

PhD Agricultural Business & Marketing

Semester-wise Break-up of Credit Hours (w.e.f. Fall 2026)

Program Code: 0414-8-ABM**1st Semester**

Course Code	Course Title	Credit Hours
ABM-801	Global Value Chain Dynamics and Development	3 (3-0)
ABM-803	Advanced Agribusiness Marketing	3 (3-0)
ABM-805	Advanced Artificial Intelligence Applications in Agribusiness Research	3 (2-1)
ABM-818	Special Problem	1 (0-1)

2nd Semester

Course Code	Course Title	Credit Hours
ABM-802	Applied Agribusiness Market Research	3 (3-0)
ABM-804	Agriculture Policy Analysis Tools for Economic Development	3 (3-0)
ABM-819	Seminar	1 (0-1)
Optional-1 from the list of three credit hours		3 (3-0)

PhD Thesis Research (Compulsory)

ABM-820	Thesis PhD Agricultural Business and Marketing	12 (0-12)
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List of Elective Courses

(Note: These courses are optional considering the previous qualification of the scholar and decided by the admission committee in consultation with the scholar)

ABM-806	Value Chain Analysis for Policy Making – A Quantitative Approach	3 (3-0)
ABM-807	ICTs and Agribusiness	3 (3-0)
ABM-808	Postharvest Processing and Management	3 (3-0)
ABM-809	Food Safety and Quality Management	3 (3-0)
ABM-810	Climate Change and Response of Agribusiness	3 (3-0)
ABM-811	Farming and Cropping System	3 (3-0)
ABM-812	Integrated Agriculture	3 (3-0)

Understanding of Holy Quran – I (GE-UHQ-814) & Understanding of Holy Quran – II (GE-UHQ-815) courses are for those students who did not take these courses at their undergraduate level

ABM-801	Global Value Chain Dynamics and Development	3 (3-0)
Objectives: To develop a holistic understanding of global value chains, their dynamics, and their implications for economic development.		
Learning Outcomes: After studying this course, the students will be able to: - 1. Understand the concept of global value chains, including their structure, governance mechanisms, and the different stages and activities involved in their operation. 2. Learn how to analyze the dynamics of global value chains, including the factors influencing their formation, expansion, and reconfiguration. 3. Examine the role of multinational corporations, technological advancements, trade policies, and other drivers of GVC dynamics. 4. Explore how participation in GVCs can influence productivity, employment, income distribution, and technological capabilities in different countries.		
Relevant SDGs: ➤ SDG 8: Decent Work and Economic Growth ➤ SDG 9: Industry, Innovation, and Infrastructure ➤ SDG 12: Responsible Consumption and Production		
Course Outline: Introduction to Global Value Chains (GVCs): Definition and key concepts, Evolution of GVCs and their significance, Major actors, and stakeholders in GVCs. Analysis Frameworks: Value chain mapping and analysis, Governance structures in GVCs, Upgrading and value chain coordination mechanisms, Drivers of GVC Dynamics. Technological advancements and digitalization: Trade policies and agreements, Foreign direct investment and multinational corporations, Global production networks and outsourcing, GVC Participation and Economic Development. Implications for productivity and competitiveness: Employment and labor conditions in GVCs, Income distribution effects, Technological capabilities, and innovation.		
Suggested Readings: 1. Kawakami M, Sturgeon TJ, editors. The dynamics of local learning in global value chains: Experiences from East Asia. Springer; 2011 Jul 19. 2. Gibbon P, Bair J, Ponte S. Governing global value chains: an introduction. Economy and society. 2008 Aug 1;38(3):315-38. 3. Swinnen JF, Global supply chains, standards & the poor: How the globalization of food systems & standards affects rural development & poverty CABI.		

4. Gereffi G, Humphrey J, Sturgeon T. The governance of global value chains. Review of international political economy. 2005 Feb 1;12(1):88-104.
5. Cheyns E, Daviron B, Djama M, Fouilleux E, Guéneau S. The standardization of sustainable development through the insertion of agricultural global value chains into international markets. In Sustainable development and tropical Agri-chains 2018 Feb 21 (pp. 283-303). Dordrecht: Springer Netherlands.
6. Lee J. Global commodity chains and global value chains. In Oxford Research Encyclopedia of International Studies 2010 Mar 1.

