Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Farm Management, Production and Resources Economics
Course Code	AE-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	Agric. Economics			**Co-Requisite/s**	Agric. Economics			
Course Outcomes & Bloom's Level	**CO1-** Describes law of return in farm management **(BL1-Remember)** **CO2-** Understand factor-product, factor-factor and product- product relationship in static production economics. **(BL2-Understand)** **CO3-** Utilization of farm resources and selection of crops and livestock's enterprises **(BL3-Apply)** **CO4-** Examine the farm planning and farm budgeting techniques **(BL4-Analyze)** **CO5-** Evaluate the balance sheet and profit and loss statement **(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	Concept of agricultural production economics, Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, Meaning and concept of cost, types of costs and their interrelationship, law or return	Cooperative Learning Strategies, Case studies, outdoor learning and project management	3
Unit 2	concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product- product relationship	Cooperative Learning Strategies, Case studies, outdoor learning and project management	3
Unit 3	Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. Importance of farm records, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming,	Cooperative Learning Strategies, Case studies, outdoor learning and project management	3
Unit 4	Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance weather based crop insurance, features, determinants of compensation.	Cooperative Learning Strategies, Case studies, outdoor learning and project management	3
Unit 5	Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.	Cooperative Learning Strategies, Case studies, outdoor learning and project management	4

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Basic concepts of production economics	Experiments	BL2-Understand	2
Practical 2	Calculation different methods of depreciation.	Experiments	BL3-Apply	2
Practical 3	Determination of least cost combination of inputs	Experiments	BL3-Apply	2
Practical 4	Determination of profit maximization of outputs	Experiments	BL3-Apply	2
Practical 5	To study about the balance sheet	Experiments	BL4-Analyze	2
Practical 6	Computation of cost concepts: CACP approach	Experiments	BL4-Analyze	2
Practical 7	Preparation of farm plan and budget	Experiments	BL5-Evaluate	2
Practical 8	Farm records and accounts	Experiments	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	Joshi, S.S. and Kapur, T. (2005). Fundamentals of farm business management, New Age Publisher. Doll, J. P. and Orazen, F. (2005) Production Economics, CBS publication, New Delhi.
Articles	
References Books	Subba reddy, S., Raghu Ram, P.T., Neelakanta sastry V. and Bhavani Devi. (2019). Agricultural economics. Oxford.
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	-	1	-	1	1	1	-	1	-	-	2	1	-	-	-
CO3	3	1	2	1	2	2	-	2	-	-	3	2	-	-	-
CO4	-	2	-	1	-	-	-	1	-	-	1	1	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Rural Sociology and Educational Psychology
Course Code	AEXT-111 (T)

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Social Science at secondary level			**Co-Requisite/s**	Agriculture at secondary level			
Course Outcomes & Bloom's Level	**CO1-** Describe the importance and scope of rural sociology in dissemination of improved agricultural technologies to farming communities**(BL1-Remember)** **CO2-** Understand the socioeconomic status of indian social groups in relation to assessing the feasibility of adaptation new agricultural technologies**(BL2-Understand)** **CO3-** Apply the different psychological and behaviorist theories and methods in agriculture extension**(BL3-Apply)** **CO4-** Analyze the role of various social Institution in socioeconomic develoment of agrarian society**(BL4-Analyze)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG5(Gender equality) SDG6(Clean water and sanitation) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Sociology and Rural sociology: Definition and scope, its significance in agriculture extension	Cooperative Learning Strategies (CLS), Role-play, Brainstorming, Critical incidents and Case studies	6
Unit 2	Social Ecology, Rural society, Social Groups, Social Stratification	PowCooperative Learning Strategies (CLS), Role-play, Brainstorming, Critical incidents and Case studieser point, Classroom teaching, Quiz, Assignment, and Mid and End term and Practical records	6
Unit 3	Culture concept, Social Institution, Social Change & Development	Cooperative Learning Strategies (CLS), Role-play, Brainstorming, Critical incidents and Case studies	6
Unit 4	Educational psychology: Meaning & its importance in agriculture extension. Behavior: Cognitive, affective, psychomotor domain	Cooperative Learning Strategies (CLS), Role-play, Brainstorming, Critical incidents and Case studies	7
Unit 5	Personality, Learning, Motivation, Theories of Motivation, Intelligence	Cooperative Learning Strategies (CLS), Role-play, Brainstorming, Critical incidents and Case studies	7

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Identification of garden tools	Field work		2

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	Velusamy, R. (2017). Textbook on Rural Sociology and Educational Psychology. Daya Publishing House. Ray, G L. (2015). Extension Communication and Management. Kalyani Publications.
Articles	NA
References Books	
MOOC Courses	
Videos	NA

Course Articulation Matrix

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

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Human Values and Ethics
Course Code	AEXT-112 [T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Social Science at secondary level			**Co-Requisite/s**	Agriculture at secondary level			
Course Outcomes & Bloom's Level	**CO1-** Describe the basic concepts of human values and ethics **(BL1-Remember)** **CO2-** Understand the significance of positive attitude, mental satisfaction and selfless service. **(BL2-Understand)** **CO3-** Demonstrate the skills of philosophy of self-exploration **(BL3-Apply)** **CO4-** Analyze the changes occurred in the thinking, nature and behaviour of humans with changing eras. **(BL4-Analyze)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG5(Gender equality) SDG6(Clean water and sanitation) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Universal human aspirations: Happiness and prosperity & Management of anger and stress.	Storytelling, Stimulus activities and Case studies	3
Unit 2	Human values and ethics: Concept, definition, significance and sources; Fundamental values: Right conduct, peace, truth, love and non-violence; Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction.	Storytelling, Stimulus activities and Case studies	3
Unit 3	Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.	Storytelling, Stimulus activities and Case studies	3
Unit 4	Ethics: professional, environmental, ICT; Sensitization towards others particularly senior citizens, developmentally challenged and gender	Storytelling, Stimulus activities and Case studies	3
Unit 5	Spirituality, positive attitude and scientific temper; Team work and volunteering; Rights and responsibilities; Road safety; Human relations and family harmony; Modern challenges and value conflict: Sensitization against drug abuse and other social evils; developing personal code of conduct (SWOT Analysis);	Storytelling, Stimulus activities and Case studies	4

