UNIVERSITY OF SARGODHA
OFFICE OF THE REGISTRAR
(ACAD BRANCH)

NOTIFICATION

On the recommendations of Academic Council made in its 21st (2/2024) meeting held on 07.06.2024, the Syndicate in its 67th (3/2024) meeting held on 12.07.2024 approved the revised curricula of following programs for implementation w.e.f. Fall 2024.

I.	M.Phil in Agricultural Economics	Annex-**'A'**
II.	Ph.D in Agricultural Economics	Annex-**'B'**

(WAQAR AHMAD)
Additional Registrar (General)

No. SU/Acad/25/ 118

Dated: 31.01.2025

Distribution:

- Incharge, Department of Agricultural Economics
- Controller of Examinations
- Director Academics

C.C:

- Dean, Faculty of Agriculture
- Principal College of Agriculture
- Director, QEC
- Additional Registrar (Affiliation & Registration)
- Secretary to the Vice-Chancellor
- PA to Registrar
- Notification File

1. Nomenclature of the Program

Master of Philosophy (M.Phil.) in Agricultural Economics

2. Department Brief

The Department of Agricultural Economics started offering agricultural economics as a major subject in the B.Sc (Hons.) Agriculture degree program. Agriculture since 2012 and currently has 42 enrolled students in the department. Since its establishment, a total number of 180 students have graduated from Agriculture Economics. They are pursuing their career in different public and private sector organizations. The department has three assistant professors and a lecturer as regular faculty, including one visiting lecturer. The department's faculty, staff, and students work in agribusiness management, marketing, agricultural finance and financial planning, policy, entrepreneurship, economic development, international trade and transportation, natural resource economics, and agricultural production economics. Faculty responsibilities are divided among teaching, extension, research, and service. Significant emphasis is given to the international dimensions of these tasks.

3. Program Learning Objectives

The M.Phil. in Agricultural Economics aims to provide students with the knowledge and skills necessary to analyze economic issues in the agricultural sector. It also aims to provide students with a strong foundation in economic theory, quantitative methods, and applied research techniques specific to agriculture and rural development, this includes understanding how to efficiently utilize scarce resources and promote the agriculture sector's development in a manner that aligns with the interests of all stakeholders involved, sustainable agriculture, society, and country development.

4. Program Structure

Duration	Minimum 1.5-Years (3-Semesters), Maximum 4-Years (8-Semesters)
Entry Requirements	Candidates having Bachelor of Science (Hons.) degree in Agriculture with major in Agricultural Economics or BS Agriculture & Resource Economics or a closely related field from HEC recognized Institutions with minimum CGPA 2.0/4.0 in B.Sc. (Hons.) or BS degree (16 years of education) in semester system
Intra-disciplinary fields allowed for admission	1. BS Economics* 2. Agricultural Sciences* (Any major in Agriculture) *Subject to take deficiency courses as per requirement
Degree Completion Requirements	Total Credit Hours of Course Work: 24-35 Total Credit Hours of Thesis/Courses In Lieu of thesis: 06 Total Credit Hours of Program:30-41 Completion of all coursework (core and elective) with satisfactory performance Successful completion of a research project and thesis defense
Program Mode (select one)	Thesis Track
Specialization (if any)	Students may tailor their studies to a specific area of Agricultural Economics through elective courses and research project topic selection. However, formal specialization tracks may not be offered.

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
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5. **List of Deficiency Courses of Level-6:** *(for intra-disciplinary admissions only)*

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	AGEC-6503	Microeconomics –I	3(3+0)	Principles of Agricultural and Resource Economics
2.	AGEC-6504	Macroeconomics – I	3(3+0)	Principles of Agricultural and Resource Economics
3.	AGEC-6511	Econometrics I	3(2+1)	Principles of Agricultural and Resource Economics
4.	AGEC-6512	Development Economics	3(3+0)	Principles of Agricultural and Resource Economics
5.	AGEC-6505	Mathematics for Economists	3(3+0)	Principles of Agricultural and Resource Economics
6.	AGEC-6520	Research Methods in Social Science	3(2+1)	Principles of Agricultural and Resource Economics
7.	AGEC-6519	Agricultural Production Economics	3(3+0)	Principles of Agricultural and Resource Economics
8.	AGEC-6506	Food and Agricultural Marketing	3(3+0)	Principles of Agricultural and Resource Economics
9.	AGEC-6518	Agricultural Finance	3(3+0)	Principles of Agricultural and Resource Economics
10.	AGEC-6522	Agricultural Issues and Policies of Pakistan	3(3+0)	Principles of Agricultural and Resource Economics

6. **List of Mandatory/Compulsory/Core Curses:**

Sr. No	Course Code	Course Title	Credit Hours	Prerequisite
1.	AGEC-7101	Microeconomics	3(3+0)	Microeconomics – I
2.	AGEC-7102	Econometrics	3(3+0)	Econometrics – I
3.	AGEC-7107	Macroeconomics	3(3+0)	Macroeconomics – I
4.	STAT-7152	Statistical Methods for Social Research	3(3+0)	Nil
5.	AGEC -7112	Special Problem	1(0+1)	Nil
6.	AGEC -7113	Seminar	1(0+1)	Nil

7. **List of Elective Courses:**

Sr. No	Course Code	Course Title	Credit Hours	Prerequisite
1.	AGEC-7103	Advanced Topics in Mathematical / Linear Programming	3(2+1)	Mathematics for Economists
2.	AGEC -7104	Food and Agricultural Policy	3(3+0)	Food and Agricultural Marketing
3.	AGEC -7105	Agricultural Growth and Poverty	3(3+0)	Food and Agricultural Marketing
4.	AGEC -7106	Water Law, Policy, and Institutions	3(3+0)	Agricultural Issues and Policies of Pakistan
5.	AGEC -7108	Production Economics	3(3+0)	Agricultural Production Economics
6.	AGEC -7109	International Economics	3(3+0)	Development Economics
7.	AGEC -7110	Project Planning and Management	3(3+0)	Agricultural Finance
8.	AGEC -7111	Political Economy of Agriculture	3(3+0)	Agricultural Issues and Policies of Pakistan

