Master of Science
(MS) in
Agriculture Business and Marketing

(Effective from Fall 2024 as per GEP-2023)

Department of Agricultural Business and Marketing
Faculty of Agricultural Sciences and Technology
Bahauddin Zakariya University, Multan

Prepared By:

Curriculum Review/Development Committee

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MS Agriculture Business & Marketing (32 Credit Hours)

Semester-wise Break-up of Credit Hours

Course Code	Course Title	Credit Hours
1st Semester		
ABM-501	Agribusiness Planning and Management	3 (3-0)
ABM-502	Agribusiness Marketing	3 (3-0)
ABM-503	Business Research Methods	3 (3-0)
Elective-1 of three credit hours from the list		3 (3-0)
2nd Semester		
ABM-506	Value Chain Analysis for Policy Making	3 (3-0)
ABM-507	Econometrics	3 (2-1)
ABM-511	International Trade and Competitiveness of Agricultural Commodities	3 (3-0)
Elective-2 of three credit hours from the list		3 (3-0)
3rd Semester		
ABM-512	Special Problem	1 (0-1)
ABM-513	Seminar	1 (0-1)
4th Semester		
ABM-514	Thesis MS Agriculture Business and Marketing	6 (0-6)

List of elective courses (optional)

[Note: Two optional subjects (6 credit hours) are mandatory to be taken by the scholar]

ABM-504	Food and Agriculture Policy Analysis	3 (3-0)
ABM-505	Global Challenges in Agriculture	3 (3-0)
ABM-508	Managerial Accounting and Control System	3 (3-0)
ABM-509	Strategic Finance	3 (3-0)
ABM-510	Case Studies in Agribusiness and Marketing	3 (3-0)
AGR-527	Climate Change and Agriculture	3 (3-0)
AGR-528	Postharvest Technology of Crops	3 (2-1)
AGR-511	Crop Management on Problem Soil	3 (2-1)
STAT-531	Statistical Methods for Business Management	3 (2-1)

List of Deficiency Courses

Note: These are the course to be taught to the students who came from Interdisciplinary subjects. The admission committee may decide few deficiency courses from this list in addition to the above designed courses of the program keeping in view the student background and knowledge).

1	Principles of Management	DC-101	3 (3-0)
2	Agricultural Marketing	DC-203	3 (3-0)
3	Agribusiness Management	DC-302	3 (3-0)
4	Agricultural Policy	DC-311	3 (3-0)
5	Agribusiness Entrepreneurship	DC-403	3 (3-0)
6	Pricing Analysis of Commodities	DC-404	3 (3-0)
7	International Tarde and WTO	DC-406	3 (3-0)
8	Principles of Agricultural & Resource Economics	DC-204	3 (3-0)

ABM-501	Agribusiness Planning and Management	3 (3-0)

Objective:

To effectively plan, develop, and manage agribusiness ventures, considering the unique challenges and opportunities in the agricultural sector.

Learning Outcomes:

After studying this course, the students will be able to: -

1. Comprehend the nature of strategic management process and decisions in agribusiness.
2. Prepare the agribusiness strategy making hierarchy and types of strategies.
3. Delineate the factors affecting strategic formulation and implementation process.

Relevant SDGs:

- SDG 2: Zero Hunger
- SDG 8: Decent Work and Economic Growth
- SDG 17: Partnerships for the Goals

Course Outline:

Nature of strategic management process and decisions in agribusiness; Agribusiness strategic management: role and tasks of agribusiness manager, agribusiness environment, internal and external environment; Development of vision and mission statements; Setting of goals; Objective; Organizational targets; Agribusiness strategy making hierarchy: corporate strategy, functional strategies, operating strategies, factors shaping strategies; Action plan choice; The generic competitive strategies; Strategies choice and analysis; Strategy implementation; Analysing strategy change; Organizational structure and culture in agribusiness; Selecting a strategy implementation approach for agribusiness; Strategic control; Agribusiness strategic control process and methods.