ABM-803	Advanced Agribusiness Marketing	3 (3-0)
Objective: To equip students with advanced knowledge and skills to effectively navigate the unique challenges and opportunities in the agribusiness sector and develop innovative marketing strategies.		
Learning Outcomes: After studying this course, the students will be able to: - 1. Explore advanced knowledge of management practices in marketing. 2. Analyse practical applications of marketing management theories. 3. Apply quantitative tools in marketing decision making.		
Relevant SDGs: ➤ SDG 2: Zero Hunger ➤ SDG 8: Decent Work and Economic Growth ➤ SDG 12: Responsible Consumption and Production		
Course Outline: Comprehensive and integrative knowledge of marketing management; Principles of marketing management; Tools used in marketing; Acquiring a critical perspective on the practical application of marketing management theories; A deep understanding of the character of the real world of marketing management practice; The forms of problems encountered and marketing management decision making; Marketing problems using conceptual and quantitative tools utilized in marketing decision making; The impact of technology on marketing opportunities; Market segmentation and selection of target markets; Positioning and value proposition of products; Estimating demand; Product policy; Setting price; Gaining access to channels; Strategy development; Decision making; Implementation and control; Substantially developing student's ability to think critically their analytic reasoning skills through contemporary case studies and marketing research projects.		
Suggested Readings:		

1. Cannon, T. 2009. Basic Marketing Principles and Practices. 12th Ed. Wiley and Sons, New York, NY, USA.
1. David, A. 2010. Strategic Market Management. 6th Ed. John Wiley International, London, UK.
2. Kotler P.T. and G. Armstrong. 2018. Principles of Marketing. 18th Ed. Pearson Higher Education Ltd. New York, NY, USA.
3. Kotler P., H. Ehsan and P.Y. Agnihotri. 2014. Principles of Marketing: A South Asian Perspective. 14th Ed. Pearson Education, New Delhi, India.
4. Stanton, W.J. 2009. Principles of Marketing. 14th Ed. McGraw Hill Pub., New York, NY, USA.

ABM-805	Advanced Artificial Intelligence Applications in Agribusiness Research	3 (2-1)
Course Description: This practice-oriented course enables doctoral students to apply artificial intelligence and digital technologies to real agribusiness entities. Students work with business data and accessible development platforms to create e-commerce, web, market-intelligence, analytics, forecasting and automation solutions. The course combines research rigour with enterprise implementation, responsible AI governance and a client-based capstone project.		
Course Objective: To develop advanced practical capacity to diagnose an agribusiness problem, select suitable AI and digital tools, build and evaluate a functional solution, and translate research evidence into measurable improvements in marketing, operations and managerial decision-making.		
Student Learning Outcomes: 1. Conduct an AI and digital-readiness assessment of an agribusiness entity and identify feasible, high-value use cases. 2. Develop a responsive agribusiness website, landing page or e-commerce prototype with appropriate content, product information, customer journey and analytics. 3. Organize, clean, analyse and visualize business, market and customer data through reproducible dashboards and decision reports. 4. Design and implement a market-research workflow using surveys, digital sources, text analysis, competitor intelligence and customer segmentation. 5. Construct, validate and communicate agricultural price, demand or sales forecasts using benchmark and AI-assisted methods. 6. Integrate generative AI, automation and customer-service tools responsibly while protecting confidential data and maintaining human oversight. 7. Deliver and defend a functional AI-enabled business solution and implementation roadmap for a real or realistically simulated agribusiness entity.		
Relevant SDGs: 1. SDG 2: Zero Hunger 2. SDG 4: Quality Education 3. SDG 8: Decent Work and Economic Growth 4. SDG 9: Industry, Innovation and Infrastructure 5. SDG 12: Responsible Consumption and Production 6. SDG 17: Partnerships for the Goals		

Course Outline:

- 1. AI Strategy and Digital Readiness for Agribusiness Entities:** Mapping the business model, customers, processes, data and pain points; distinguishing automation, prediction, content generation and decision support; selecting use cases through value, feasibility, risk and cost criteria; preparing an AI adoption roadmap, key performance indicators and return-on-investment logic.
- 2. E-Commerce for Agricultural and Food Businesses:** E-commerce models, online marketplaces and direct-to-consumer channels; product catalogue, pricing, inventory, order flow, payments, delivery and returns; trust, food and product information, customer reviews, platform selection and conversion measurement; prototype development using a content-management, hosted or no-code commerce platform.
- 3. Web Development and Digital Presence:** Domain, hosting, website architecture, responsive design, accessibility and security; introductory HTML and CSS concepts; no-code/low-code development; landing pages, enquiry and order forms, maps, multilingual content, search-engine fundamentals, web analytics and integration with social media, messaging and customer-relationship systems.
- 4. Business Data Management, Analysis and Dashboards:** Data inventory, spreadsheets, databases, data cleaning, merging, missing values and quality controls; descriptive and diagnostic analytics; sales, cost, customer, inventory, procurement and operational indicators; visualization and interactive dashboards using Excel, Power BI, Python/R or equivalent tools; reproducible reporting and decision interpretation.
- 5. AI-Assisted Market Research and Customer Intelligence:** Problem definition, research design, online and field surveys, sampling and questionnaire development; digital competitor analysis, online reviews, social listening and secondary-data acquisition; text classification and sentiment analysis; market segmentation, customer personas, willingness-to-pay and demand assessment; responsible use of web and platform data.
- 6. Agricultural Price, Demand and Sales Forecasting:** Time-series structure, trend, seasonality, structural breaks and external drivers; data preparation and visualization; naïve and seasonal benchmarks, moving averages, exponential smoothing, ARIMA and introductory machine-learning forecasts; rolling-origin validation, MAE, RMSE and MAPE; prediction intervals, scenario analysis and translating forecasts into procurement, pricing, production and inventory decisions.
- 7. Digital Marketing, Content and Customer Engagement:** Digital marketing funnel; segmentation, targeting and positioning; search, social, email and messaging campaigns; generative AI for product descriptions, images, campaigns, translation and customer communication; content calendar, experimentation, conversion rates, customer acquisition cost, retention and campaign analytics; verification and brand-voice controls.
- 8. AI Automation, Chatbots and Business Workflows:** Process mapping; AI assistants and chatbots for customer service, extension, sales and internal knowledge; workflow automation, forms, alerts and reporting; introductory APIs and integrations; retrieval from approved business documents; testing accuracy, escalation to humans, monitoring and maintenance.
- 9. AI Applications across Agribusiness Operations:** Quality grading, traceability, inventory optimization, logistics, demand planning, credit and risk assessment, supplier evaluation and climate-risk information; matching technology to business size and data availability; evaluation of operational, financial, customer and sustainability impacts.
- 10. Responsible Implementation and Governance:** Confidentiality, privacy, cybersecurity, intellectual property, bias, fairness, transparency and explainability; data and model documentation, consent, access controls, vendor assessment, audit trails and human accountability; inclusive solutions for small enterprises and rural users; environmental and employment implications.

11. Practical Capstone with an Agribusiness Entity: Each student or team will select a real or realistically simulated agribusiness entity and deliver: a digital-readiness and problem brief; a functioning website, landing page or e-commerce prototype; a cleaned business/market dataset and dashboard; a short market-research report; a validated price, demand or sales forecast; an AI-enabled workflow or customer-support demonstration; and an implementation plan with costs, risks, KPIs, ethical safeguards and a final client-style presentation.