8. **Thesis:**

1.	Thesis	6

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha
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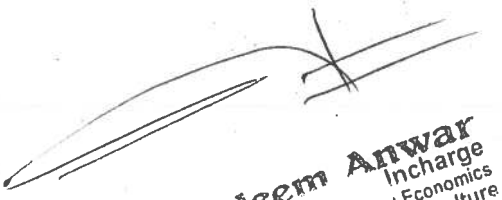
It is certified that the list of terminal degrees is according to "International Standard Classification of Education (ISCED-F 2013)"



Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha
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SCHEME OF STUDIES
FOR THE DEGREE OF

Master of Philosophy (M.Phil.) in Agricultural Economics

2024

Department of Agricultural Economics

College of Agriculture
UNIVERSITY OF SARGODHA

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Incharge
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Scheme of Studies

Master of Philosophy in *Agricultural Economics*

Semester-I

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Deficiency-1*	AGEC-65xx	*To be selected from list*	3(2+1)/3(3+0)	
Complusory-1	AGEC-71xx	*To be selected from list*	3(3+0)	
Complusory-2	AGEC-71xx	*To be selected from list*	3(3+0)	
Elective-1	AGEC-71xx	*To be selected from list*	3(2+1)/3(3+0)	
Elective-2	AGEC-71xx	*To be selected from list*	3(2+1)/3(3+0)	

Semester Credit Hours: 12-15

Semester-II

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Deficiency-2*	AGEC-65xx	*To be selected from list*	3(2+1)/3(3+0)	
Complusory-3	AGEC-71xx	*To be selected from list*	3(3+0)	
Complusory-4	STAT-7152	Statistical Methods for Social Research	3(3+0)	
Elective-3	AGEC-71xx	*To be selected from list*	3(2+1)/3(3+0)	
Elective-4	AGEC-71xx	*To be selected from list*	3(2+1)/3(3+0)	

Semester Credit Hours: 12-15

Semester-III

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Deficiency-3*	AGEC-65xx	*To be selected from list*	3(2+1)/3(3+0)	
Complusory-5	AGEC -7112	Special Problem	1(1+0)	
Complusory-6	AGEC -7113	Seminar	1(1+0)	

*For intra-disciplinary admitted candidates only

Semester Credit Hours: 2-5

Semester-IV

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Complusory-7		Thesis	6(0+6)	Completion of course work

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
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Program Summary:

Category	Minimum No of Courses	Minimum No of Credit Hours
Deficiency Courses	3	9
Compulsory Courses	6	14
Elective Courses	4	12

Note:

I. The Regulations related to MS/M.Phil./M.Sc.(Hons) or equivalent approved by the Syndicate from time to time shall also be applicable.

II. Deficiency Courses are to be decided by the Graduate Program Committee at the start of each session.

III. The department can change the order of Core/Compulsory and Elective Courses as per the availability of resources or demand.

IV. The department can change the course offering as per available resources but shall be uniform for one session.

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Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha.
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Course Contents
(List of Deficiency Courses)

AGEC-6503 **MICROECONOMICS – I** **3(3+0)**

This course discusses the terminology, concepts, contents, methodology, and limitations of current microeconomic analysis. The course provides students with a theoretical structure to analyze and understand economics as it relates to individuals and businesses. In addition, it seeks to provide students with an understanding of how political, social, and market forces determine and affect the economy. This introductory course explores the principles of production and consumption – and the exchange of goods and services – in a market economy. In particular, it complements other courses in agricultural economics by highlighting the various market mechanisms that influence managerial decision-making in agricultural business. After completing the course, students will be able to understand economic issues about households and firms.

Contents

1. Scope of Economics
2. Contents of Consumer's Behavior – Approaches to Utility analysis.
3. Laws of Demand and Supply
4. Various dimensions of Elasticity of Demand and Supply
5. Contents of Production
6. Cost concepts in the short run and long run
7. Market equilibrium analysis.

Recommended Texts

1. Parkin, M. (2010). Economics, 10th Edition, Addison Weslay Publishing Company.
2. Nicholson, W. & Snyder C. M. (2009). Intermediate Microeconomics and its application, 11th Edition, Mason: South-Western Cangage learning Publisher.

Suggested Readings

1. Varian, H.R. (2009). Intermediate Microeconomic, 8thEdition, New York: W.W. Norton Company inc.
2. Pindyck, R. & Daniel, R. (2012). Microeconomics, 8th Edition, Prentice Hall publisher.

AGEC-6504 **MACROECONOMICS – I** **3(3+0)**

The purpose of this course is to provide the students with an introduction to the basic macroeconomic principles; to enable students to appreciate the workings of real (labour and goods) and asset/money markets and the nature of equilibrium in each market; to emphasize the role of macroeconomic policies that affect internal and external deficits, inflation and growth of per capita income. Throughout the course a focus will be on 'critical thinking' to analyze macroeconomic problems. The major areas of focus will be the inputs market, goods market, money/asset market, and economic growth. Business cycles will also be discussed and linked to macroeconomic policy debate issues of 'active' versus 'passive' and 'rules' versus discretion. The equilibrium IS-LM, ADAS model will be covered with some basic applications, providing a smooth transition to Intermediate macroeconomics. The course is pitched at the core principles level so is based on the understanding that students have at least attained some basic macroeconomics knowledge equivalent to that covered in any primary economics course. After completing the course, students are supposed to have fundamental knowledge of economic issues at aggregate level.

Contents

1. An introduction to Macroeconomics and the economy
2. Microeconomics versus macroeconomics
3. The Roots of macroeconomics
4. Structure of economy and circular flow of income
5. Measuring domestic output and national income
6. Product, expenditure and income approaches
7. Other national income accounts

Nadeem Anwar
Incharge
Department of Agricultural Economics
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8. Price indices, Nominal and real GDP
9. Economic growth and instability
10. The business cycle
11. Unemployment and its types
12. Inflation and its types
13. The income consumption and income saving relationships
14. The real interest rate and investment relationship
15. The multiplier, accelerator and super-multiplier effect
16. The aggregate expenditure model.

Recommended Texts

1. McConnel, C.R., Brue, S.L and Flynn, S.M. (2011). *Economics: Principles, Problems and Policies* 19thEdition, New York: McGraw-Hills.