Suggested Readings:

1. Akridge, J.T., F.L. Barnard, F.J. Dooley and J.C. Foltz. 2016. Agribusiness Management. 5th Ed. Routledge Publishers, London, UK.
2. David, F.R. 2008. Strategic Management. Prentice Hall, New York, NY, USA.
3. David, F.R. 2011. Strategic Management: Concepts and Cases. 13th Ed. Pearson Higher Education Ltd. New York, NY, USA.
4. Harling, K. 2008. Strategic Management in Agribusiness. Pearson Higher Education and Professional Group, New York, NY, USA.
5. Thompson, A.A. 2004. Strategic Management: Concepts and Handouts. McGraw Hill, New York, NY, USA

ABM-502	Agribusiness Marketing	3 (3-0)

Objective:

To effectively market agricultural products and services, considering the unique challenges and opportunities in the agribusiness sector

Learning Outcomes:

After completing the course, students will be able to:

1. Understand the significance of marketing in today's scenario on a broader level and in particular of agricultural marketing.
2. Identify and critically discuss the key concepts, theories and models of basic agricultural marketing and relate it with agricultural marketing mix.
3. Understand and appreciate that how the marketing creates consumer insight and turn this into the creation of agricultural commodities marketing opportunities and markets in today's unsustainable and changing environment.

Relevant SDGs:

- SDG 2: Zero Hunger
- SDG 8: Decent Work and Economic Growth
- SDG 12: Responsible Consumption and Production

Course Outline:

Concepts and definitions of market; Marketing, Agricultural Marketing; Classification and scope of markets; Role of agricultural marketing in economic development; Factors responsible for neglect of agricultural marketing; Stages of development; The functional approach; The institutional approach; The commodity approach; The behavioural system approach; Market structure approach; Market conduct approach; Market performance approach; Marketable and marketed surplus; Market channels; Market integration; Post-harvest handling of Agri commodities; Agri marketing system; Grading; Packaging; Financing; Marketing pools; Cooperatives; Marketing boards; Market efficiency; Indicators of market efficiency; Standardization and grading; Marketing information; Market legislation;

Market committees; Management of wholesale markets; Support prices; Agricultural marketing problems.

Suggested Readings:

1. Cannon, T. 2009. Basic Marketing Principles and Practices. 12th Ed. Wiley and Sons, New York, NY, USA.
2. Kohls, R.L. and J.N. Uhl. 2005. Marketing of Agricultural Products. 9th Ed. Max Well Publisher, Macmillan, New York, NY, USA.
3. Kotler, P. and G. Armstrong. 2008. Principal of Marketing. 12th Ed. Prentice-Hall International, Inc., New York, NY, USA.
4. Mohy-ud-Din, Q. and H. Badar. 2011. Agricultural Marketing. 2nd Ed. A-One Publishers, Al-Fazal Market, Urdu Bazar, Lahore, Pakistan.
5. Vercammen, J. 2011. Agricultural Marketing: Structural Models for Price Analysis. 1st Ed. Routledge Publishers, London, UK.

ABM-402	Business Research Methods	3 (2-1)

Course Description:

Agribusiness Management explores strategic planning, financial analysis, and sustainable practices in agricultural enterprises, equipping students with skills vital for effective leadership. Through practical applications, students learn to navigate complex challenges and opportunities in the agribusiness sector, fostering innovation and economic growth while promoting sustainability.

Course Objective:

- Identifying the problems areas and formulating the research questions
- Understating different forms of research studies

Student Learning Outcomes:

- Learning the overall research framework and enhancing the basic skill set
- Applying theoretical knowledge to real life scenarios
- Data management and use of technology in research process
- Interpretation and inferences from the data

Relevant SDGs:

SDG 2: Zero Hunger; SDG 8: Decent Work and Economic Growth; SDG 12: Responsible Consumption and Production

Course Outline:

Introduction to Research, Types of Research, Scientific Approach and alternative approaches to research, Defining and Redefining the problem, The critical literature review, Theoretical framework and hypothesis Development, Elements of research design, Interviews, Data Collection Methods, Primary data collection methods, interviews, type of interview, conduct interviews, conduct focus group discussion, Observation, Administering questionnaires, Measurement of variable, scaling, reliability and validity, Types of scale Goodness of measure, reflective v/s formative measurement, Sampling, Quantitative Data Analysis, Introduction to Data analysis Software SPSS, Quantitative data analysis hypothesis testing, Type I and Type II error, Interpretation of Results, Qualitative Research, Research Report, Referencing.