Suggested Readings:

1. Laudon, K.C. and C.G. Traver. 2024. E-Commerce 2023–2024: Business, Technology, Society. Global 18th Ed. Pearson, Harlow, UK.
2. Robbins, J.N. 2025. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics. 6th Ed. O'Reilly Media, Sebastopol, CA, USA.
3. Chaffey, D. and F. Ellis-Chadwick. 2022. Digital Marketing: Strategy, Implementation and Practice. 8th Ed. Pearson, Harlow, UK.
4. James, G., D. Witten, T. Hastie, R. Tibshirani and J. Taylor. 2023. An Introduction to Statistical Learning: With Applications in Python. Springer, Cham, Switzerland. <https://doi.org/10.1007/978-3-031-38747-0>
5. Hyndman, R.J. and G. Athanasopoulos. 2021. Forecasting: Principles and Practice. 3rd Ed. OTexts, Melbourne, Australia. <https://otexts.com/fpp3/>
6. Provost, F. and T. Fawcett. 2013. Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking. O'Reilly Media, Sebastopol, CA, USA.
7. Géron, A. 2022. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow. 3rd Ed. O'Reilly Media, Sebastopol, CA, USA.
8. Agrawal, A., J. Gans and A. Goldfarb. 2022. Power and Prediction: The Disruptive Economics of Artificial Intelligence. Harvard Business Review Press, Boston, MA, USA.
9. UNESCO. 2021. Recommendation on the Ethics of Artificial Intelligence. UNESCO, Paris, France.

ABM-802	Applied Agribusiness Market Research	3 (3-0)
Objectives: To build ability to gather, analyze, and interpret market data to make informed business decisions and develop effective marketing strategies in the agricultural industry.		
Learning Outcomes: After studying this course, the students will be able to: - 1. Comprehend research designs related to data recording and analysis. 2. Use relevant software packages for data analysis and business decision making. 3. Conduct individual research project.		
Relevant SDGs: ➤ SDG 12: Responsible Consumption and Production ➤ SDG 15: Life on Land,		

➤ SDG 17: Partnerships for the Goals8

Course Outline:

Research design formulation; Qualitative and quantitative research methods; Sampling; Issues of precision and confidence in determining sample size; Data processing; Data measurement and analysis: univariate, bivariate, multivariate data analysis; Hypothesis testing; Regression analysis; Dummy dependent variable model; Linear probability model; Logit model; Probit model; Tobit model and their applications in the analysis of business data; Approaches to time series analysis and forecasting; Methods of forecasting and their reliability; Commonly used technologies in business research; Some software packages useful for data analysis; Designing of a research proposal; Individual research project formulation.

Suggested Readings:

1. Bazeley, P. and K. Jackson. 2013. Qualitative data analysis with NVivo, SAGE Publications, Los Angeles, CA, USA.
2. Bryman, A., and E. Bell. 2015. Business Research Methods. Oxford University Press, Oxford, London, UK.
3. Creswell, J.W. 2012. Qualitative Inquiry and Research design: Choosing among Five Approaches, SAGE Publications, Los Angeles, CA, USA.
4. Hair, J.F., W. Black, B.J. Babin and R.E. Anderson. 2010. Multivariate data analysis, Prentice Hall Higher Education, Upper Saddle River, NJ, USA.
5. Sekaram, U. 2016. Research Methods for Business: A Skill Building Approach. Wiley, Publisher, Hoboken, NJ, USA.

ABM-804	Agriculture Policy Analysis Tools for Economic Development	3 (3-0)
Objectives: To analyze and evaluate agricultural policies, enabling students to contribute to evidence-based decision-making processes and promote economic development in the agriculture sector.		
Learning Outcomes: After studying this course, the students will be able to: - 1. Understand the price determination and movements over time in agriculture sector. 2. Estimate market margins and marketing costs in different market structures. 3. Examine government intervention in pricing policies of farm products.		
Relevant SDGs: ➤ SDG 2: Zero Hunger,		

➤ SDG 8: Decent Work and Economic Growth

Course Outline:

Price determination and price discovery; Correction for inflation; Use of index numbers; Simple linear regression and estimation of trend; Price movements over time; Measuring cycles; Use of trends in measuring cycles; Use of moving average in measuring cycles; Seasonality of prices, measuring seasonality through simple average approach and moving average approach; Spatial price movements; Price movements associated with quality; Supply demand relationships; Estimation of demand and supply through multiple graphic correlation and regression analysis; Market margins and marketing costs; Market structures; Pure competition; Monopoly and monopsony; Oligopoly and oligopsony; Future markets; Product quotas and their implications; Price relationships on commodity futures markets; Functions of commodity futures markets; Government intervention in pricing farm products and their implications; Price support programme in Pakistan and its repercussions.