Suggested Readings

1. Dornbusch, R., Fischer, S. and Startz, R. (2013). *Macroeconomics*, 12th Edition, New York: McGraw Hill.
2. Shapiro E. (2003). *Macroeconomic Analysis*, 5th Edition. HARCOURT BRACE publisher.
   Abel, B. Andrew & Ben S. Bernanke. (2005). *Macroeconomics*, 6th edition. Mcgraw Hill Inc.

AGEC-6505 MATHEMATICS FOR ECONOMISTS 3(3+0)

The course is intended for students without sufficient mathematics who wish to obtain knowledge of mathematical techniques suitable for economic analysis. It assumes very little prerequisite knowledge. The approach is informal and aims to show students how to do and apply the mathematics they require for a successful study of economics. Economic applications are considered, although this course aims to teach the mathematics not the economics. Topics covered include basic algebra, simple calculus and matrix algebra. After completing the course, students will have the basic understanding about the use of Mathematics in Economics.

Contents

1. The nature of mathematical economics
2. Mathematical versus non-mathematical economics and econometrics
3. Economic models and equilibrium analysis
4. Matrix algebra
5. Applications of derivatives
6. Comparative static analysis in economics and economic models
7. Derivatives of implicit functions
8. Optimization Problems, General Constrained Optimization, Dynamic optimization & Integration
9. Convexity and Optimization—Multivariate Optimization
10. Mathematical Programming
11. The concepts of Linear and Non-Linear Programming.

Recommended Texts

1. Chiang, A. C. (2005). *Fundamentals Methods of Mathematical Economics*, 3rdEdition., International Edition, McGraw Hill publications.

Suggested Readings

1. Goshaw, M. (2008). *Concepts of calculus with applications*, 1st Edition, Singapore: Pearson Publisher.
2. Shannon, J. (1995). *Mathematics for Business Economics and Finance*, Australia:John Willey & Sons.

AGEC-6506 FOOD AND AGRICULTURAL MARKETING 3(3+0)

The primary purpose of this course is to help students develop analytical tools of thinking about agricultural marketing. The course covers the principles of agricultural marketing including consumers demand and supply. The course will also provide an overview of the role of agriculture in Pakistan and some world economies. Students in this course may complete a market analysis to show that they understand how managers, firms,

wholesalers, retailers, transporters, packagers and storage, etc. function in the agricultural marketing system. At the end of this course the students will be able to define agricultural marketing. Students will be able to identify the problems of agricultural marketing and find solutions to solve the problems and will be able to explain the principles of demand & supply and understanding the relationship in the agricultural marketing system. they will complete a market analysis to understand the functions of all of the actors with in a marketing food distribution channel.

Contents

1. Basic concepts and principles of food and fiber marketing system and its role in development
2. Marketing structure, Marketing Approaches and problems
3. Marketing functions; standardization, grading, Packing coding, packaging, storage, transportation, information, legislation and management.
4. Marketing margins and profitability
5. Market functionaries, marketing channels, price variation and stabilization
6. Concept of supply chain management
7. Review of agricultural marketing systems in Pakistan.

Recommended Texts

1. Crawford, I.M. (1997). *Agriculture and food marketing management*. Africa: FAO publishers.
2. Kohls, R.L., & Uhl, J. N. (2002). *Marketing of Agricultural Products*, 9th Edition. New York: MacMillan.

Suggested Readings

1. Clarkson, K.W., & Miller, R. L. (1997). *Industrial Organization, Contents, Evidence and Public Policy*, New York: McGraw-Hill.
2. Scarborough, V. &Kydd, J. (1992). *Economic Analysis of Agricultural Markets: A Manual*, Chatham, UK: Natural Resources Institute.

Shepherd, G. F. (2004). *Marketing Farm Products- Economic Analysis*, 4th Edition, Islamabad: National Book Foundation

AGEC-6512 AGRIBUSINESS MANAGEMENT 3(3+0)

This course provides a perspective and understanding of the key components of agricultural business management, with a focus on the management tools used to measure business performance. There will be an emphasis on evaluating farm businesses incorporating financial, marketing, production and human resource management tools, decision making techniques, technology adoption and management of risk. After completing the course, students will have developed some understanding of concepts, principles and issues in business management.

Contents

1. Scope of Agribusiness Management
2. Functions of management
3. Forms of business organizations
4. Principles and Techniques of farm planning, operation and management
5. Enterprise budgeting
6. Resource constraints
7. Optimum combinations and alternate business plans.
8. Balance Sheet, income statement and their analysis
9. Benefit Cost Analysis
10. Uncertainty and Risk in Farm Business
11. Risk Management Strategies
12. Supply chain management and Relevant Case studies
13. Role of Government in Agribusiness management.

Recommended Texts

1. Downey, W.D. & Erickson, S. P. (2002). *Agribusiness Management.* Singapore: McGraw Hill Education.
2. Castle, E. N., Becker, M. H. & Nelson, A. G. (2002). *Farm Business Management*, New York: Macmillan.

Suggested Readings

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha.
SARGODHA

1. Kinsey, B. H. (2002). *Agri. Business and Rural Enterprise*, London: Croom Helm Ltd.
2. Goldberg, R. A., Wilson, L. M., & Austin, J. E. (1974). *Agribusiness Management for Developing Countries*, Cambridge, MA: Ballinger Publishing Company.
3. Buckett, M. (1981). *An Introduction to Farm Organization and Management*, Elsevier Science &Technology Books.
4. Kay, R., Edwards, W., & Duffy, P. (2007). *Farm Management*, 7th Edition. McGraw Hill Education, EU.

AGEC-6514 ECONOMETRICS –I 3(2+1)

Econometrics I introduces students the regression methods for analyzing data in economics. This course emphasizes both the theoretical and the practical aspects of statistical analysis, focusing on techniques for estimating econometric models of various kinds and for conducting tests of hypotheses of interest to economists. The goal is to help students develop a solid theoretical background in introductory level econometrics, the ability to implement the techniques and to critique empirical studies in economics. After completing the course, students will be in a position to apply the econometric tools and techniques in the field of Agricultural Economics.