Suggested Readings:

- Sekaran,U. Research Methods For Business: A Skill Building Approach, 7th edition. John Wiley & Sons, Inc., 2016.
- Cooper,D.R. & Schindler, P.S. Business Research Methods, 11th edition, McGraw-Hill

ABM-506	Value Chain Analysis for Policy Making	3 (3-0)

Objective:

To conduct comprehensive value chain analyses that inform evidence-based policy decisions, promoting inclusive economic development and sustainable growth.

Learning Outcomes:

After studying this course, the students will be able to: -

1. Understand dynamics of value chains and different principles of value chain management.
2. Analyse value chain of various agro-based products.
3. Identify constraints that affect value chain performance and suggest measures for improvements in value chain management.

Relevant SDGs:

- SDG 8: Decent Work and Economic Growth
- SDG 9: Industry, Innovation, and Infrastructure
- SDG 12: Responsible Consumption and Production

Course Outline:

The concept of value and value chains; Creating and capturing value; Sources and drivers of value; Structure of value chains; Value chain actors and service providing institutions; Value chain types: traditional, modern and export value chains; Value chain flows: product, information and financial flows; Value chain governance: market-based, modular, relational, captive and hierarchy governance models; Nature and impact of value chain relationships: power, trust and commitment on chain performance; Value chain management: drivers, benefits and principles; Management of value chain resources: capabilities and core competencies; Critical success factors for value chain management; Value chain constraints; Value chain actor: system and support services related constraints; Value chain upgrading: product, process and functional upgrading.

Suggested Readings:

1. Bozarth, B.C. and B.R.H. Hand and B.R. Field. 2015. Introduction to Operations and Supply Chain Management. Pearson Publishers, London, UK.
2. Chandrasekaran, N. and G. Raghuram. 2014. Agribusiness Supply Chain Management. CRC Press, Taylor and Francis Group, London, UK.

3. M4P. 2008. Making Value Chains Work Better for the Poor: A Tool Book for practitioners of Value Chain Analysis. Department for International Development (DFID), London, UK.
4. Sabri, E.H. and S.N. Shaik. 2010. Lean and Agile Value Chain Management: A Guide to the Next Level of Improvement. J. Ross Publishing, Inc., Fort Lauderdale, FL, USA.
5. Sharangi, A.B., and D. Suchand. 2015. Value Addition of Horticultural Crops: Recent Trends and Future Directions. 1st Ed. Springer Publisher, New York, NY, USA.

ABM-507	Principals of Econometrics	3 (2-1)

Objective:

To provide students with a solid foundation in econometric theory and methods, enabling them to analyze and interpret economic data, estimate econometric models, and make informed empirical conclusions.

Learning Outcomes:

By the end of this course students will be able to: -

1. Have concise knowledge of concepts and techniques in econometrics, with a special focus on the classical linear regression model.
2. Understand the assumptions upon which different econometric methods are based and their implications if different fields of economics.
3. Interpret and critically evaluate econometric outcomes of empirical analysis as well as formulate and estimate appropriate models.
4. Use statistical software to implement the various techniques taught and demonstrates ability to analyse and assess empirical results.

Relevant SDGs:

- SDG 1: Poverty reduction
- SDG 8: Decent Work and Economic Growth

Course Outline:

Theory: Definition, scope and importance of econometrics; Basic concepts; Regression theory and multiple regression; Properties of statistical estimators; Inferences, and hypothesis testing; Regression analysis, OLS estimation of simple and multiple Regression, dummy variables; Specification bias and tests; Overview of issues of multicollinearity, Heteroscedasticity and Autocorrelation; Causes, effects, tests and remedial measures; Model specification issues, limited dependent variables (such as LPM, Tobit, Logit and Probit Models); Auto regressive and distributed lag models.