Suggested Readings:

1. Vercammen, J. 2011. Agricultural Marketing: Structural Models for Price Analysis. 1st Ed. Routledge Publishers, London, UK.
2. Norwood, F.B. and J.L. Lusk. 2008. Agricultural Marketing and Price Analysis. Prentice Hall Publishers, New Delhi, India.
3. Tomek, W., G.K.L. Robinson. 2003. Agricultural Product Prices. Cornell University Press, Ithaca, NY, USA.
4. Goodwin, J.W. 1994. Agricultural Price Analysis and Forecasting. John Wiley and Sons, New York, NY, USA.
5. Niaz, M. S. 1995. Pricing of Farm Produce in Pakistan: Objective, Practices and Experiences. Print Associates International, Islamabad, Pakistan.

ABM-806	Value Chain Analysis for Policy Making – A Quantitative Approach	3 (3-0)
Objectives: To conduct value chain analysis, enabling students to inform evidence-based policy making and enhance the effectiveness of policies in promoting economic development.		
Learning Outcomes: After completing the course, students will be able to: - 1. Analyze value chains, including data collection, statistical analysis, and modeling techniques. 2. Develop a deep understanding of the dynamics and interdependencies within value chains, including factors such as supply chain linkages, value addition, and market dynamics.		

3. Evaluate the impacts of different policy interventions on value chains using quantitative approaches, assessing the effects on economic growth, competitiveness, employment, and other relevant indicators.
4. Formulate evidence-based policy recommendations for value chain development, drawing on their quantitative analysis and understanding of value chain dynamics to propose targeted interventions and policy adjustments.

Relevant SDGs:

- SDG 1: No Poverty
- SDG 9: Industry, Innovation, and Infrastructure

Course Outline:

Definition and importance of value chain analysis in policy formulation; Overview of quantitative approaches in value chain analysis; Linking value chain analysis to evidence-based policy making; Identification and collection of relevant data for value chain analysis; Quantitative analysis techniques, including statistical methods and modeling approaches; Handling and processing data for value chain analysis; Mapping the structure and dynamics of value chains; Quantitative techniques for value chain analysis, such as value chain mapping, value chain finance analysis, and value chain coordination analysis; Identifying key actors, activities, and relationships within value chains; Input-output analysis and its application in value chain analysis; Cost-benefit analysis and economic impact assessment in value chain interventions; Market and price analysis within value chains; Evaluating the impact of policy interventions on value chains; Counterfactual analysis and impact assessment methods; Monitoring and evaluating value chain performance and effectiveness of policies

Suggested Readings:

1. Bellù LG. Value chain analysis for policy making. Methodological Guidelines and country cases for a Quantitative Approach. Roma: Food and Agriculture Organization. 2013.
2. Hillman M, Keltz H. Managing risk in the supply chain: a quantitative study. AMR Research. 2008 Jan 3(January):1-24.
3. Klose A, Speranza MG, Van Wassenhove LN, editors. Quantitative approaches to distribution logistics and supply chain management. Springer Science & Business Media; 2002 Jun 26.

ABM-807	ICTs and Agribusiness	3 (3-0)
Objective: To explore the role and potential of Information and Communication Technologies (ICTs) in enhancing efficiency, productivity, and innovation within the agribusiness sector, and to equip students with the knowledge and skills to leverage ICTs for sustainable agricultural development.		

Learning Outcomes:

After completing the course, students will be able to: -

1. To become familiar with state-of-the-art Electronic Model, Payment Mechanisms.
2. To understand the basic principle of E-Government, Securities, Supply Chain Management.
3. To evaluate and observe various online Agri related businesses.