Contents

1. Definition, scope and importance of econometrics
2. Basic concepts
3. Properties of statistical estimators
4. Inferences and hypothesis testing
5. Regression analysis
6. OLS estimation of simple and multiple Regression
7. Dummy variables
8. Specification bias and tests
9. Concepts of Multicollinearity
10. Heteroscedasticity
11. Autocorrelation

Recommended Texts

1. Gujrati, D.N. (2009). *Essentials of Econometrics,* 4thEdition, London: McGraw-Hill.
2. Wooldridge J.M. (2012). *Introductory Econometrics: A Modern Approach,*5th Edition. USA: Cengage Learning Publisher.

Suggested Readings

1. Mirar, T.W. (1990). *Economic Statistics and Econometrics*, New York: McMillan Publishing Co.
2. Ramanathan R. (2001). *Introductory Econometrics with Applications*, 5th Edition. South-Western College Publisher.

AGEC-6516 AGRICULTURAL FINANCE 3(3+0)

The course is designed to provide students a general overview of the fundamentals of finance and its application in agriculture and agribusiness. Consequently, it will cover a broad range of finance topics and applications. In addition to a broad overview of finance, it will also cover in some detail several fundamental concepts of finance, including the nature of financial markets, financial instruments and techniques that are critical in financial decision-making. The objectives of the course may be summarized as 1. Introduce students to agricultural finance and highlight the importance of finance in real-world decision-making and the uniqueness of finance related to agriculture. 2. Introduce the fundamental concepts and techniques that are at the heart of financial decision-making. This course will cover various topics including the time value of money, financial statement analysis, capital budgeting and structure, investment decisions, farmland valuations, credit, banking, agricultural lending, risk management and financial markets.

Contents

1. Nature and scope of agricultural finance

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
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2. Sources and types of financial instruments and intermediaries in Pakistan's perspective
3. Credit assessment and decision criteria
4. Agricultural credit markets
5. Agricultural credit policies and their problems
6. Role of central bank and other financial institutions in agricultural financing
7. Classification of loans
8. Insurance in agricultural sector
9. Micro-credit and role of NGO's in agricultural lending and development
10. Nature and scope of financial management
11. Time value of money
12. Capital budgeting
13. Capital and its cost
14. Financial analyses
15. Capital structure
16. Liquidity and lender-borrower relationship and credit evaluation
17. Risk management
18. Financial markets.

Recommended Texts

1. Reddy, S. S., &Ram, P. Raghu. (1996). *Agricultural Finance and Management*, Oxford & IBH publisher Co.

Suggested Readings

1. Barry, P. J., Ellinger, P. N., Hopkin, J.A., & Baker, C. B. (2000). *Financial Management in Agriculture*, 6th Edition. Prentice Hall.
Downey, W.D. &Enieson, S.P. (2002). *Agribusiness Management*, Singapore: McGraw Hill.

AGEC-6518 RESEARCH METHODS IN SOCIAL SCIENCES 3(2+1)

This course is designed for students who wish to gain an understanding of the limits and potentials of social science research, and for those who intend to research social phenomena scientifically. This course is intended to facilitate student's awareness of the research process and their ability to conduct research in an ethical and thorough manner using appropriate research strategies. This course has technical and critical components. This means understanding the course requires a good grasp of many technical concepts and processes and applying these concepts to the study of social phenomena. After completing the course, students will be in a position to understand the methods of conducting research in the field of Social Sciences

Contents

1. Foundation of Empirical Research
2. The scientific approach
3. The Conceptual foundation of Research
4. Research Ethics
5. Review of literature and plagiarism
6. Research proposal and its contents
7. Sampling and Sample Design
8. Survey methods
9. Observation methods
10. Data Types
11. Questionnaire construction process
12. Data collection: Data coding, entry and analysis
13. Univariate, bivariate and multivariate analyses
14. Citation methods
15. Presentation and dissemination of research results.

Recommended Texts

1. Nachmias, C. F. &Nachmias, D. (2007).*Research Methods in the Social Sciences*, 7th Edition, London: Worth Publisher.
Ethridge, D. E. (2004). *Research Methodology in Applied Economics*, 2ndEdition, Wiley-Blackwell.

Suggested Readings

1. Baker, T. L. (1998). *Doing Social Research*, 3rd Editions. London: McGraw-Hill Social Science Series.
2. Vaus, D.A. (1993). *Surveys in Social Research*, Australia: Allen & Unwin Pvt. Ltd.
3. Goode, W.J &Hatt, P.K. (1999). *Methods in Social Research*, US: McGraw Hill Inc.

(List of Mandatory/Compulsory/Core Courses)

AGEC-7101 **MICROECONOMICS** **3(3+0)**

Learning Objectives

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

- Demonstrate an in-depth understanding of microeconomic principles and theories.
- Learn different methods of analysis in microeconomics.
- Apply analytical methods to solve and interpret complex economic problems, like choice and uncertainty.
- Critically evaluate use of microeconomic concepts and methods to analyze and interpret real-world microeconomic phenomena.

Theory

Economic activity and economic theory; Organization of an economic system; Factors of production and their reward; Factor's returns and income distribution, Engle curve and demand curve; Demand and supply elasticity price determination; Market equilibrium; Market price and government set prices; Preferences and demand relationships among goods; Theory of consumer behavior; Different approaches of consumer choice and demand; The theory of firm, production, cost and profit functions; Profit maximization and cost minimization; Optimization; Firm and industry supply analysis; Determination of price and output; Models of perfect and imperfect competition; Game theory; Demand and supply for factors of production; Pareto optimality and choice under risk; Optimum distribution of resources/outputs; Externalities and public goods, Economies of scale and size, Static and dynamic adjustments in the market equilibrium.

Suggested Readings

- Dodge, E.R. 2022. 5 Steps to a 5: AP Microeconomics. 1st Ed. McGraw Hill, New York, USA.
- Mankiw, N.G. 2020. Principles of Microeconomics. 9th Ed. Cengage Learning, Massachusetts, USA.
- Mateer, D. and L. Coppock. 2021. Principles of Microeconomics: COVID-19 Update. 3rd Ed. W.W. Norton & Company, New York, USA.
- Nicholson, W. 2016. Microeconomic Theory, Basic Principles and Extensions. 12th Ed. Dryden Press, London, UK
- William, J.B., and M. Melvin. 2016. Microeconomics. 10th Ed. South Western Cengage learning, Mason, USA.