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	Mathur, S.S. (2010). Education for Values, Environment and Human Rights. RSA. International. Sharma, R.P. and Sharma, M. (2011). Value Education and Professional Ethics. Kanishka Publishers. Srivastava, S. (2011). Human Values and Professional Ethics. S K Kataria and Sons.
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	2	-	-	-	-	-	-	-	-	-	-
CO2	-	1	2	-	1	2	-	1	1	3	1	-	-	-	-
CO3	2	-	-	1	1	3	2	2	2	3	1	2	-	-	-
CO4	-	-	-	-	-	-	-	1	-	-	1	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Entrepreneurship Development and Business Communication
Course Code	AEXT-311[T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					1	0	1	2
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Fundamentals of Agricultural Economics			**Co-Requisite/s**	Communication skills and Personality Development			
Course Outcomes & Bloom's Level	**CO1-** Remember the entrepreneurial and managerial attributes.**(BL1-Remember)** **CO2-** Describe the agri-preneurship, startups and commercialization**(BL2-Understand)** **CO3-** Apply the knowledge of entrepreneurial and managerial attributes for operating and managing an enterprise**(BL3-Apply)** **CO4-** Analyze the emerging domestic and international issues related to agriculture entrepreneurship**(BL4-Analyze)** **CO5-** Prepare their own project for establishing enterprises as trained entrepreneurs they would not seek the job, but give the job to others.**(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	Concept of Entrepreneur, Entrepreneurship, Distinction between an Entrepreneur and a Manager ; Management – Levels & Functions of Management - planning-Organizing - Directing – motivation – ordering – leading – supervision-Communication and control. Characteristics of Entrepreneurs; Opportunities for entrepreneurship and rural entrepreneurship. Types of Entrepreneurs, Functions of Entrepreneurship	Content based instruction, Jigsaws, Cognitive learning, Group discussion	3
Unit 2	Agri –Entrepreneurship - Concept, Need and Scope. Assessing overall business environment in Indian economy; Globalization and the emerging business entrepreneurial Environment.	Content based instruction, Jigsaws, Cognitive learning, Group discussion	3
Unit 3	Entrepreneurship Development Programmes (EDPs) – Objectives, Phases, Problems of EDPs, Entrepreneurial behavior and Role of Achievement Motivation, Factors Affecting Entrepreneurship Development; Generation, Incubation and Commercialization of Business Ideas. Environment scanning and opportunity identification, Researching / Managing Competition - Ways to define possible Competitors.	Content based instruction, Jigsaws, Cognitive learning, Group discussion	3
Unit 4	Globalization and the emerging business entrepreneurial environment; Role of ED in economic development of a country- Overview of Indian social, political systems and their implications for decision making by individual entrepreneurs SWOT Analysis - Concept, Meaning and Advantages. Government Policies, Incentives, Programmes and Schemes for Entrepreneurship Development; Export and Import Policies relevant to Indian Agriculture Sector. Institutional Support - Financial Institutions and other agencies in entrepreneurship development. Venture capital (VC), contract farming (CF) and joint ventures (JV), Public-private partnerships (PPP); Overview of agricultural Input industry – Seed, Fertilizer, Pesticides, Farm Machinery, Agricultural Food Processing Industry.	Content based instruction, Jigsaws, Cognitive learning, Group discussion	3
Unit 5	Definition of business; Stakeholders in business; Stages of Indian business; Importance of agribusiness in Indian economy; Business Communication for Public Relation , Advertisement and crisis communication. Social responsibility of business. Morals and ethics in enterprise management Assessment of Entrepreneurship skills, Business Leadership Skills. Communication Skills for entrepreneurship development, Developing organizational skill, Managerial skills, Problem solving skill and Time management skills	Content based instruction, Jigsaws, Cognitive learning, Group discussion	4

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Field Visits to study any one Agri - based industries / business – Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis	Industrial Visit	BL2-Understand	2
Practical 2	Constraints in setting up of agro based industries.	Field work	BL3-Apply	2
Practical 3	Formulation of project feasibility reports; industrial and agribusiness Houses	PBL	BL4-Analyze	2
Practical 4	Characteristics of Successful Agripreneurs, any one of the Local Financial Institutions to study the MSME Policies.	PBL	BL4-Analyze	2
Practical 5	Visit to Entrepreneurial Development Institute to study the Process of Entrepreneurship Development	Industrial Visit	BL3-Apply	2
Practical 6	Carrying out the SWOT Analysis of nearby Successful Enterprises.	Experiments	BL5-Evaluate	3
Practical 7	Visit to nearest Agri - Clinic and Agri - Business Centre if any.	Industrial Visit	BL2-Understand	3