Practical: Estimation for simple and multiple regression models, hypothesis testing, detection and remedial measures for multicollinearity, Heteroscedasticity and Autocorrelation; Estimation of limited dependent variables models and ARDL models by using computer software like Excel, SPSS, STATA, and E-views etc.

Suggested Readings:

1. Gujrati, D.N. 2021. Essentials of Econometrics. 5th Ed. SAGE Publications, Inc.

2. Gujrati, D.N. and D.C. Porter. 2009. Basic Econometrics. International Ed. (5th Ed.). McGraw-Hill Series, NY, USA.
3. Ramanathan, R. 2001. Introductory Econometrics with Applications. 5th Ed. South-Western College Pub.
4. Studenmund, A.H. 2010. Using Econometrics: A Practical Guide. 6th Ed. Pearson Custom Publishing.
5. Wooldridge, J.M. 2015. Introductory Econometrics: A Modern Approach. 6th Ed. Southwestern College, California, USA.

ABM-511	**International Trade and Competitiveness of Agricultural Commodities**	**3 (3-0)**

Objective:

To analyse and understand the dynamics of international agricultural trade, including factors influencing competitiveness, market access, and trade policies, enabling students to navigate global agricultural markets effectively.

Learning Outcomes:

After studying this course, the students will be able to: -

1. Develop a good understanding of the concept of globalization and trade related aspects.
2. Orientation towards national and international trade drivers and related policy issues.
3. Gain practical insight of application of international trade theories and models to real world case studies.

Relevant SDGs:

- SDG 8: Decent Work and Economic Growth
- SDG 9: Industry, Innovation, and Infrastructure
- SDG 12: Responsible Consumption and Production

Course Outline:

An overview of globalization and its evolution; Drivers of globalization and their impacts; The perspectives of developing and developed countries towards globalization; Policy debates on globalization; Review of the theories and the political economy of international trade; The global trade patterns; Country specializations in production and exports; Trade policies and their role in economic growth and development; Application of trade theories and models; Contemporary trade policy issues; dumping, outsourcing, offshoring and the global financial crisis; Changes in the global trading system; Global and regional economic integration; The world trade organization: developing and developed countries perspectives, disputes settlement mechanism, rules, procedures, case studies; Free trade agreements; Policy prescriptions for the reform of the global financial and trade institutions.

Suggested Readings:

1. Appleyard, D.R., A.J. Field and S.L. Cobb. 2014. International Economics: Trade, Theory and Policy. 8th Ed. McGraw-Hill Irwin, New York, NY, USA.

2. Bhagwati, J. 2007. Defence of Globalization, Oxford University Press, London, UK.
3. Hill, C.W.L. 2013. Global Business Today. McGraw-Hill Publisher, New York, NY, USA.
4. Joseph, E. and J.E. Stiglitz. 2006. Making Globalization Work. W. W. Norton & Company, New York, NY, USA.
5. Scott, J. 2000. WTO: 1996-2000. Setting the Course for World Trade, Policy Analysis in International Economics. Institute for International Economics, Washington DC., USA.

ABM-504	Food and Agriculture Policy Analysis	3 (3-0)

Objective:

To analyse, evaluate, and formulate effective policies that address food security, agricultural sustainability, and rural development challenges.

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
- SDG 12: Responsible Consumption and Production

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. 2007. 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-505	Global Challenges in Agriculture	3 (3-0)

Objective:

To examine and understand the complex and interconnected challenges faced by the agricultural sector worldwide and explore innovative and sustainable solutions for a resilient and food-secure future.

Learning Outcomes:

After studying this course, students will be able to: -

- Analyse the differences between Inter- Regional and International Trade
- WTO and its impact on Pakistan's agriculture
- Decide on the most appropriate international marketing entry method for their international target markets.