Relevant SDGs:

- SDG 8: Decent Work and Economic Growth
- SDG 9: Industry, Innovation, and Infrastructure

Course Outline:

Introduction to E-commerce; The difference between e-commerce and e-business; Types of e-commerce; Origins and Growth of E-commerce; Impact of E-commerce on Consumer; Organization and Society; Benefits and Limitations of E-commerce to Consumer; Organization and Society; Barriers to E-commerce; E-commerce business models and concepts; Business-to-consumer (B2C), Business-to-business (B2B) and Business-to-Government (B2G) business models; Business models in other emerging e-commerce areas; How the Internet and Web change business; Strategy; Structure and process; The Internet and World Wide Web; Evolution of the Internet; The Internet – Key technology concepts; TCP/IP, IP Address, Domain names and URLs, Internet Protocols; Email: SMTP, POP and IMAP; FTP: File transfer protocol; Ping: testing the address; The Internet today; The Internet Backbone; Network access points and metropolitan area exchange; Internet Service Providers; Intranets and extranets; Building an E-commerce website; Security and Encryption; E-marketing Concepts; Basic marketing concepts; On-site Marketing Techniques – customer feedback; Links; Banner ads affiliate programs; Newsletters; Emails.

Suggested Readings:

1. Reynolds, J. 2014. The Complete E-Commerce Book. Design, Build & Maintain a Successful Web-based Business. 2nd Ed. CRC Press, New York, NY, USA.
2. Laudon, K. and C.G. Traver. 2006. E-Commerce 2009: Business, Technology, and Society. 3rd Ed. Prentice Hall, New York, NY, USA.
3. European Association of Agricultural Economics. 2003. E-Commerce and Electronic Markets in Agribusiness and Supply Chains: Proceedings of the 85th Seminar of the European Association of Agricultural Economics Publishers.
4. Morley, M., and C.S. Parker. 2011 Understanding Computers: Today and Tomorrow, Comprehensive. 13th Ed. Cengage Learning, New York, NY, USA.

5. Marques, J.P. 2008 Applied Statistics Using SPSS, STATISTICA, MATLAB. 2nd Ed. Springer, New York, NY, USA.

ABM-808	Postharvest Processing and Management	3 (3-0)
Objectives: To educate students with harvesting post-harvest technology, losses, and marketing of crop produce		
Learning Outcomes: After studying this course, the students will be able to: - 1. Describe the importance of post harvest technology and optimum harvesting time of crops. 2. Understand about the processing, grading, seed treatment, storage of different crops. 3. Impart new techniques for harvesting and processing of crop produce. 4. Demonstrate different harvesting and post harvesting processes along with packing and marketing of crops		
Relevant SDGs: ➤ SDG 12: Responsible Consumption and Production ➤ SDG 13: Climate Action		
Course Outline: Concepts, objectives, and importance of Post harvest Technology in field crops. Objects of harvesting, threshing, processing, cleaning, and grading, Seed treatment and storage. Modern technology of harvesting, threshing, shelling, cleaning, drying, grading of cereal grains. Reaping, beating/threshing, cleaning, and drying of wheat and paddy rice. Picking, ginning, and separating lint and seed of cotton. Cutting, stripping, and topping of sugarcane. Harvesting, beating/threshing, and cleaning of grain legumes and oilseeds. Digging, cleaning, topping, and washing of root and tuber crops. Marketing of field crop products.		
Suggested Readings: 1. ARNON, I. 1982. Crop production in dry regions. Volume II: Plant Science Monographs Series. by I. Edited by Nicholas Polunin. 2. Bhatti, I. M and A. H. Soomro. 1996. Agriculture Inputs and field crop production in Sindh, Directorate of Agriculture Research Sindh, Hyderabad. 3. Nazir, M. S. 1994. Crop Production. National Book foundation, Islamabad 4. Reddy, S. R. 2004. Principles of Crop Production (2nd edition). Kalyani Publishers, New Delhi.		