AGEC-7102 **ECONOMETRICS** **3(3+0)**

Learning Objectives

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

- Understand econometric techniques and their appropriate use.
- Apply the concepts to integrate the economic phenomena.
- Estimate and interpret econometric models.

Azeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha.
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- Explain the results and give policy implications based on empirical estimates.

Theory

The nature of regression analysis; Classical linear regression model; Multiple regression analysis; Violation of basic assumptions; Single equation regression models and their applications in economics; Problems of estimation and hypotheses testing; Multicollinearity; Heteroscedasticity, Autocorrelation and model specification problems; Causality and its detection; Distributed and autoregressive lag models; VAR models; Finite and infinite distribution lags etc; Adaptive expectations, partial adjustment and rational expectations models; Simultaneous equation models; Identification problems; Indirect least squares, 2SLS, 3SLS and seemingly unrelated regression models; Qualitative response models; Estimation of multiple linear regression and hypothesis testing; Regression of dummy variables; Estimation of logit and probit models; Estimation of VAR models using softwares like MINITAB, STATA and E-VIEWS.

Suggested Readings

- Dougherty. C. 2016. Introduction to Econometrics. 5th Ed. Oxford UniversityPress.
- Baltagi, B.H. 2021. Econometric Analysis of Panel Data. 6th Ed. Springer, Berlin, Germany.
- Camron, C.A. 2022. Analysis of Economics Data: An Introduction to Econometrics. Kindle Direct Publishing, Washington, D.C., USA.
- Green, W.H. 2018. Econometric Analysis. 8th Ed. Pearson, London, UK.
- Gujrati. D.N. 2021. Essentials of Econometrics. 5th Ed. SAGE Publications. California, USA.
- Zaman, A. 2023. Statistical Foundations for Econometric Techniques:Reprint 2023. Independently Published, Amazon, Washington, D.C. USA.

AGEC- 7107 **MACROECONOMICS** **3(3+0)**

Learning Objectives

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

- Understand, analyze, and evaluate the most fundamental growth models in macroeconomics.
- Comprehend the factors behind the economic growth.
- Answer many macroeconomic questions.
- Design a theoretical framework for their research.

Theory

Macro-economic foundation; Major macroeconomic puzzles; National income accounting-different approaches; Aggregate demand and supply analysis: Monetary and real sectors; wages, prices and employment; The interplay of monetary and fiscal policies in stabilizing the economy; IS-LM model of macroeconomic analysis; Consumption, saving, investment and theory of income determination; Level of investment, interest and money; Demand for money; Money and credit, stabilization policy; Economic growth; Macroeconomic dynamics; Inflation, unemployment, budget deficit and public debt; International adjustment and interdependence; Business cycle.

Suggested Readings

- Bells, J. 2021. Macroeconomics: Every Thing You Need to Know About Macroeconomics. Kindle Direct Publishing, Washington, D.C., USA.
- Blanchard, O. 2021. Macroeconomics: Global Edition. 8th Ed. Pearson, London, UK
- Dodge, E.R. 2022. 5 Steps to a 5: AP Macroeconomics. 1st Ed. McGraw Hill, New York, USA.
- Dornbush, R., S. Fischer and R. Startz. 2018. Macroeconomics. 13th Ed. McGraw Hill, New York, USA.
- Froyen, R. T. 2008. Macroeconomics. 8th Ed. Pearson Education Inc., New Jersey, USA.

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
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STAT-7152 **Statistical Methods for Social Research** **3(3+0)**

The purpose of this course isto impart the knowledge of statistical techniques and software used to analyze the data. This course has been designed to improve the students' skills for selecting appropriate tools for analysis of their research data in social sciences and educational research.

Contents

- Basics of Statistics, Importance of Statistics in Social Research
- Scale of measurements
- Graphical representation of data
- Some descriptive measures: Mean, median, mode, Variance, Standard deviation, CV, Quartiles, Quartile Deviation
- Sampling and its types
- Testing of Hypothesis about mean with Normal, t and F Distribution
- Basic principles of experimental design
- CRD, RCBD, and Latin Square Design used in educational research
- Non-parametric Methods for testing of hypotheses
- Correlation Analysis: Simple correlation, Multiple Correlation, Partial Correlation, Rank Correlation
- Simple and Multiple regressions
- Logistic Regression and Odd Ratios
- Chi-Square test: Analysis of Count and Frequency data, Contingency Tables, Test of Independence

Suggested Readings

- Rao G.N. (2007). Statistics for Agricultural Sciences, (2nd Edition) BS Publication, Giriraj Lane, Sultan Bazar, Hyderabad, India.
- Mead,R. (1995). The Design of Experiments. Cambridge University Press, Cambridge
- Steel,R.G. D., Torrie, J.H. & Dicky, D.A. (1983). Principles and Procedures of Statistics: A Biometerical Approach. (3rd Edition) McGraw Hill, New York, USA.
- Box,G.E.P.& Hunter, J.S. (1978). Statistics for Experimenters. New York: Wiley
- Tabachnick, B. G., &Fidell, L. S. (1996). Using Multivariate Statistics. New York: HarperCollins College Publishers.
- Dillon, W. R., & Goldstein, M. (1984). Multivariate Analysis: Methods and Applications. New York: Wiley.
- Agresti. A. (2002). An Introduction to Categorical Data Analysis. New York: Wiley
- Chatterjee, S.; &Ali.S.H.(2004). Regression Analysis by Examples. (4th Edition). New York, Wiley
- Jerrold H. Z. (2009). Biostatistical Analysis, (4th edition) ,Dorling Kindersley India
- Cox D.R. (2000). The Theory of the Design of Experiments, Chapman and Hall, USA
- Gomez.K.A, & Gomez A.A. (1976). Statistical procedures for agricultural research. The international Rice Research Institute.

Richard A. J., & Wichern, D.W. (2007). Applied multivariate statistical analysis. (6th Edition), Pearson Education International.

(List of Elective Courses)

AGEC-7103 ADVANCED TOPICS IN MATHEMATICAL / LINEAR PROGRAMMING 3(2+1)

Learning Objectives

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

- Practice linear programming.
- Apply linear programming concepts using different software.
- Practice advanced mathematical economic concepts.
- Make farm decision making under uncertainty and risk.

