practices for improving yield of vegetable crops.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction, commercial and nutritional importance, origin and distribution, botany and taxonomy, area, production, productivity and constraints, soil requirements, climatic factors for yield and quality, commercial varieties/ hybrids, seed rate and seed treatment, raising of nursery, sowing/ planting time and methods, hydroponics and aeroponics, precision farming, cropping system, nutritional including micronutrients and irrigation requirements, intercultural operations, special horticultural practices, weed control, mulching, role of plant growth regulators, physiological disorders, maturity indices, harvesting, yield, post-harvest management (grading, packaging and marketing), pest and disease management and production economics of crops. Bulb and tuber crops: Onion, garlic and potato.	Cooperative Learning Strategies Brainstorming Stimulus activities Fieldwork and outdoor learning	2
2	Cole crops: Cabbage, cauliflower, kohlrabi, broccoli, Brussels sprouts and kale.	Cooperative Learning Strategies, Fieldwork and outdoor learning, Guided Learning/Questioning, Talks and presentations	2
3	Root crops: carrot, radish, turnip and beetroot	Cooperative Learning Strategies, Fieldwork and outdoor learning, Guided Learning/Questioning, Talks and presentations	2
4	Peas and beans: Garden peas and broad bean.		2
5	Leafy vegetables: Beet leaf, fenugreek, coriander and lettuce.	Cooperative Learning Strategies, Fieldwork and outdoor learning, Guided Learning/Questioning, Talks and presentations	2

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Scientific raising of nursery and seed treatment	PBL		
Practical 2	Sowing, transplanting, vegetable grafting	PBL		
Practical 3	Description of commercial varieties and hybrids	PBL		
Practical 4	Demonstration on methods of irrigation, fertilizers and micronutrients application	PBL		
Practical 5	Mulching practices, weed management	PBL		
Practical 6	Use of plant growth substances in warm season vegetable crops;	PBL		
Practical 7	Study of nutritional and physiological disorders;	PBL		
Practical 8	Studies on hydroponics, aeroponics and other soilless culture;	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. Bose TK, Kabir J, Maity TK, Parthasarathy VA &Som MG. 2003. Vegetable Crops. Vols. I-III. NayaUdyog. 2. Bose TK, Som MG &Kabir J. (Eds.). 2002. Vegetable Crops. NayaProkash. 3. Chadha KL &Kalloo G. (Eds.). 1993-94. Advances in Horticulture. Vols. V-X. Malhotra Publ. House. 4. Fageria MS, Choudhary BR & Dhaka RS. 2000. Vegetable Crops: Production Technology. Vol. II. Kalyani. 5. Gopalakrishanan TR. 2007. Vegetable Crops. New India Publ. Agency. 6. Rana MK. 2008. Olericulture in India. Kalyani. 7. Rana MK. 2008. Scientific Cultivation of Vegetables. Kalyani. 8. Shanmugavelu KG. 1989. Production Technology of Vegetable Crops. Oxford & IBH. 9. Singh DK. 2007. Modern Vegetable Varieties and Production Technology. International Book Distributing Co. 10. Singh NP, Bharadwaj AK, Kumar A & Singh KM. 2004. Modern Technology on Vegetable Production. International Book Distributing Co. 11. Singh SP. (Ed.). 1989. Production Technology of Vegetable Crops. Agril. Comm. Res. Centre. 12. Thamburaj S & Singh N. 2004. Vegetables, Tuber Crops and Spices. ICAR.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO3	-	1	-	-	-	-	1	-	1	-	-	2	-	1	-
CO4	1	-	-	-	-	1	-	-	-	-	-	-	1	-	-
CO5	1	1	-	-	-	1	1	-	1	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Growth and Development of Vegetable Crops
Course Code	VSC-503[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To identify plant growth substances.**(BL1-Remember)** **CO2-** To understand role and use of plant growth substance in vegetable production.**(BL2-Understand)** **CO3-** To detect plant growth substance in plant sample.**(BL3-Apply)** **CO4-** To analyze plant growth physiology.**(BL4-Analyze)** **CO5-** To evaluate the effects of abiotic stresses in horticultural crops.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit – 1	Unit – 1 Introduction and phytohormones: Definition of growth and development; Cellular structures and their functions; Physiology of phyto-hormones functioning/ biosynthesis and mode of action; Growth analysis and its importance in vegetable production.	Cooperative Learning Strategies Brainstorming Problem-based learning Guided Questioning Fieldwork and outdoor learning Stimulus activities	2