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	1. Anil Kumar, S., Poornima, S. C., Mini, K., Abraham and Jayashree, K. 2003.Entrepreneurship Development. New Age International Publishers, New Delhi. 2. Bhaskaran, S. 2014. Entrepreneurship Development & Management. Aman Publishing House, Meerut. 3. Gupta, C.B. 2001. Management: Theory and Practice. Sultan Chand and Sons, New Delhi. Indu Grover 2008. Handbook on Empowerment and Entrepreneurship. Agro-tech 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	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-
CO3	-	-	2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	-	3	-	-	-	-	2	-	-	-	-	-	-	-	-
CO5	-	-	3	-	2	-	-	-	2	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	National Cadet Core
Course Code	BNCC01GE03 [T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					1	0	1	2
Course Type	Lab only							
Course Category	Foundation core							
Pre-Requisite/s	Physical Education at secondary level			**Co-Requisite/s**	Agriculture at secondary level			
Course Outcomes & Bloom's Level	**CO1-** Describe the role and scope of NSS program activities **(BL1-Remember)** **CO2-** Understand the community mobilization, Social harmony and national integration **(BL2-Understand)** **CO3-** Organize various social activities **(BL3-Apply)** **CO4-** Analyze the role citizenship, constitution and human rights **(BL4-Analyze)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG5(Gender equality)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	NCC General: Introduction of NCC, History, Aims, Objective of NCC & NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct	Activity Based Learning, Assignment, Extempore, Group discussions	4
Unit 2	National Integration & Awareness: National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security.	Activity Based Learning, Assignment, Extempore, Group discussions	4
Unit 3	Personality Development: Intra & Interpersonal skills - Self-Awareness- &Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.	Activity Based Learning, Assignment, Extempore, Group discussions	4
Unit 4	Social Service and Community: Development: Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.	Activity Based Learning, Assignment, Extempore, Group discussions	4

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Drill: Foot Drill- Drill ki Aam Hidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, Khade Khade Salute Karna Parade Par, Visarjan, Line Tod, Tej Chal, Tham aur Dhire Chal, Tham.	Field work	BL2-Understand	3
Practical 2	Weapon Training: Introduction & Characteristics of .22 rifle, Handling of .22 rifle	Field work	BL2-Understand	3
Practical 3	Map Reading: Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.	Field work	BL3-Apply	3
Practical 4	Field Craft & Battle Craft (FC & BC): Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.	Field work	BL4-Analyze	3
Practical 5	Social Service and Community Development: (SSCD): Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc.	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**
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	Ramachandra Rao P. and Samath Kumar, R.D. 2017. Training of Trainers in National Service Scheme. Uday Publishing 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	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	1	-	-	-	1	-	2	-	-	-
CO3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	1	-	-	2	-	-	1	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Artificial Intelligence
Course Code	ELCT-AENG-311[T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Discipline Electives							
Pre-Requisite/s	Agriculture Engineering			**Co-Requisite/s**	Agriculture Engineering			
Course Outcomes & Bloom's Level	**CO1-** Remember the LIPS and PROLOG. **(BL1-Remember)** **CO2-** Describe A and AO logarithm**(BL2-Understand)** **CO3-** Apply the knowledge of LIPS and PROLOG in constructing symbolic grammars for natural language that would be used to construct logical representations of sentences. **(BL3-Apply)** **CO4-** Analyse the uncertainty on the basis of probabilistic interferences. **(BL4-Analyze)** **CO5-** Prepare the robot with artificial intelligence. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth) SDG12(Responsible consuption and production) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Foundation and history of artificial intelligent, problems and techniques AI programming languages, introduction to LISP and PROLOG- problem spaces and searches, blind search strategies, Breadth first- Depth first- heuristic search techniques	Class room teaching (chalk-board), Power Point Presentations, ABL activities, Assignments, Quiz.	6
Unit 2	Hill climbing: best first-A* algorithm AO* algorithm- game tree, Min max algorithms, game playing- alpha beta pruning. Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.	Class room teaching (chalk-board), Power Point Presentations, ABL activities, Assignments, Quiz.	6
Unit 3	Reasoning under uncertainity, review of probability, Bay;s probabilistic interferences and Dempster shafer theory, Heuristic methods, symbolic reasoning under uncertainty, Statistical reasoning, Fuzzy reasoning, Temporal reasoning, Non monotonic reasoning.	Class room teaching (chalk-board), Power Point Presentations, ABL activities, Assignments, Quiz.	6
Unit 4	Planning and planning in situational calculus, representation for planning, partial order planning algorithm, learning from examples, discovery as learning, learning by analogy, explanation based learning, neural nets, genetic algorithms.	Class room teaching (chalk-board), Power Point Presentations, ABL activities, Assignments, Quiz.	7
Unit 5	Principles of Natural language processing, rule based systems architecture, Expert systems, knowledge acquisition concepts, AI application to robotics, and current trends in intelligent systems.	Class room teaching (chalk-board), Power Point Presentations, ABL activities, Assignments, Quiz.	7