Theory

Formulation of the Linear Programming Problem; Dual Linear Programming; Interpretation of the linear programming solution. Sensitivity analysis, Range analysis, Parametric programming; Linear Programming Modelling; Integer and Nonlinear Programming: integer programming, duality and integer programming, nonlinear programming, quadratic programming, the peak load pricing problem; Dynamic Programming; Latest theoretical discussions (research papers).

Practical

The above topics will be complemented with computed based assignments using LP/TORA/GAMS/LINGO software.

Suggested Readings

- Benton, D.J. 2021. Numerical Methods: Nonlinear Equations, Numerical Calculus & Differential Equations. Kindle Direct Publishing, Washington, D.C., USA.
- Chartrand, G., A. Polimeni and P. Zhang. 2017. Mathematical Proofs: A Transition to Advanced Mathematics. 4th Ed. Pearson, London, UK.
- Frost, J. 2020. Regression Analysis: An Intuitive Guide for Using and Interpreting Linear Models. Statistics By Jim Publishing, Pennsylvania, USA.
- Montgomery, D.C., E.A. Peck and G.G. Vining. 2021. Introduction to Linear Regression Analysis.6th Ed. Wiley, New Jersey, USA.
- Mulenga, K. and. L. Mupakati. 2018. Advanced-Level and Freshman Economics with Model Answers. iUniverse, Indiana, USA.

AGEC-7104 FOOD AND AGRICULTURAL POLICY 3(3+0)

Learning Objectives

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

- Develop a basic understanding of the history of Pakistan's agricultural policy, including the alternative philosophies used to justify government intervention in agriculture over time.
- Gain the broad appreciation of contemporary agricultural policy issues needed by professionals in a variety of agriculture-related occupations.
- Apply economic principles to evaluate the impacts of alternative policy options.
- Develop an understanding of the policy process itself, including the actors and arenas involved, especially as it applies to agricultural and food policy.

Theory

Price Support Policies; Public Procurement Policy; Food Security Policy; Inputs Subsidy Policies; Agricultural Credit / Rural Finance Policies; Land Reforms (Land Market Policy); Farm Mechanization Policy; Agricultural Innovation, Extension and Education Policies; Livestock Policy; Trade and Exchange Rate Policy linkages to Agriculture; Monetary Policy linkages to Agriculture; Fiscal Policy linkages to Agriculture; Marketing Policy (output & input markets); Agricultural Taxation Policy; Water Resources Policy; Environmental Policy linkages to agriculture; Rural Development Policy (Institutions, Governance, Economy); Latest trends in research.

Suggested Readings

- Andersen, P. P., and D. D. Watson II. 2011. Food Policy for Developing Countries: The Role of Government in Global, National, and Local Food Systems. Cornell University Press, Ithaca, USA.
- Batini, N. 2021. The Economics of Sustainable Food: Smart Policies for Health and the Planet. Island Press, Washington, D.C., USA.
- Carolan, M. 2021. The Sociology of Food and Agriculture. 3rd Ed. Routledge, London, UK.

Waheem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha,
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- Grant, W.P. 2022. Rethinking Agricultural and Food Policy. Edward Elgar Publishing, Cheltenham, UK.
- Johan, S. 2018. The Political Economy of Agricultural and Food Policies. Palgrave Studies in Agricultural Economics and Food Policy. Palgrave Macmillan, London, UK.

AGEC-7105 AGRICULTURAL GROWTH AND POVERTY 3(3+0)

Learning Objectives

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

- Develop the understanding of how macroeconomic growth and development of a country is related to the agricultural sector and how the linkages between agriculture and growth can be used to eradicate poverty.
- Comprehend the role of technology in agricultural transformation.
- Understand Nexus between Agricultural Growth, Poverty, and Food Security.
- Comprehend the role of Public Policies in alleviating poverty and Income Inequality.

Theory

Classical Theories of Economic Growth and Development; Models of agricultural growth; Determinants of rural-urban disparity; Role of technology in agricultural growth; Interdependence between agricultural growth and economic growth; Agricultural Transformation and the Changing Role of Agriculture in Economic Development; Measuring the Impact of Agricultural Growth on Economic Transformation;Agriculture and Pro-Poor Growth;Agricultural Growth, Poverty, Food Security and Nutrition Nexus;Role of Physical Infrastructure, Rural Education, Research & Extension, Agricultural Finance and Markets in Agricultural Growth and Poverty Alleviation; Political Institutions and Agricultural Growth; Poverty, Inequality and Development; Poverty profile, sources and consequences; Poverty and Income Inequality alleviation polices; Strategic Reforms for Agricultural Growth in Pakistan; Case studies on growth and poverty in Pakistan.

Suggested Readings

- Fuglie. K., M. Gautam, A. Goyal and W.F. Maloney. 2019. Harvesting Prosperity: Technology and Productivity Growth in Agriculture, World Bank Publications, Washington, D.C., USA.
- John, W. M. 2017. Agricultural Development and Economic Transformation: Promoting Growth with Poverty Reduction. Palgrave Macmillan, London, UK
- Mishra, R. 2019. Agricultural Growth for Poverty Alleviation. Amiga Press Inc. Delhi, India.
- Otsuka, K., and S. Fan. 2021. Agricultural Development: New Perspectives in a Changing World. IFPRI, Washington, D.C., USA.
- Todaro, M.P. and S.C. Smith. 2015. Economic Development. 12th Ed. Pearson Education, Inc, New Jersey, USA.

AGEC-7106 WATER LAW, POLICY AND INSTITUTIONS 3(3+0)

Learning Objectives

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

- Analyze the history of water development.
- Assess alternative means of responding to growing worldwide demand for water.
- Analyze the deficient management policies for managing water resources.
- Analyze most significant global instruments.

Theory

Water law and policy; Legal control of water resources; Water policy and markets; Economics of intersectoral water allocation; Institutional Analysis and Development Framework, Design Principles; Implications of deficiency management policies; Aspects of national and transnational water management; The human right to water; Institutional perspectives on water policy; Policy actors and instruments; Policy evaluation tools; Operationalization of concepts for policy evaluation: Ex-post and ex-ante evaluations; Water institutions and governance; Water laws and institutions; Case studies of developed and developing countries; Pakistani context; Latest research trends.