Unit-2	Unit – 2 Physiology of dormancy and germination: Physiology of dormancy and germination of vegetable seeds, tubers and bulbs; Role of auxins, gibberellilns, cyktokinins and abscissic acid; Application of synthetic PGRs including plant growth retardants and inhibitors for various purposes in vegetable crops; Role and mode of action of morphactins, antitranspirants, anti-auxin, ripening retardant and plant stimulants in vegetable crop production.	Cooperative Learning Strategies Brainstorming Problem-based learning Guided Questioning Fieldwork and outdoor learning Stimulus activities	2
Unit – 3	Unit – 3 Abiotic factors: Impact of light, temperature, photoperiod, carbon dioxide, oxygen and other gases on growth, development of underground parts, flowering and sex expression in vegetable crops; Apical dominance.	Cooperative Learning Strategies Brainstorming Problem-based learning Guided Questioning Fieldwork and outdoor learning Stimulus activities	2
Unit – 4	Unit – 4 Fruit physiology: Physiology of fruit set, fruit development, fruit growth, flower and fruit drop; parthenocarpy in vegetable crops; phototropism, ethylene inhibitors, senescence and abscission; fruit ripening and physiological changes associated with ripening.	Cooperative Learning Strategies Brainstorming Problem-based learning Guided Questioning Fieldwork and outdoor learning Stimulus activities	2
Unit – 5	Unit – 5 Morphogenesis and tissue culture: Morphogenesis and tissue culture techniques in vegetable crops; Grafting techniques in different vegetable crops.	Cooperative Learning Strategies Brainstorming Problem-based learning Guided Questioning Fieldwork and outdoor learning Stimulus activities	2

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Preparation of plant growth regulator's solutions and their application	PBL		
Practical 2	Experiments in breaking and induction of dormancy by chemicals	PBL		
Practical 3	Induction of parthenocarpy and fruit ripening;	PBL		
Practical 4	Application of plant growth substances for improving flower initiation, changing sex expression in cucurbits and checking flower and fruit drops and improving fruit set in solanaceous vegetables	PBL		
Practical 5	Growth analysis techniques in vegetable crops;	PBL		
Practical 6	Grafting techniques in tomato, brinjal, cucumber and sweet pepper.	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	1. Bleasdale JKA. 1984. Plant physiology in relation to horticulture (2nd Edition) MacMillan. 2. Gupta US. Eds. 1978. Crop physiology. Oxford and IBH, New Delhi. 3. Kalloo G. 2017. Vegetable grafting: Principles and practices. CAB International 4. Krishnamoorti HN. 1981. Application growth substances and their uses in agriculture. Tata McGraw Hill, New Delhi. 5. Leopold AC and Kriedemann PE. 1981. Plant growth and development, Tata McGraw-Hill, New Delhi. 6. Peter KV and Hazra P. (Eds). 2012. Hand book of vegetables.Studium Press LLC, P.O. Box 722200, Houston, Texas 77072, USA, 678p. 7. Peter KV. (Eds). 2008. Basics of horticulture. New India publication agency, New Delhi. 8. Rana MK. 2011. Physio-biochemistry and Biotechnology of Vegetables. New India Publishing Agency, Pritam Pura, New Delhi. 9. Saini et al. (Eds.). 2001. Laboratory manual of analytical techniques in horticulture. Agrobios, Jodhpur. 10. Wien HC. (Eds.). 1997. The physiology of vegetable crops. CAB International.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	-	-	-	-	-	-	1	-	-	-	2	2	-	-	-
CO3	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	1	-	-	-	1	1	1	-	-
CO5	1	-	-	-	-	-	1	-	-	-	1	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Princinples of Vegetable Breeding