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**

Part E

Books	Russell, S. and Norvig, P. (1998). Artificial Intelligence: A Modern Approach. Prentice Hall.
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	-	2	1	-	2	-	1	-	-	-	2	-	-	3	-
CO3	2	-	2	1	2	-	1	-	-	-	1	1	-	-	2
CO4	-	1	1	-	-	-	-	-	-	-	-	2	-	-	-
CO5	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	Intellectual Property Rights
Course Code	GPB-312 [T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	IPR at higher secondary level			**Co-Requisite/s**	IPR at intermediate level			
Course Outcomes & Bloom's Level	**CO1-** Define the basic concepts of intellectual property rights and describe different kinds of IPRs**(BL1-Remember)** **CO2-** Explain the various legal frameworks and instruments related to IPRs**(BL1-Remember)** **CO3-** Apply the various IPR tools with respect to wealth and value creation in a knowledge based economy**(BL3-Apply)** **CO4-** Analyse the process of protection of the various kinds of intellectual property (IP) at national and international level**(BL4-Analyze)** **CO5-** Evaluate the impact of National IPR Policy on agricultural research and innovation**(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	Introduction and meaning of intellectual property. Brief introduction to GATT, WTO, TRIPs and WIPO Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc.	Training, Workshop and Classroom Discussion	3
Unit-2	Types of Intellectual Property and legislations covering IPR in India: Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.	Training, Workshop and Classroom Discussion	3
Unit-3	Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.	Training, Workshop and Classroom Discussion	3
Unit-4	Origin and history including a brief introduction to UPOV for protection of plant varieties; Protection of plant varieties under UPOV and PPV&FR Act of India; Plant breeders rights; Registration of plant varieties under PPV&FR Act 2001; breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders;	Training, Workshop and Classroom Discussion	3
Unit-5	Convention on Biological Diversity; International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.	Training, Workshop and Classroom Discussion	4

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**

Part E

Books	Acharya, N.K. 2014. Text book of Intellectual Property Rights. Asia Law House, Hyderabad. 2. Loganathan, E.T. 2012. Intellectual Property
Articles	
References Books	Rights. New Century Publications, 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	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
CO5	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Genetics_and_Plant_Breeding

Title of the Course	Varietal Development And Maintenance Breeding
Course Code	GPB-504[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					1	0	1	2
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Fundamental concepts crop breeding.			**Co-Requisite/s**	DUS Characterization Technique.			
Course Outcomes & Bloom's Level	**CO1-** Define the fundamental concepts and theories of crop breeding. **(BL1-Remember)** **CO2-** Describe the nature and structure of crop breeding practices. **(BL2-Understand)** **CO3-** Conceptualize crop breeding exercises and hands on lab tools and techniques **(BL3-Apply)** **CO4-** Apply the concepts of crop breeding for development of transgenic.**(BL4-Analyze)**							
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) SDG8(Decent work and economic growth) SDG12(Responsible consuption and production) SDG15(Life on land) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Wheat: Origin, evolution, mode of reproduction, chromosome number; Genetics – cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, heterosis breeding, released varieties, examples of MAS used for improvement. Oats: Origin, evolution, mode of reproduction, chromosome number; Genetics – cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, released varieties, examples of MAS used for improvement. Barley: Origin, evolution, center of origin, mode of reproduction, chromosome number; Genetics – cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, released varieties, examples of MAS used for improvement.	ABL, Field Base & Outdoor Learning, Stimulus activity, Project Work	6
Unit 2	Chickpea: Origin, evolution mode of reproduction, chromosome number; Genetics – cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, released varieties, examples of MAS used for improvement. Other pulses: Lentil, field pea, Rajma, Horse gram: Origin, evolution, mode of reproduction, chromosome number; Genetics. cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, heterosis breeding, released varieties, examples of MAS used for improvement. Interspecific crosses attempted and its implications, reasons for failure, ways of overcoming them.	ABL, Field Base & Outdoor Learning, Stimulus activity, Project Work	6
Unit 3	Rapeseed and Mustard: Origin, evolution, mode of reproduction, chromosome number; Genetics – cytogenetics and genome relationship; Breeding objectives; yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, heterosis breeding, released varieties, examples of MAS used for improvement, Oil quality, Improvement for oil quality. Sunflower, Safflower: Origin, mode of reproduction, chromosome number; Genetics, cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, heterosis breeding, released varieties, examples of MAS used for improvement.	ABL, Field Base & Outdoor Learning, Stimulus activity, Project Work	6
Unit 4	Mesta and minor fibre crops: Origin, mode of reproduction, chromosome number; Genetics–cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, released varieties, examples of MAS used for improvement. Forage crops: Origin, evolution mode of reproduction, chromosome number; Genetics–cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance.	ABL, Field Base & Outdoor Learning, Stimulus activity, Project Work	6
Unit 5	Seed spices: Origin, evolution, mode of reproduction, chromosome number; Genetics–cytogenetics and genome relationship; Breeding objectives: yield, quality characters, biotic and abiotic stress resistance, etc., breeding approaches, introgression of alien gene(s) (if required), biotic and abiotic stress resistance, scope of heterosis breeding, released varieties, examples of MAS used for crop improvement.	ABL, Field Base & Outdoor Learning, Stimulus activity, Project Work	8

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, oats, barley, chickpea, rajma, rapeseed mustard, sunflower;	Field work	BL2-Understand	2
Practical 2	Study of range of variation for yield and yield components;	Field work	BL2-Understand	2
Practical 3	Study of segregating populations in cereal, pulses and oilseed crops;	Field work	BL3-Apply	2
Practical 4	Use of descriptors for cataloguing; Learning on the crosses between different species;	Field work	BL3-Apply	2
Practical 5	Trait based screening for stress resistance;	Field work	BL3-Apply	2
Practical 6	Learning on the Standard Evaluation System (SES) and descriptors;	Field work	BL4-Analyze	2
Practical 7	Use of software for database management and retrieval.	Field work	BL4-Analyze	4