Relevant SDGs:

- ➢ SDG 12: Responsible Consumption and Production
- ➢ SDG 13: Climate Action
- ➢ SDG 15: Life on Land
- ➢ SDG 17: Partnerships for the Goals

Course Outline:

Differences between Inter- Regional and international trade, similarities between inter-regional and international trade; The production possibility curve, community indifference curve; Use of indifference curve in international trade; Pre-trade situation under constant; Pre trade equilibrium and increasing opportunity costs; Post trade equilibrium: constant costs; Post trade equilibrium: Increasing and decreasing costs; The offer curve Continue, Box diagram, Smith's theory of absolute differences in costs; Ricardo theory of comparative differences in costs, Criticism; The Heckscher Ohlin theory; Superiority of the theory; Stopler Samuelson theorem, Rybczynski theorem; Meaning and types of tariffs, effects of tariffs, effects of import Quotas, equivalence of tariffs and quotas; Import quotas Vs import tariffs; Dumping and types of dumping, price determination under dumping, effects of dumping, anti-dumping measures; WTO, difference between GATT and WTO, structure, Objective and functions of WTO, WTO Agreements: Agreement on Agriculture (AOA), Application of Agreement on Agriculture, Agreement on Textile and Clothing (ATC) , Trade related investment measures (TRIMS), Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS).

Suggested Readings:

1. Charles, H. 2011. Global Business Today. Mac-Graw Hill, New York, NY, USA.
2. Cateora, G. and A. Graham. 2010. International Marketing. 13th Ed. Richard D Irwin Publishers, Homewood, IL, USA.

3. The World Trade Organization: Understanding the WTO. 3rd Ed. Geneva, Switzerland.
4. Charles, H. 2010. Global Business Today. Mac-Graw Hill, New York, NY, USA.
5. Cateora, G. and Graham. 2009. International Marketing. 13th Ed. Richard D Irwin Publishers, Homewood, IL, USA.

ABM-508	Managerial Accounting and Control System	3 (3-0)

Objective:

To understand and apply managerial accounting concepts, techniques, and control systems for effective decision-making and performance management in organizations.

Learning Outcomes:

After studying this course student will be able to: -

1. Apply various types of management accounting systems.
2. Compute and contrast various costing methods for effective managerial control.
3. Develop the understanding of cost accounting information system in a dynamic business environment.

Relevant SDGs:

- SDG 8: Decent Work and Economic Growth
- SDG 12: Responsible Consumption and Production

Course Outline:

Managerial accounting perspective; Cost terms; Accounting concepts and classification; Responsibility accounting and cost allocation concepts; Responsibility accounting centres and performance reports; Cost flows and accumulation; The basic cost flow model; Cost accumulation; Merchandising; Manufacturing and services organization; Costing systems; Job order-costing systems; Process costing system; Hybrid product costing system; Cost management systems; Cost behaviour and estimation; Cost behaviour patterns; Cost estimation methods and account analysis; Cost–volume–profit (CVP) analysis; Break-even point; CVP analysis; CVP with multiple products; Cost structure and leverage analysis; Standard costing systems; Standard costs and control; Setting cost standards; Overhead application in a standard costing system; Differential cost analysis; Differential costs versus variable costs; Differential costs versus total costs; Cost analysis for pricing; Variable costing; Variable costing versus full absorption costing; Appropriateness of variable costing and full absorption costing methods; Flexible budgeting.

Suggested Readings:

1. Bragg, S.M. 2014. Cost Accounting Fundamentals: Essential Concepts and Examples. Accounting Tools, Inc., Centennial, CO, USA.
2. Braun, W.K. and M.W. Tietz. 2017. Managerial Accounting. Pearson Publishers, London, UK.
3. Garrison, R. 2012. Managerial Accounting. Richard D. Irwin, Inc., Chicago, IL. USA.
4. Kaluza, J. 2008. Accounting: A Systems Approach. 8thEd. McGraw Hills Inc. New York. NY, USA.