Course Code	VSC-504[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of IPR.**(BL1-Remember)** **CO2-** Elaborate scope of various types of IPRs in agriculture.**(BL2-Understand)** **CO3-** Understand the significance of various national and international initiatives for biodiversity protection.**(BL3-Apply)** **CO4-** Apply the approach of IPRs for protection.**(BL4-Analyze)** **CO5-** CO-5 Equip the students/scholars with skills to apply for IPR. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Floral biology and pollination behaviour of different vegetables	PBL		
Practical 2	Techniques of selfing and crossing of different vegetables, viz., Cole crops, okra, cucurbits, tomato, eggplant, hot pepper, etc.;	PBL		
Practical 3	Breeding system and handling of filial generations of different vegetables;	PBL		
Practical 4	Exposure to biotechnological lab practices	PBL		
Practical 5	Visit to breeding farms	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
30	15				

Part E

Books	1. Kalloo G. 1988. Vegetable breeding (Vol. I, II, III). CRC Press, Fl, USA. 2. Kole CR. 2007. Genome mapping and molecular breeding in plants-vegetables. Springer, USA. 3. Peter KVand Pradeep Kumar T. 1998. Genetics and breeding of vegetables. ICAR, New Delhi, p. 488. 4. Prohens J and Nuez F. 2007. Handbook of plant breeding-vegetables (Vol I and II). Springer, USA. 5. Singh BD. 2007. Plant breeding- principles and methods (8th edn.). Kalyani Publishers, New Delhi. 6. Singh Ram J. 2007. Genetic resources, chromosome engineering, and crop improvement-vegetable crops (Vol. 3). CRC Press, Fl, USA.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	2	-	-	2	-	-	-	-	2	-	-	-
CO3	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-
CO4	1	-	-	-	-	-	1	-	-	-	-	1	-	-	-
CO5	1	-	-	1	-	-	1	-	-	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Breeding of Self Pollinated Vegetable Crops
Course Code	VSC-505[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of IPR.**(BL1-Remember)** **CO2-** Elaborate scope of various types of IPRs in agriculture.**(BL2-Understand)** **CO3-** Understand the significance of various national and international initiatives for biodiversity protection.**(BL3-Apply)** **CO4-** Apply the approach of IPRs for protection.**(BL4-Analyze)** **CO5-** CO-5 Equip the students/scholars with skills to apply for IPR. **(BL5-Evaluate)** **CO6- ()**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG15(Life on land)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Floral mechanisms favouring self and often cross pollination	PBL		
Practical 2	Progeny testing and development of inbred lines	PBL		
Practical 3	Selection of desirable plants from breeding population, observations and analysis of various qualitative and quantitative traits in germplasm, hybrids and segregating generations;	PBL		
Practical 4	Palynological studies, selfing and crossing techniques;	PBL		
Practical 5	Hybrid seed production of vegetable crops in bulk	PBL		
Practical 6	Screening techniques for biotic and abiotic stress resistance in above mentioned crops;	PBL		
Practical 7	Molecular marker techniques to identify useful traits in the vegetable crops and special breeding techniques;	PBL		
Practical 8	Visit to breeding farms;	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	A. Text and Reference books: 1. Allard RW. 1999. Principles of plant breeding. John Wiley and Sons. 2. Basset MJ. (Ed.). 1986. Breeding vegetable crops. AVI Publ. Dhillon BS, Tyagi RK, Saxena S and Randhawa GJ. 2005, Plant genetic resources: horticultural crops. Narosa Publ. House. 3. Fageria MS, Arya PS and Choudhary AK. 2000, Vegetable crops: Breeding and seed production. Vol. I. Kalyani. 4. Gardner EJ. 1975. Principles of genetics. John Wiley and Sons. Hayes HK, Immer FR and Smith DC. 1955. Methods of plant breeding. McGraw-Hill. 5. Hayward MD, Bosemark NO and Romagosa I. (Eds.). 