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	Bahl, P.N., and Salimath, P.M. (1996). Genetics, Cytogenetics and Breeding of Crop Plants. Vol. I. Pulses and Oilseeds. Oxford & IBH. Gupta, S.K. (2012). Technological Innovations in Major World Oil crops. Vol. I. Springer, USA. Gupta, S.K. (2012). Technological Innovations in Major World Oil crops. Vol. II. Springer, USA. Gupta, S.K. (2016). Breeding of Oilseed Crops for Sustainable Production. Academic Press, USA. Kannaiyan, S., Uthamasamy, S., Theodore, R.K. and Palaniswamy, S. (2002). New Dimensions and Approaches for Sustainable Agriculture. Directorate of Extension Education, TNAU, Coimbatore. Parthasarathy, V.A. (2017). Spices and Plantation Crops Vol.1 (Part A) Breeding of Breeding and Genetics. John Wiley & Sons.
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	-	-	-	-	-	-	-	-	-	-	3	1	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	1	2	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2
CO4	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

BSc_HonsAgriculture

Title of the Course	National Service Scheme
Course Code	NSS-111 [P]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					0	0	2	2
Course Type	Lab only							
Course Category	Foundation core							
Pre-Requisite/s	NSS at secoundary level			**Co-Requisite/s**	Agriculture			
Course Outcomes & Bloom's Level	**CO1-** Describe the role and scope of NSS program activities**(BL1-Remember)** **CO2-** Understand the community mobilization, Social harmony and national integration**(BL2-Understand)** **CO3-** Organize various social activities**(BL3-Apply)** **CO4-** Analyze the role citizenship, constitution and human right**(BL4-Analyze)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG5(Gender equality)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical-1	History, objectives, principles, symbol, badge, regular programmes under NSS, organizational structure of NSS, code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health, concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analysing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary, Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change, Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilisation involving youth-adult partnership, Indian history and culture, role of youth in nation building, conflict resolution and peace-building, Indian tradition of volunteership, its need, importance, motivation and constraints; shramdan as part of volunteerism, Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information, Concept of family, community (PRIs and other community based organisations) and society.	Field work	BL4-Analyze	32

Part D(Marks Distribution)

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

Part E

Books	Ramachandra Rao P. and Samath Kumar, R.D. (2017). Training of Trainers in National Service Scheme. Uday Publishing House.
Articles	NA
References Books	
MOOC Courses	
Videos	NA

Course Articulation Matrix

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

Syllabus-2023-2024

MSc_Agriculture-Agronomy

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	basic concepts of IPR			**Co-Requisite/s**	Knowledge of Patent Farmer wrights			
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-** 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)**	SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	UNIT-I: History of IPR: Historical perspectives and need for the introduction of Intellectual Property Right regime. TRIPs and various provisions in TRIPS Agreement.	Brain storming, Guided learning, Cooperative Learning Strategies	
Unit 2	UNIT II: 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.	Brain storming, Guided learning, Cooperative Learning Strategies	
Unit 3	UNIT III: Fundamentals of IPRs: Fundamentals of patents, copyrights. Geographical indications, designs and layout, trade secrets and traditional and biodiversity protection.	Guided learning, Cooperative Learning Strategies	
Unit 4	UNIT IV: Protection of IPR: Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection.	Cooperative Learning Strategies, Problem-based learning	
Unit 5	UNIT V: 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.	Problem-based learning ,Discussions and Presentation, ABL	

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1		Experiments	BL2-Understand	0

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	

Part E

Books	Erbisch, F.H., and Maredia, K. (1998). Intellectual Property Rights in Agricultural Biotechnology. CABI. Ganguli, P. (2001). Intellectual Property Rights: Unleashing Knowledge Economy. McGraw-Hill. Ministry of Agriculture. (2004). State of Indian Farmer. Vol. V. Technology Generation and IPR Issues. Academic Foundation. Rothschild, M., and Scott, N. (2003). Intellectual Property Rights in Animal Breeding and Genetics. CABI. Saha, R. (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	1	-	3	-	-	-	-	-	-	-	2	1	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	1	2	-
CO3	1	-	2	-	-	-	-	-	-	-	-	-	-	-	2
CO4	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Genetics_and_Plant_Breeding

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	Define various aspects of IPR			**Co-Requisite/s**	Scope of various types of IPRs in agriculture.			
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-** 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)**	SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	UNIT-I: History of IPR: Historical perspectives and need for the introduction of Intellectual Property Right regime. TRIPs and various provisions in TRIPS Agreement.	ABL, IPR based activities, Stimulus activity, Project work	3
Unit 2	UNIT II: 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.	ABL, IPR based activities, Stimulus activity, Project work	3
Unit 3	UNIT III: Fundamentals of IPRs: Fundamentals of patents, copyrights. Geographical indications, designs and layout, trade secrets and traditional and biodiversity protection.	ABL, IPR based activities, Stimulus activity, Project work	3
Unit 4	UNIT IV: Protection of IPR: Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection.	ABL, IPR based activities, Stimulus activity, Project work	3
Unit 5	UNIT V: 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.	ABL, IPR based activities, Stimulus activity, Project work	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, oats, barley, chickpea, rajma, rapeseed mustard, sunflower;	Field work	BL2-Understand	2