ABM-809	Food Safety and Quality Management	3 (3-0)
Objectives: To ensure the production, handling, and distribution of safe and high-quality food, addressing foodborne risks, and promoting consumer health and well-being.		
Learning Outcomes: By the end of this course students will be able to: - 1. Understand the knowledge of food processing and preservation techniques. 2. Understand the food sources and their current status. 3. Know the food constituents and their behaviour during the processing. 4. Learn practically about the processing and preservation techniques of food products.		
Relevant SDGs: ➤ SDG 2: Zero Hunger, ➤ SDG 3: Good Health and Well-being, ➤ SDG 12: Responsible Consumption and Production		
Course Outline: Introduction: Food science and technology, food processing and preservation; Food safety and security; Food sources and global food situation; Food constituents and their functions: Water, carbohydrates, lipids, proteins, vitamins and minerals; Food classification based on perishability and pH; Spoilage agents in food: Enzymes, microorganisms, insects, rodents, birds and physical factors; Principles of food preservation; Preparatory operations in food processing; Food preservation techniques: High temperature: Pasteurization, sterilization and canning; Low temperature: Refrigeration and freezing; Removal of moisture: Drying and dehydration; Use of chemical additives; Fermentation techniques: Alcoholic, acetic and lactic; Irradiation technology; Food packaging and labelling.		
Suggested Readings: 1. Awan, J.A. 2020. Food Processing and Preservation. Unitech Communications, Faisalabad, Pakistan. 2. Awan, J.A. 2020. Food Science and Technology. Unitech Communications, Faisalabad, Pakistan. 3. Raheem, M.I.U. and R. M. Aadil. 2019. Practical Manual for: Fruits and Vegetable Processing and Preservation. Pak TM Printers, Faisalabad. 4. Rehman, M.S. 2008. Handbook of Food Preservation. CRC Press Taylor & Francis Group, Boca Raton, FL, USA. 5. Zahoor, T., and M. S. Butt. 2018. Handbook of Food Science and Technology. University of Agriculture, Faisalabad, Pakistan.		

ABM-810	Climate Change and Response of Agribusiness	3 (3-0)
Objectives: To develop an understanding of agriculture and marketing risks under changing climate.		
Learning Outcomes: After studying this course, the students will be able to: - 1. Comprehend importance of climate in agriculture. 2. Compare climate variability and change: past, present, and future scenario. 3. Analyse impact of climate change in different regions. 4. Interpret influence of climate change on productivity of major and minor crops. 5. Examine implications of changing climatic scenario for pests, livestock, and natural resources. 6. Design strategies for managing climate change and vulnerability;		
Relevant SDGs: ➤ SDG 2: Zero Hunger ➤ SDG 13: Climate Action ➤ SDG 15: Life on Land ➤ SDG 17: Partnerships for the Goals8		
Course Outline: Climate and agriculture; Climate variability and change-past, present, and future scenario; Impact of climate change in different regions; Influence of climate change on productivity of major and minor crops; Implications of changing climatic conditions for risk aversion; farmers response to marketing risks under climate change; Strategies for managing climate change and vulnerability; Capacity building and action plan for policy makers and planners.		
Suggested Readings: 1. Hillel, D., and C. Rosenzweig. 2013. Handbook of Climate Change and Agroecosystems: Global and Regional Aspects and Implications. Imperial College Press, London, UK. 2. Anboumozhi, V., M. Breiling, S. Pathmarajah and V.R. Reddy. 2012. Climate Change in Asia and the Pacific: How can Countries Adapt? SAGE Publication India Pvt. Ltd. 3. Sivakumar, M.V.K. and R.P. Motha. 2008. Managing Weather and Climate: Risks in Agriculture. Springer, Berlin, Heidelberg, New York.		

4. Sivakumar, M.V.K. and J. Hansen. 2008. Climate Predictions and Agriculture. Springer, Berlin, Heidelberg, New York.
5. Mavi, H.S. and G.J. Tupper. 2005. Agrometeorology Principles and Application of Climate Studies in Agriculture. International Book Distribution Co., Lucknow, India.
6. Sivakumar, M.V.K. and R.P. Motha. 2005. Increasing Climate Variability and Change: Reducing the vulnerability of agriculture and forestry. Springer, Dordrecht, The Netherland.