1993. Plant Breeding-principles and prospects. Chapman and Hall. 6. Hazra P and Som MG. 2015. Vegetable science (Second revised edition), Kalyani publishers, Ludhiana, 598 p. 7. Hazra P and Som MG. 2016. Vegetable seed production and hybrid technology (Second revised edition), Kalyani Publishers, Ludhiana, 459p 8. Kalloo G. 1988. Vegetable breeding. Vols. I-III. CRC Press. 9. Kalloo G. 1998. Vegetable breeding. Vols. I-III (Combined Ed.). PanimaEdu. Book Agency. 10. Kumar JC and Dhaliwal MS. 1990. Techniques of developing hybrids in vegetable crops. Agro Botanical Publ. 11. Paroda RS and Kalloo G. (Eds.). 1995. Vegetable research with special reference to hybrid technology in Asia-Pacific Region. FAO. 12. Peter KV and Pradeepkumar T. 2008. Genetics and breeding of vegetables. Revised, ICAR. 13. Peter KV and Hazra P. (Eds). 2012. Hand book of vegetables. Studium press LLC, P.O. Box 722200, Houston, Texas 77072, USA, 678p. 14. Peter KV and Hazra P (Eds). 2015. Hand book of vegetables Volume II.Studium Press LLC, P.O. Box 722200, Houston, Texas 77072, USA, 509 p. 15. Peter KV and Hazra P. (Eds). 2015. Hand book of vegetables Volume III.Studium Press LLC, P.O. Box 722200, Houston, Texas 77072, USA, 634 p. 16. Rai N and Rai M. 2006. Heterosis breeding in vegetable crops. New India Publ. Agency. Ram HH. 1998. Vegetable breeding: principles and practices. Kalyani Publishers, New Delhi. 17. Simmonds NW. 1978. Principles of crop improvement. Longman. Singh BD. 1983. Plant Breeding. Kalyani Publishers, New Delhi. 18. Singh PK, Dasgupta SK and Tripathi SK. 2004. Hybrid vegetable development. International Book Distributing Co. 19. Swarup V. 1976. Breeding procedure for cross-pollinated vegetable crops. ICAR.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	2	-	-	2	-	-	-	-	-	-	-	-
CO2	-	2	1	1	-	2	1	-	-	-	-	-	1	-	-
CO3	2	-	1	2	-	1	1	-	1	-	-	-	-	1	-
CO4	-	1	-	-	-	-	-	-	-	-	-	3	2	-	-
CO5	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Breeding of Cross Pollinated Vegetable Crops
Course Code	VSC-506[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	3	1	6
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of IPR.**(BL1-Remember)** **CO2-** Elaborate scope of various types of IPRs in agriculture.**(BL2-Understand)** **CO3-** Understand the significance of various national and international initiatives for biodiversity protection.**(BL3-Apply)** **CO4-** Apply the approach of IPRs for protection.**(BL4-Analyze)** **CO5-** CO-5 Equip the students/scholars with skills to apply for IPR. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG13(Climate action) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Floral mechanisms favoring cross pollination	PBL		
Practical 2	Development of inbred lines	PBL		
Practical 3	Selection of desirable plants from breeding population	PBL		
Practical 4	Observations and analysis of various quantitative and qualitative traits in germplasm, hybrids and segregating generations	PBL		
Practical 5	Induction of flowering, palynological studies, selfing and crossing techniques	PBL		
Practical 6	Hybrid seed production of vegetable crops in bulk; Screening techniques for biotic and abiotic stress resistance in above mentioned crops	PBL		
Practical 7	Demonstration of sib-mating and mixed population;	PBL		
Practical 8	Molecular marker techniques to identify useful traits in vegetable crops and special breeding techniques;	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	□ Fageria MS, Arya PS and Choudhary AK. 2000. Vegetable crops: breeding and seed production. Vol. I. Kalyani. □ Hazra P and Som MG. 2015. Vegetable science (Second revised edition), Kalyani publishers, Ludhiana, 598 p. □ Hazra P and Som MG. 2016. Vegetable seed production and hybrid technology (Second revised edition), Kalyani Publishers, Ludhiana, 459 p □ Kalloo G. 1988. Vegetable breeding. Vols. I-III. CRC Press. □ Kalloo G. 1998. Vegetable breeding. Vols. I-III (Combined Ed.). Panima Edu. Book Agency. □ Singh BD. 1983. Plant breeding. Kalyani Publishers, New Delhi. □ Singh PK, Dasgupta SK and Tripathi SK. 2004. Hybrid vegetable development. International book distributing Co. □ Swarup V. 1976. Breeding procedure for cross-pollinated vegetable crops. ICAR.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	-	2	-	-	-	-	2	-	-	2	-	-	1	-	-