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	Erbisch, F.H., and Maredia, K. (1998). Intellectual Property Rights in Agricultural Biotechnology. CABI. Ganguli, P. (2001). Intellectual Property Rights: Unleashing Knowledge Economy. McGraw-Hill. Ministry of Agriculture. (2004). State of Indian Farmer. Vol. V. Technology Generation and IPR Issues. Academic Foundation. Rothschild, M., and Scott, N. (2003). Intellectual Property Rights in Animal Breeding and Genetics. CABI. Saha, R. (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	-	-	-	-	-	-	-	-	-	-	2	1	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	1	2	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-Agronomy

Title of the Course	Agricultural Research Research Ethics and Rural Development Programmes
Course Code	PGS-505 [T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	basic knowledge of Agriculture ug courses			**Co-Requisite/s**	human and farmer wrights			
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of agricultural research. **(BL1-Remember)** **CO2-** Understand the research ethics. **(BL2-Understand)** **CO3-** Apply the skill for rural development programmes. **(BL3-Apply)** **CO4-** Relate the functioning of agricultural research systems at national and international levels. **(BL4-Analyze)** **CO5-** Equip the students/scholars with skills to perform research.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	: Agricultural Research: History of agriculture in brief. Global agricultural research system: need, scope, opportunities. Role in promoting food security, reducing poverty and protecting the environment.	Brain storming, Guided learning, Cooperative Learning Strategies	3
Unit 2	NARS and CGIAR: National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions. Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels. International fellowships for scientific mobility.	Brain storming, Guided learning, Cooperative Learning Strategies	2
Unit 3	Research Ethics: Research ethics: research integrity, research safety in laboratories. Welfare of animals used in research, computer ethics. Standards and problems in research ethics.	Guided learning, Brain storming, Cooperative Learning Strategies	3
Unit 4	RDP- Concept and policies: Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/ NonGovernmental Organisations.	Cooperative Learning Strategies, Fieldwork and outdoor learning, Problem-based learning	3
Unit 5	RDP- Evaluation and implementation: Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.	Brain storming, Problem-based learning ,Discussions and Presentation, ABL	4

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	Bhalla, G. S., and Singh, G. (2001). Indian Agriculture - Four Decades of Development. Sage Publ. Punia, M. S., and Punia, M. S. (2006). Manual on International Research and Research Ethics. CCS Haryana Agricultural University, Hisar. Rao, B. S. V. (2007). Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives. Mittal Publ. Singh, K. (1998). Rural Development - Principles, Policies and Management. Sage Publ.
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	-	-	-	-	-	-	-	1	-	-
CO2	-	1	-	-	2	-	-	1	-	-	-	-	-	-	1
CO3	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-
CO4	-	1	-	1	-	-	-	1	-	-	-	-	1	-	1
CO5	-	-	1	-	2	-	1	-	-	-	-	-	-	1	1
CO6	1	-	-	-	1	-	-	2	-	-	-	-	-	2	-

Syllabus-2023-2024

MSc_Agriculture-Genetics_and_Plant_Breeding

Title of the Course	Agriculture Research Research Ethics and Rural development Programmes
Course Code	PGS-505[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Agriculture Extension			**Co-Requisite/s**	Rural Extension & Ethics			
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of agricultural research. **(BL1-Remember)** **CO2-** Understand the research ethics. **(BL2-Understand)** **CO3-** Apply the skill for rural development programmes. **(BL3-Apply)** **CO4-** Relate the functioning of agricultural research systems at national and international levels. **(BL4-Analyze)** **CO5-** Equip the students/scholars with skills to perform research.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Agricultural Research: History of agriculture in brief. Global agricultural research system: need, scope, opportunities. Role in promoting food security, reducing poverty and protecting the environment.	Classroom Lectures, Web-based information, Student Seminars/ Presentations/Workshop, ABL activities, Case studies, Community development programs,	3
Unit 2	NARS and CGIAR: National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions. Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels. International fellowships for scientific mobility.	Classroom Lectures, Web-based information, Student Seminars/ Presentations/Workshop, ABL activities, Case studies, Community development programs,	3
Unit 3	Research Ethics: Research ethics: research integrity, research safety in laboratories. Welfare of animals used in research, computer ethics. Standards and problems in research ethics.	Classroom Lectures, Web-based information, Student Seminars/ Presentations/Workshop, ABL activities, Case studies, Community development programs,	3
Unit 4	RDP- Concept and policies: Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/ NonGovernmental Organisations.	Classroom Lectures, Web-based information, Student Seminars/ Presentations/Workshop, ABL activities, Case studies, Community development programs,	3
Unit 5	RDP- Evaluation and implementation: Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.	Classroom Lectures, Web-based information, Student Seminars/ Presentations/Workshop, ABL activities, Case studies, Community development programs,	4

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				

Part E

Books	Bhalla, G. S., and Singh, G. (2001). Indian Agriculture - Four Decades of Development. Sage Publ. Punia, M. S., and Punia, M. S. (2006). Manual on International Research and Research Ethics. CCS Haryana Agricultural University, Hisar. Rao, B. S. V. (2007). Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives. Mittal Publ. Singh, K. (1998). Rural Development - Principles, Policies and Management. Sage Publ.
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	-	-	-	-	3	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-	-	3	-
CO3	1	-	-	2	-	-	-	-	-	-	-	-	2	-	1
CO4	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Horticulture_Vegetable_Science