5. Lanen, W., S. Anderson and M. Maher. 2013. Fundamentals of Cost Accounting. McGraw-Hill Education, New York, NY, USA.

ABM-509	Strategic Finance	3 (3-0)

Objective:

To make strategic financial decisions and effectively manage financial resources to drive organizational growth and success.

Learning Outcomes:

By the end of this course students will be able to:

1. Understand the role of agricultural finance in the economic development of Pakistan.
2. Understand the nature and scope of financial management in agri-business.
3. Understand agricultural value chain finance and its different business models.
4. Understand the role of the regulator in agricultural financing.

Relevant SDGs:

- SDG 8: Decent Work and Economic Growth
- SDG 9: Industry, Innovation, and Infrastructure
- SDG 12: Responsible Consumption and Production

Course Outline:

Brief History of Rural Finance Development; Agricultural Finance–Concepts, Principles & Scope; Investment in Agriculture; Classification of Agriculture Credit, Features of Farm Finance; Supply and Demand of Credit (Gap Analysis); Formal & Informal Sources of Credit; Characteristics of Small Holders; Agriculture Loan Schemes; Lender-Borrower Relationship and Credit Evaluation, Procedural formalities in Sanction of Farm Loans; Tools of Financial Analysis, Ratio Analysis Applied to Farm; Financing Agribusiness; Role of the State Bank of Pakistan in Agriculture Credit (Policy/Regulatory Framework and Initiatives);International Best Practices in Agricultural Finance; Innovative Lending Methodology and Delivery Channels; Digital Technologies to Finance Agriculture; Innovative Risk Management Strategies in Agriculture Finance; Understanding Agricultural Value Chain Finance; Value Chain Business Models; Agricultural Value Chain Finance Instruments; Value chain, Financial, Technological, Infrastructural & Policy innovations; Sources and types of Financial Instruments and Market Intermediaries in Pakistan's Perspective.

Suggested Readings:

1. Devino, G.T. 1981. Agricultural Finance, Inter State Printers and Publishers, Inc. Danville, Illinois, USA.
2. FAO. 2017. Innovative Risk Management Strategies in Rural and Agriculture Finance – The Asian Experience, by Emilio Hernández (ed.), Rome, Italy.
3. Ghafoor, A. 2018. Agribusiness Management in Pakistan. UAF Online Books. Faisalabad, Pakistan.
4. Hohl, R.M. 2019. Agricultural Risk Transfer: From Insurance to Reinsurance to Capital Markets. John Wiley & Sons, Chichester, West Sussex, United Kingdom.
5. Miller, C., and L. Jones. 2010. Agricultural Value Chain Finance: Tools and Lessons.

Food and Agriculture Organization of the United Nations and Practical Action Publishing, Rome, Italy.

6. Moss C. B. 2013. Agricultural Finance. 1st Ed. Routledge. Taylor and Francis. London, UK.
7. Mushtaq, K. and M.K. Bashir. 2018. Agriculture Credit and Cooperation in Developing Sustainable Agriculture in Pakistan. CRC Press Taylor and Francis group. Florida, USA.
8. PMN. 2013. Who is the Aarthi: Understanding the Commission Agent's role in the Agriculture Supply Chain, a joint project report of Pakistan Microfinance Network and National Institute of Banking and Finance, Islamabad.
9. State Bank of Pakistan. 2009. Handbook on Best Practices in Agri/Rural Finance. Agricultural Credit Department State Bank of Pakistan, Karachi, Pakistan.

ABM-510	Case Studies in Agribusiness and Marketing	3 (3-0)

Objective:

To analyse real-world agribusiness and marketing cases to develop problem-solving skills, critical thinking, and decision-making abilities in the context of agricultural industries.

Learning Outcomes:

At the end of this course students will be able to: -

1. Review the various agricultural policies experienced in Pakistan as case study.
2. Understand the basic concepts and principles of economic policies.
3. Comprehend the economic theory and tools pre-requisite for agricultural policy formulation.
4. Explain the policy analysis and policy interventions.