Suggested Readings

- Dinar, A. 2000. The Political Economy of Water Pricing Reforms. 1st Ed. World Bank Publications, Washington, D.C., USA.
- Haddar, O.B. 2021. Economical, Political, and Social Issues in Water Resources. Kindle Direct Publishingm Washington, D.C., USA.
- Kanazawa, M. 2021. Natural Resources and the Environment. 1st Ed. Routledge, London, UK.
- Molle, F., C.S. Ibor and L.A. Reus. 2019. Irrigation in the Mediterranean: Technologies, Institutions and Policies. 1st Ed. Kindle Direct Publishing, Washington, D.C., USA.
- Rinaudo, J.D., C. Holley, S. Barnett and M. Montginoul. 2020. Sustainable Groundwater Management: A Comparative Analysis of French and Australian Policies and Implication to Other Countries. Springer, Berlin, Germany.

AGEC-7108 **PRODUCTION ECONOMICS** **3(3+0)**

Learning Objectives

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

- Understand the advanced concepts of production and production functions.
- Develop understanding of law of variable proportions.
- Apply the principles of production mathematically and algebraically in agricultural production process.
- Estimate advance production issues such as degree of risk awareness, efficiency, etc.

Theory

Relationship between resource use and products; Principles of resource choices and resource allocation; Resource substitution and factor relationships; Resource combination and cost minimization; Resource allocation and enterprises combination; Choice between products and resource uses; Types of production function and their properties; Specification and estimation of production functions; Constraint optimization and resource/input demand functions; Resource allocation and efficiency in agriculture as influenced by price instability; Technological advances and imperfect knowledge of production methods.

Suggested Readings

- Antras, P. 2020. Global Production: Firms, Contracts, and Trade Structure. Princeton University Press, New Jersey, USA.
- Barkley, A. and P.W. Barkley. 2020. Principles of Agricultural Economics. 3rd Ed. Routledge, London, UK.
- Beattie; B. R. and C. R. Taylor. 1985. The Economics of Production. John Wiley and Sons; New York; USA.
- Debertin, D.L. 2012. Agricultural Production Economics. 2nd Ed. CreateSpace Independent Publishing Platform, South Carolina, USA.
- Minor, T. S., Thornsbury and A.K. Mishra. 2019. The Economics of Food Loss in the Produce Industry. 1st Ed. Routledge, London, UK.
- Rasmussen, S. 2013. Production Economics: The Basic Theory of Production Optimization. 2nd Ed. Springer, Berlin, Germany.

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha.
SARGODHA

AGEC-7109 INTERNATIONAL ECONOMICS 3(3+0)

Learning Objectives

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

- Understand the effect of international trade on welfare and income distribution.
- Analyze the role of firm heterogeneity in international trade.
- Interpret the relationship between international trade and regional inequality.
- Discuss price levels, output, and exchange rates in the long run and short run.

Theory

International economics and economic theory; Importance of international trade in the changing world; Theories of international trade; History of international trade; Pre-classical theories of international trade: Mercantilism, and Physio racy; Classical theories of international trade: Absolute advantage, comparative advantage and reciprocal demand; Non-classical theories of international trade: Opportunity cost theory; Modern theory of international trade: H-O theory, H-O-S Hypothesis; International trade policies; Free trade vs protected trade; Instruments of trade policies; Tariff barriers, non-tariff trade barriers; Trade policies in developing countries; Import substituting industrialization; Export oriented industrialization; The balance of payments; Balance of payments accounting; Features of balance of payment; Components of balance of payment; Measuring the deficit or surplus of balance of payments.

Suggested Readings

- Carbough, R. 2018. International Economics. Cengage Learning, Massachusetts, USA.
- Feenstra, R.C. and A.M. Taylor. 2020. International Economics. Worth Publishers, New York, USA.
- Gerber, J. 2017. International Economics. Pearson, London, UK.
- Pugel, T. 2019. International Economics. McGraw-Hill Education, New York, USA.
- Reinert, K.A. 2020. An Introduction to International Economics: New Perspectives on the World Economy. Cambridge University Press, Cambridge, UK.

AGEC-7110 PROJECT PLANNING AND MANAGEMENT 3(3+0)

Learning Objectives

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

- Understand issues in each phase of project life cycle.
- Successfully identify, plan, design, manage, monitor, evaluate and terminate projects of varying complexities.
- Understand various techniques of economic analysis.
- Make case for development projects.

Theory

Development Planning (concept and practice); Planning Processes (Logical Framework Analysis, Annual Development Plan Formulation, Planning Architecture at Federal and Provincial Level); Project Management (Finances, Materials, Human Resources); Project Identification and Feasibility (PC-II); Identification of project costs and benefits and their pricing; Project Preparation (PC-I); Project Appraisal (Undiscounted measures of project worth, Discounted measures of project worth (Net present worth, Benefit-Cost ratio, Internal rate of return, Net benefit investment ratio, Sensitivity / uncertainty Analysis, Risk Management); Project Approval (Approval Stages, Approving Forums, Approval Types and Procedures etc.); Project Execution and Implementation (PMU); Project Monitoring (Types and Methods of Monitoring, Process Monitoring, Result Base Monitoring, PC III Annual Targets and Progress Reporting); Project Evaluation (Purpose and types of Evaluation); Project Impact Assessment (Meaning, Purpose and Types; Impact Assessment Methods); Project Closure and Transfer of Assets (Operational & Financial; PC IV Project Completion Report; PC V Annual Performance Report After Completion of Project).

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
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Suggested Readings

- ADB. 2017. Guidelines for the Economic Analysis of Projects. Asian Development Bank, Manila, Philippines.
- Anandajayasekeram, P., C.J.V Rooyen and F. Liebenberg. 2004. Agricultural Project Planning and Analysis: A Sourcebook. 2nd Ed. University of Pretoria, Pretoria, South Africa.
- Government of the Punjab. 2015. Punjab Planning Manual, Planning and Development Department, Govt. of the Punjab, Lahore, Pakistan.
- Harold, K. 2017. Project Management: A Systems Approach to Planning, Scheduling & Controlling. 12th Ed. Wiley, New Jersey, USA.
- Jeffrey, K.P. 2020. Project Management: Achieving Competitive Advantage, 5th Ed. Pearson, London, UK.