Title of the Course	Agricultural Research Ethics and Rural Development Programmes
Course Code	PGS-505[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					1	0	0	1
Course Type	Theory only							
Course Category	Non-graded Core Requirement							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Define various aspects of agricultural research.**(BL1-Remember)** **CO2-** Understand the research ethics.**(BL2-Understand)** **CO3-** Apply the skill for rural development programmes.**(BL3-Apply)** **CO4-** Relate the functioning of agricultural research systems at national and international levels.**(BL4-Analyze)** **CO5-** Equip the students/scholars with skills to perform research.**(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	Agricultural Research: History of agriculture in brief.Global agricultural research system: need, scope, opportunities.Role in promoting food security, reducing poverty and protecting the environment.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
2	NARS and CGIAR: National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions. Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels.□ International fellowships for scientific mobility.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
3	Research Ethics: Research ethics: research integrity, research safety in laboratories.Welfare of animals used in research, computer ethics.Standards and problems in research ethics.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
4	RDP- Concept and policies: Concept and connotations of rural development, rural development policies and strategies.Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group – Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/ Non-Governmental Organisations.	Cooperative Learning Strategies Brainstorming Case studies Talks and presentations	1
5	RDP- Evaluation and implementation: Critical evaluation of rural development policies and programmes.Constraints in implementation of rural policies and programmes.	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	. Bhalla GS and Singh G. 2001. Indian Agriculture - Four Decades of Development. Sage Publ. 2. Punia MS. Manual on International Research and Research Ethics. CCS Haryana Agricultural University, Hisar. 3. Rao BSV. 2007. Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives. Mittal Publ. 4. Singh K. 1998. Rural Development - Principles, Policies and Management. Sage Publ.
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	-	-	2	-	-	-	-	2	-	-
CO2	2	2	-	1	-	-	3	-	-	2	-	2	-	-	-
CO3	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-
CO4	1	1	-	-	1	1	-	1	-	1	-	1	-	-	-
CO5	1	1	-	1	-	-	1	-	-	1	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2023-2024

MSc_Agriculture-Agronomy

Title of the Course	Statistical Methods For Applied Sciences
Course Code	STAT-502[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Agronomy			**Co-Requisite/s**	Agronomy			
Course Outcomes & Bloom's Level	**CO1-** Describe the understanding of basic concept of Statistics and Probability in the field of agriculture**(BL1-Remember)** **CO2-** Explain the concepts of probability distributions and various statistical tools used for agricultural data analysis**(BL2-Understand)** **CO3-** Calculate the various statistical parameters of given data samples using parametric and non-parametric tests**(BL2-Understand)** **CO4-** Investigate the multivariate analysis using different software**(BL4-Analyze)** **CO5-** Evaluate the use of various statistical software used for agricultural data sets test/analysis**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
Unit-1	Classification, tabulation and graphical representation of data. Descriptive statistics (including Box-plot and Scatter grams). Probability Theory, Statistics and exploratory Data Analysis. Random variable and mathematical expectation.	Classroom Lectures Activity based learning Power Point Presentations ABL activities Assignments Unannounced Test Quiz	8
Unit-2	Discrete and continuous probability distributions: Binomial, Poisson, Normal distribution, Beta and Gamma distributions and their applications. Concept of sampling distribution: chi-square, t and F distributions. Tests of significance based on t and F distributions.	Classroom Lectures Activity based learning Power Point Presentations ABL activities Assignments Unannounced Test Quiz	10
Unit-3	Introduction to theory of estimation and confidence-intervals. Correlation and regression. Simple and multiple linear regression model, estimation of parameters, predicted values and residuals, correlation, partial correlation coefficient, multiple correlation coefficient, rank correlation, test of significance of correlation coefficient and regression coefficients.	Classroom Lectures Activity based learning Power Point Presentations ABL activities Assignments Unannounced Test Quiz	10
Unit-4	Unit – 4 Non-parametric tests - sign, Wilcoxon, Mann-Whitney U-test, Wald Wolfowitz run test, Run test for the randomness of a sequence. Median test, Kruskal- Wallis test, Friedman two-way ANOVA by ranks. Kendall's coefficient of concordance.	Classroom Lectures Activity based learning Power Point Presentations ABL activities Assignments Unannounced Test Quiz	10
Unit-5	Unit-5 Introduction to multivariate analytical tools- Hotelling's T2 Tests of hypothesis about the mean vector of a multinormal population. Cluster analysis, principal component analysis and Factor analysis.	Classroom Lectures Activity based learning Power Point Presentations ABL activities Assignments Unannounced Test Quiz	10