Relevant SDGs:

- SDG 2: Zero Hunger
- SDG 8: Decent Work and Economic Growth
- SDG 12: Responsible Consumption and Production
- SDG 17: Partnerships for the Goals

Course Outline:

Overview of Pakistan's agriculture, concept of market, policy and state, policy analysis framework with Objective, constraints, instruments, and phases, concepts in applied welfare economics, scope and task of policy analysis, producer and consumer surplus, world prices and opportunity cost, examples of policy intervention effects, private, economic and social prices, The policy analysis matrix; A measure of the overall effects of policies, a critical analysis and way forward of price policy, marketing policy, input policy, credit policy, mechanization policy, land reforms policy, research policy, irrigation policy, agricultural extension policy, climate change policy, food security policy, an overview of success or failure of these policies in Pakistan.

Suggested Readings:

1. Ellise, F. 1992. Agricultural Policies in Developing Countries. Cambridge University Press, London, UK.
2. Government of Punjab. 2018. Punjab's Agricultural Policy. Department of Agriculture, Govt. of Punjab, Lahore, Pakistan.
3. Khan, I.A. and M.S. Khan. 2018. Developing Sustainable Agriculture in Pakistan, CRS Press, Taylor and Francis Inc, Bosa Roca, USA.
4. Spielman, D.J., S.J. Malik, P. Dorosh and N. Ahmad. (eds.) 2016. Agriculture and the Rural Economy in Pakistan. 1st Ed. University of Pennsylvania Press, Philadelphia.
5. Swinnen, J. 2018. The Political Economy of Agricultural and Food Policies. Palgrave Studies in Agricultural Economics and Food Policy. Nature America, 1 New York Plaza, New York, NY 10004, U.S.A.
6. Vasile, A.J., J. Subic, A. Grubor and D. Privitera (Eds.). 2019. Handbook of Research on Agricultural Policy, Rural Development, and Entrepreneurship in Contemporary Economies. IGI Global.

AGR-527	Climate Change and Agriculture	3 (3-0)

Objective:

To develop ink-link about 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 13: Climate Action
- SDG 15: Life on Land
- SDG 6: Clean Water and Sanitation
- SDG 11: Sustainable Cities and Communities

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. 2007. Managing Weather and Climate: Risks in Agriculture. Springer, Berlin, Heidelberg, New York.
4. Sivakumar, M.V.K. and J. Hansen. 2007. 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.

AGR-528	Postharvest Technology of Crops	3 (2-1)

Objective:

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 2: Zero Hunger
- SDG 12: Responsible Consumption and Production
- SDG 9: Industry, Innovation, and Infrastructure

Course Outline:

Theory: Concepts, Objective, 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. 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.

Practical: Demonstration of harvesters, reapers and pickers, threshers, air screen cleaners (Wheat and paddy) and ginners (Cotton). Field demonstration for sugarcane cutting and sugar beet digging by manual methods. Seed processing, cleaning, grading and packing practices in cereals, legumes, oilseeds, condiments, spices and vegetables etc. Visits of local farms.

Suggested Readings:

1. ARNON, I. 1972. 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.

AGR-511	Crop Management on Problem Soil	3 (2-1)

Objective:

To strengthen the knowledge for raising crops successfully on problem soils.

Learning Outcomes:

Upon successful completion of the course, student will be able to: -

1. Understand the problem soils and their types.
2. Manage different types of problem soils.
3. Apply different crop management practices to reduce the intensity of problem soils.

Relevant SDGs:

- SDG 2: Zero Hunger
- SDG 15: Life on Land
- SDG 13: Climate Action

Course Outline:

Theory: Concept and perspective of crop productivity in eroded; salt affected, water deficit and water-logged soils; their improvement and reclamation; Site specific cultural practices; Fertilizer and irrigation adjustments; Specific cropping patterns and crop management practices for economic crop production in problem soils; Demonstration of degraded soils.