AGEC-7111 POLITICAL ECONOMY OF AGRICULTURE 3(3+0)

Learning Objectives

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

- Develop knowledge of the macroeconomic side of the political economy.
- Understand the relationship of political economy with the agricultural sector and rural development.
- Explore theories of agrarian change and the role of agriculture in development
- Apply knowledge of political economics and rural development to real-life phenomena.

Theory

Understanding Govt. intervention in Agriculture (Production, distribution & consumption); Political economy of Agricultural Distortions (effects and measures of taxes and subsidies); Economic growth, structural change and the Political economy of Protection (growth, roots and determinants of Agricultural protectionism; price, trade and welfare effects of agricultural protection); Political economy of Agriculture pricing policies (origin, motives and effects of pricing policies; Administrative aspects of pricing policies.

Suggested Readings

- Anderson, P. and Y. Hayami. 2010. The Political Economy of Agricultural Protection. Taylor & Francis, Routledge, London, UK.
- Hui, H.J. 2020. Research on the Financing and Agricultural Subsidy Mechanism of Company Farmer Order Agricultural Supply Chain. China Agricultural Science and Technology Press, Beijing, China.
- Krueger. 1992. The Political Economy of Agriculture Pricing Policy. Johns Hopkins University Press, Maryland, USA.
- Kym, A. 2010. The Political Economy of Agricultural Price Distortions. Cambridge University Press, Cambridge, UK.
- Swinnen J. 2018. The Political Economy of Agricultural and Food Policies. 1st Edition. Palgrave Macmillan, London, UK.
- William H. F. 1991. Towards a New Political Economy of Agriculture. Westview Press, Colorado, USA.

Nadeem Anwar
Incharge
Department of Agricultural Economics
University College of Agriculture
University of Sargodha
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1. **Nomenclature of the Program**
   Doctor of Philosophy (Ph.D) Agricultural Economics

2. **Department Brief**
   The Department of Agricultural Economics started offering agricultural economics as a major subject in the B.Sc (Hons.) Agriculture degree program. Since its initiation in 2012 currently this department has 42 enrolled students. So far, a total number of 180 students have graduated from Agriculture Economics. They are pursuing their career in different public and private sector organizations. The department has three assistant professors and a lecturer as regular faculty including one visiting lecturer. The department's faculty, staff, and students work in agribusiness management, marketing, agricultural finance and financial planning, policy, entrepreneurship, economic development, international trade and transportation, natural resource economics, and agricultural production economics. Faculty responsibilities are divided among teaching, extension, research, and service. Significant emphasis is given to the international dimensions of these tasks.

3. **Program Learning Objectives**
   The Ph.D. in Agricultural Economics endeavors to equip research scholars with the necessary advanced theoretical knowledge and quantitative expertise to analyze issues concerning the agricultural economy. These skills and knowledge enable scholars to conduct research independently, think critically, analyze complex agriculture economic issues, and advance knowledge in the field. Its goal is to propose research-driven solutions aimed at fostering sustainable agriculture and rural development and strengthening linkages with various sectors of the economy, both upstream and downstream.

4. **Program Structure**

Duration	Minimum 3-Years (6-Semesters), Maximum 8-Years (16-Semesters)
Entry Requirements:	Candidates having Master of Science (Hons.)/MPhil degree in Agricultural Economics, from HEC recognized Institutions with minimum CGPA 3.0/4.0 in M.Sc. (Hons.) or MS/MPhil degree (18 years of education) in semester system
Intra-disciplinary fields allowed for admission	1. MS/Mphil Economics* 2. M.Sc (Hons.) Agricultural Sciences* (Any major in Agriculture) *Subject to take deficiency courses as per requirement
Degree Completion Requirements:	Total Credit Hours of Course Work: 18-30 Total Credit Hours of Program:18-30 Completion of all coursework (core and elective) with satisfactory performance followed with comprehensive exam. Successful completion of a research project and thesis defense.
Program Mode (select one)	Thesis Track
Specialization (if any)	Students may tailor their studies to a specific area of agricultural economics through elective courses and research project topic selection. However, formal specialization tracks may not be offered.

5. **List of Deficiency Courses of Level-7:** *(for intra-disciplinary admissions only)*

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	AGEC-7101	Microeconomics	3(3+0)	Microeconomics - I
2.	AGEC-7102	Econometrics	3(3+0)	Econometrics I
3.	AGEC-7107	Macroeconomics	3(3+0)	Macroeconomics – I
4.	AGEC -7104	Food and Agricultural Policy	3(3+0)	Food and Agricultural Marketing
5.	AGEC -7105	Agricultural Growth and Poverty	3(3+0)	Food and Agricultural Marketing
6.	AGEC -7106	Water Law, Policy, and Institutions	3(3+0)	Agricultural Issues and Policies of Pakistan
7.	AGEC -7108	Production Economics	3(3+0)	Agricultural Production Economics

8.	AGEC -7109	International Economics	3(3+0)	Development Economics

6. List of Mandatory/Compulsory/Core Curses

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	AGEC-8101	Advanced Microeconomics	3(3+0)	Microeconomics
2.	AGEC-8105	Advanced Macroeconomic	3(3+0)	Macroeconomics
3.	STAT-8132	Advanced Statistical Methods for Social Research	3(3+0)	Nil
4.	AGEC-8108	Special Problem	1(1+0)	Nil
5.	AGEC-8109	Seminar-I	1(1+0)	Nil
6.	AGEC-8110	Seminar-II	1(1+0)	Nil
Total			12	

7. List of Elective Courses

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	AGEC-8102	Advanced Econometrics	3(2+1)	Econometrics
2.	AGEC-8103	Advances in Agricultural Policy Analysis	3(3+0)	Agricultural Growth and Poverty
3.	AGEC-8104	Spatial Economics	3(3+0)	Nil
4.	AGEC-8106	Agricultural Pricing Analysis	3(3+0)	Food and Agricultural Policy
5.	AGEC-8107	Economics of Food Systems	3(3+0)	Food and Agricultural Policy
Total			15	

It is certified that the list of terminal degrees is according to "International Standard Classification of Education (ISCED-F 2013)"

Nadeem Anwar
Incharge
Department of Agricultural Economics
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SARGODHA