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit-1	1. Tabulation and graphical presentation of data. 2. Fitting of distributions ~ Binomial, Poisson and Normal. 3. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F. 4. Confidence interval estimation and point estimation of parameters of binomial, Poisson and Normal distribution. 5. Correlation and regression analysis. 6. Applications of dimensionality reduction technique PCA. 7. Nonparametric tests.	Experiments	BL2-Understand	2
Unit-2	1. Tabulation and graphical presentation of data. 2. Fitting of distributions ~ Binomial, Poisson and Normal. 3. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F. 4. Confidence interval estimation and point estimation of parameters of binomial, Poisson and Normal distribution. 5. Correlation and regression analysis. 6. Applications of dimensionality reduction technique PCA. 7. Nonparametric tests.	Experiments	BL2-Understand	2
Unit-3	1. Tabulation and graphical presentation of data. 2. Fitting of distributions ~ Binomial, Poisson and Normal. 3. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F. 4. Confidence interval estimation and point estimation of parameters of binomial, Poisson and Normal distribution. 5. Correlation and regression analysis. 6. Applications of dimensionality reduction technique PCA. 7. Nonparametric tests.	Experiments	BL3-Apply	2
Unit-4	1. Tabulation and graphical presentation of data. 2. Fitting of distributions ~ Binomial, Poisson and Normal. 3. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F. 4. Confidence interval estimation and point estimation of parameters of binomial, Poisson and Normal distribution. 5. Correlation and regression analysis. 6. Applications of dimensionality reduction technique PCA. 7. Nonparametric tests.	Experiments	BL3-Apply	2
Unit-5	1. Tabulation and graphical presentation of data. 2. Fitting of distributions ~ Binomial, Poisson and Normal. 3. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F. 4. Confidence interval estimation and point estimation of parameters of binomial, Poisson and Normal distribution. 5. Correlation and regression analysis. 6. Applications of dimensionality reduction technique PCA. 7. Nonparametric tests.	Experiments	BL4-Analyze	2
Unit-6	1. Tabulation and graphical presentation of data. 2. Fitting of distributions ~ Binomial, Poisson and Normal. 3. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F. 4. Confidence interval estimation and point estimation of parameters of binomial, Poisson and Normal distribution. 5. Correlation and regression analysis. 6. Applications of dimensionality reduction technique PCA. 7. Nonparametric tests.	Experiments	BL4-Analyze	2
Unit-7	1. Tabulation and graphical presentation of data. 2. Fitting of distributions ~ Binomial, Poisson and Normal. 3. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F. 4. Confidence interval estimation and point estimation of parameters of binomial, Poisson and Normal distribution. 5. Correlation and regression analysis. 6. Applications of dimensionality reduction technique PCA. 7. Nonparametric tests.	Experiments	BL5-Evaluate	4

Part D(Marks Distribution)

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

Part E

Books	Gupta, S. C. and Kapoor, V. K. (2014). Fundamentals of Mathematical Statistics. Sultan Chand and sons. New Delhi
Articles	Gupta, V. (2002). Comdex Computer Kit. Dream Tech Press, New Delhi.
References Books	Rangaswamy, R. (1995). A Text Book of Agricultural Statistics. New Age International Publishing Limited, Hyderabad.
MOOC Courses	
Videos	Gupta, S. C. and Kapoor, V. K. (2014). Fundamentals of Mathematical Statistics. Sultan Chand and sons. New Delhi

Course Articulation Matrix

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

Syllabus-2023-2024

MSc_Agriculture-Agronomy

Title of the Course	Experimental Designs
Course Code	STAT-511 [T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Experimental Designs			**Co-Requisite/s**	Experimental Designs			
Course Outcomes & Bloom's Level	**CO1-** Describe the basic concept of designing of field experiment **(BL1-Remember)** **CO2-** Compare the different experimental designs used in agriculture field experiments **(BL2-Understand)** **CO3-** Demonstrate the analysis of covariance in basic designs and confounding in factorial experiments **(BL3-Apply)** **CO4-** Analyse the result of various statistical designs along give scientific interpretation **(BL4-Analyze)** **CO5-** Assess the suitability of different Software for the statistical analysis of different designs for different sets of experimental conditions **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professsonal Ethics ✓ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Unit-1	Need for designing of experiments, characteristics of a good design. Data Transformation, Basic principles of designs- randomization, replication and local control.	Brain storming, Guided learning, Cooperative Learning Strategies	6
Unit-2	Uniformity trials, size and shape of plots and blocks; Analysis of variance; completely randomized design, randomized block design and Latin square design.	Problem-based learning	6
Unit-3	Factorial experiments, (symmetrical as well as asymmetrical). Orthogonality and partitioning of degrees of freedom, Confounding in symmetrical factorial experiments, Factorial experiments with control treatment.	Cooperative Learning Strategies, Problem-based learning ,Discussions and Presentation	6
Unit-4	Split plot and strip plot designs; Analysis of covariance and missing plot techniques in randomized block and Latin square designs; Transformations, crossover designs, balanced incomplete block design, resolvable designs and their applications ~ Lattice design, alpha design - concepts, randomization procedure, analysis and interpretation of results. Response surfaces. Experiments with mixtures.	Brain storming, Guided learning, Cooperative Learning Strategies	7
Unit-5	Bioassays- direct and indirect, indirect assays based on quantal dose response, parallel line and slope ratio assays potency estimation	Brain storming, Guided learning, Cooperative Learning Strategies	7

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	1. Analysisof data obtainedfromCRD	PBL		2
Practical 2	2. Analysisofdata obtainedfromRBD	PBL		2
Practical 3	3. Analysisofdata obtainedfromLSD	PBL		2
Practical 4	4. Analysisof factorialexperimentswithoutandwithconfounding	PBL		2
Practical 5	5. AnalysisofSplitplotDesign	PBL		2
Practical 6	6. AnalysisofStripplotdesign	PBL		2
Practical 7	7. Transformationofdata	PBL		2
Practical 8	8. UniformityTrialdataanalysis	PBL		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	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10	0		0	

Part E

Books	Dean, A.M. and Voss, D. 1(999). Design and Analysis of Experiments. Springer.Pearce, S.C. (1983). The Agricultural Field Experiment: A Statistical Examination of Theory and Practice. John Wiley
Articles	
References Books	Gupta, S. C. and Kapoor, V. K. (2007). Fundamentals of Applied Statistics. Sultan Chand and sons. New Delhi Nigam, A.K. and Gupta, V.K. 1979. Handbook on Analysis of Agricultural Experiments. IASRI Publ. Rangaswamy, R. (1995). A Text Book of Agricultural Statistics. New Age International Publishing Limited, Hyderabad.
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	1	-
CO2	-	-	1	-	-	-	-	-	-	-	-	-	1	2	-
CO3	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-