Practical:

Hands-on soil sampling techniques; Soil analysis and interpretation of soil test results; Assessing soil physical properties and fertility status; Visiting farms or research sites with problem soils; Demonstrations of practical techniques for soil management and crop adaptation on problem soils; Application of soil amendments, such as organic matter, lime, and gypsum; Implementing soil erosion control measures; Hands-on soil preparation techniques for problem soils; Field-based demonstrations of pest and disease identification and management techniques for problem soils; Hands-on application of integrated pest management strategies

Suggested Readings:

1. Gupta, U.S. 2005. Physiology of Stressed Crops: nutrient relations. Science Pub., India.
2. IIMI. 1997. Salinization, Alkalinisation and Sodification on Irrigated Areas in Pakistan. Lahore.
3. Lauchli, A. and U. Luttge. 2002. Salinity: environment-plant-molecules. Lavoisir, France.

STAT-531	Statistical Methods for Business Management	3 (2-1)

Objective:

To apply statistical techniques and methods for effective decision-making, data analysis, and problem-solving in various business management contexts.

Learning Outcomes:

After studying this course, the students will be able to: -

1. Enabling the use of data for business development.
2. Understand the language of statistics to collect, organize, analyse and obtain information from data for informed decisions.
3. Orientation to business-related topics in applied statistics.

Relevant SDGs:

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

Course Outline:

Introduction to Statistics; Role of Statistics in Business; Constructing a Frequency Distribution; Graphing frequency distribution; Measures of Central Tendency; Choosing Measures of Central Tendency: percentiles, deciles & quartiles; Measures of Dispersion: range & semi-inter quartile range, variance, standard deviation, coefficient of variation; Chebyshev's inequality probability; Sample Spaces & Events; Definitions of Probability: addition & multiplication, rules of probability; Conditional probability; Baye's theorem probability distribution; Discrete probability; Distribution expected values & variance; Continuous probability distribution; The binomial distribution; Poisson distribution; Hyper geometric distribution; Normal distribution sampling; Sampling distribution; Population & sample parameters & estimators; Reasons for sampling; Types of sampling; random sampling, stratified random sampling, systematic sampling, cluster sampling, sampling distributions; Point & interval estimation; Determination of sample size; Testing of hypothesis; Rationale of hypothesis testing; Type of errors; Testing hypothesis about one mean; Testing of hypothesis about two means; Testing hypothesis about proportions; Goodness of fit; Contingency table analysis; Regression analysis; Correlation analysis; Time series; Index numbers; Set theory & system of Linear Equations; Metrices; Differentiation; Integration.

Suggested Readings:

1. Agresti, A. & B. Finlay. 2008. Statistical Methods for the Social Sciences. 4^{th} Ed. Prentice Hall, Upper Saddle River, NJ, USA.
2. Choudhry, M. 2000. Introduction to Statistical Theory. Ilmi Kutab Khana, Urdu Bazar, Lahore, Pakistan.
3. Johnson, R.A. 2005. Statistics: Principles & Methods. 5^{th} Ed. Wiley, NY, USA.
4. Muhammad, F. 2015. Statistical Methods & Data Analysis. Kitab Markaz, Bhawana Bazar, Faisalabad, Pakistan.
5. McClave, J.T., P. G. Benson, T. Sincich. 2017. Statistics for Business & Economics 13^{th} Ed. Pearson Higher Education Ltd. New York, NY, USA.

ABM-512	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 & presentation; Interpretation of results & report writing by the student.

Note: *The post-graduate students will be assigned topics on recent developments in agribusiness & marketing research by the concerned teacher.*

ABM-513	Seminar	1 (0-1)

Objective:

To improve students' communication & presentation skills.

Course Content:

Selection of research topic, preparation of material for presentation, & presentation by the student in the department to defend the research proposal or on a particular topic in consultation with the teacher.

Note: *The post-graduate students will be assigned topics on recent developments in agribusiness & marketing research by the concerned teacher.*