CO3	2	1	-	1	-	1	-	-	-	-	-	-	-	-	-
CO4	-	1	-	1	-	-	1	-	-	1	-	-	1	-	-
CO5	-	-	-	1	-	1	-	-	-	1	-	2	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Seed Production of Vegetable Crops
Course Code	VSC-508[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of IPR.**(BL1-Remember)** **CO2-** Elaborate scope of various types of IPRs in agriculture.**(BL2-Understand)** **CO3-** Understand the significance of various national and international initiatives for biodiversity protection.**(BL3-Apply)** **CO4-** Apply the approach of IPRs for protection.**(BL4-Analyze)** **CO5-** CO-5 Equip the students/scholars with skills to apply for IPR. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	1. Study of floral biology and pollination mechanisms in vegetables;	PBL		
Practical 2	2. Determination of modes of pollination	PBL		
Practical 3	3. Field and seed standards	PBL		
Practical 4	4. Use of pollination control mechanisms in hybrid seed production of important vegetables	PBL		
Practical 5	5. Maturity standards and seed extraction methods	PBL		
Practical 6	6. Seed sampling and testing;	PBL		
Practical 7	7. Visit to commercial seed production areas	PBL		
Practical 8	8. Visit to seed processing plant	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. AGRAWAL RL. (ED.). 1997. SEED TECHNOLOGY. OXFORD & IBH. 2. FAGERIA MS, ARYA PS & CHOUDHARY AK. 2000. VEGETABLE CROPS: BREEDING AND SEED PRODUCTION. VOL. I. KALYANI. 3. GEORGE RAT. 1999. VEGETABLE SEED PRODUCTION. 2ND ED. CABI. 4. SINGH NP, SINGH DK, SINGH YK & KUMAR V. 2006. VEGETABLE SEED PRODUCTION TECHNOLOGY. INTERNATIONAL BOOK DISTRIBUTING CO. 5. SINGH SP. 2001. SEED PRODUCTION OF COMMERCIAL VEGETABLES. AGROTECH PUBL. ACADEMY. 6. VEGETABLE SEED PRODUCTION AND HYBRID TECHNOLOGY BY P. HAZRA AND M.G. SOM, KALYANI PUBLISHERS
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO2	-	2	2	-	-	-	2	-	-	-	-	2	-	-	-
CO3	1	1	-	1	1	1	-	-	1	-	-	-	-	-	-
CO4	-	1	-	1	-	-	1	-	-	-	-	1	-	-	-
CO5	1	-	-	-	1	1	-	-	-	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Organic Vegetable Production
Course Code	VSC-511[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of IPR.**(BL1-Remember)** **CO2-** Elaborate scope of various types of IPRs in agriculture.**(BL2-Understand)** **CO3-** Understand the significance of various national and international initiatives for biodiversity protection.**(BL3-Apply)** **CO4-** Apply the approach of IPRs for protection.**(BL4-Analyze)** **CO5-** CO-5 Equip the students/scholars with skills to apply for IPR. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professsonal Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Methods of preparation and use of compost, vermicompost, biofertilizers and biopesticides	PBL		
Practical 2	Soil solarisation	PBL		
Practical 3	Use of green manures	PBL		
Practical 4	Waste management; Organic soil amendments in organic production of vegetable crops	PBL		
Practical 5	Weed, pest and disease management in organic vegetable production	PBL		
Practical 6	Visit to organic fields and marketing centres	PBL		

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41	50		50	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	Dahama AK. 2005. Organic Farming for Sustainable Agriculture. 2nd Ed.Agrobios. Gehlot G. 2005. Organic Farming; Standards, Accreditation Certificationand Inspection. Agrobios. Palaniappan SP &Annadorai K. 2003. Organic Farming, Theory andPractice. Scientific Publ. Pradeepkumar T, Suma B, Jyothibhaskar&Satheesan KN. 2008.Management of Horticultural Crops. New India Publ. Agency. Shivashankar K. 1997. Food Security in Harmony with Nature. 3rd IFOAMASIA,Scientific Conf.. 1- 4 December, 1997, UAS, Bangalore.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	2	2	-	-	-	-	-	2	-	-	-
CO3	2	-	1	2	-	-	-	-	-	-	-	-	-	-	-
CO4	-	2	1	-	-	1	-	-	-	-	-	1	-	-	-
CO5	1	1	-	-	1	1	1	-	-	1	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-