ABM-811	Farming and Cropping System	3 (3-0)
Objectives: To identify the issues of farming/cropping systems and demonstrate research methods for sustainable production.		
Learning Outcomes: Upon successful completion of the course, the student will be able to: - 1. Understand the concepts and significance of farming/cropping systems. 2. Assess input use efficiencies in various farming/cropping systems. 3. Use allied enterprises in agriculture-based systems. 4. Apply the acquired knowledge for sustainable production		
Relevant SDGs: ➤ SDG 2: Zero Hunger ➤ SDG 12: Responsible Consumption and Production ➤ SDG 15: Life on Land		
Course Outline: Concept, scope, classification and components; Agricultural resources, their utilization and management; Major farming and cropping systems of Pakistan; Role of tillage, root dynamics, cover crops, crop residues in cropping system; Assessing input use efficiencies in various farming/cropping systems; Role of precision agriculture in farming system; Study of allied enterprises (livestock, poultry, aquaculture, mushroom culture, tunnel farming); Emerging trends in farming/cropping system research; Researchable issues and research methods in farming and cropping systems.		
Suggested Readings: 1. Balasubramaniyan, P. and S.P. Palaniappan. 2009. Principles and Practices of Agronomy. Agrobios, Jodhpur, India. 2. Dixit, R.S. 2008. Cropping System Research. Kalyani Publishers, New Delhi, India.		

3. Panda, S.C. 2006. Crop Management and Integrated Farming. Agrobios, Jodhpur, India.
4. Shrestha, A. 2003. Cropping Systems Trends and Advances. Food Products Press, Binghamton, NY, USA.

ABM-812	Integrated Agriculture	3 (3-0)
Objective: To enhance the understanding of environmental degradation and conservation through integrated approaches.		
Learning Outcomes: After successful completion of the course, students will be able to: - 1. Describe impact of agricultural practices and industrial/municipal wastes on the environment and ecosystem. 2. Develop strategies to minimize degradation of environment and ecosystem resulting from agro-chemicals and industry. 3. Understand the rules and regulations of environment conservation		
Relevant SDGs: ➤ SDG 2: Zero Hunger ➤ SDG 8: Decent Work and Economic Growth ➤ SDG 12: Responsible Consumption and Production		
Course Outline: Definition and principles of integrated agriculture; Benefits and importance of integrated approaches in agriculture; Overview of sustainable development goals and integrated agriculture; Concepts and principles of agroecology; Sustainable farming systems, including organic farming, permaculture, and regenerative agriculture; Case studies and best practices in sustainable farming systems; Integrated crop-livestock systems and their benefits; Rotational grazing, mixed farming, and agroforestry practices; Synergies and interactions between crops and livestock in integrated systems; Resource Management in Integrated Agriculture; Efficient water management techniques; Soil conservation and erosion control practices; Nutrient cycling and organic matter management		
Suggested Readings: 1. Allaby, M. 2000. Basics of Environmental Science. Rutledge, London. 2. Hudson, N.W. 2004. Soil and water conservation in semi-arid areas. Scientific Publishers, India. 3. Kirkham, M.B. (Editor). 2004. Water Use in Crop Production. Narosa Publishing House Pvt. Ltd. New Delhi, India.		

4. Maloo, S.R. 2002. Sustainable Crop Production Under Stress Environments. Agro-tech Publishing Academy, Udaipur, India.
5. Raven, P.H. Berg, L.R. and G.B. Johnson. 1993. Environment. International Ed. Saunders College Publishing, New York.

ABM-818	Special Problem	1 (0-1)
Objective: To broaden student capacity for handling a project independently.		
Course Content: Preparation of research proposals for agribusiness & marketing research; Data collection methods; Introduction to the data analysis tools; Compilation and presentation; Interpretation of results and report writing by the student. <i>Note: The post-graduate students will be assigned the topics on recent developments in agribusiness & marketing research by the concerned teacher.</i>		

ABM-819	Seminar	1 (0-1)
Objective: To improve students' communication and presentation skills.		
Course Content: Selection of research topic, preparation of material for presentation, and presentation by the student in the department to defend the research proposal or on a particular topic in consultation with the teacher. <i>Note: The post-graduate students will be assigned the topics on recent developments in agribusiness & marketing research by the concerned teacher.</i>		