AGRICULTURAL ECONOMICS

Course Structure - at a Glance

CODE	COURSE TITLE	CREDITS
AG ECON 501*	MICRO ECONOMIC THEORY AND APPLICATION	2+0
AG ECON 502*	MACRO ECONOMICS AND POLICY	2+0
AG ECON 503*	EVOLUTION OF ECONOMIC THOUGHT	1+0
AG ECON 504*	AGRICULTURAL PRODUCTION ECONOMICS	1+1
AG ECON 505*	AGRICULTURAL MARKETING & PRICE ANALYSIS	2+1
AG ECON 506*	RESEARCH METHODOLOGY FOR SOCIAL SCIENCES	1+1
AG ECON 507*	ECONOMETRICS	2+1
AG ECON 508*	LINEAR PROGRAMMING	1+1
AG ECON 509*	AGRICULTURAL FINANCE AND PROJECT MANAGEMENT	2+1
AG ECON 511	INTERNATIONAL ECONOMICS	1+1
AG ECON 512	INSTITUTIONAL ECONOMICS	1+0
AG ECON 513	AGRICULTURAL DEVELOPMENT POLICY ANALYSIS	2+0
AG ECON 514	NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS	1+1
AG ECON 515	INTELLECTUAL PROPERTY MANAGEMENT	1+0
AG ECON 516#	COMPUTER APPLICATION FOR AGRICULTURAL ECONOMICS	2+1
AG ECON 517	RURAL MARKETING	2+0
AG ECON 518	COMMODITY FUTURES TRADING	2+0
AG ECON 591	MASTER'S SEMINAR	1+0
AG ECON 599	MASTER'S RESEARCH	20
AG ECON 601**	ADVANCED MICRO-ECONOMIC ANALYSIS	1+1
AG ECON 602**	ADVANCED MACRO-ECONOMICS ANALYSIS	2+0
AG ECON 603**	ADVANCED ECONOMETRICS	2+1
AG ECON 604**	ADVANCED PRODUCTION ECONOMICS	2+1
AG ECON 605**	QUANTITATIVE DEVELOPMENT POLICY ANALYSIS	1+1
AG ECON 606**	ADVANCED AGRICULTURAL MARKETING AND PRICE ANALYSIS	2+1
AG ECON 608	COMMODITY FUTURES TRADING	2+0
AG ECON 609	NATURAL RESOURCES MANAGEMENT	1+1
AG ECON 610	ENVIRONMENTAL ECONOMICS	2+0
AG ECON 691	DOCTORAL SEMINAR I	1+0
AG ECON 692	DOCTORAL SEMINAR II	1+0
AG ECON 699	DOCTORAL RESEARCH	45

* Compulsory for Master's programme; ** Compulsory for Doctoral proramme # Cross-listed with Statistics

The following Basic Supporting courses (5 credits) are recommended for M. Sc. /Ph.D. programmes

M. Sc.		
STAT	MATHEMATICS FOR AGRICULTURAL ECONOMICS	3
STAT	STATISTICAL METHODS FOR SOCIAL SCIENCE	2
Ph. D.		
STAT	MULTIVARIATE ANALYSIS	2
TAT	OPERATIONS RESEARCH	3

AGRICULTURAL ECONOMICS
Course Contents

AG ECON 501   **MICRO ECONOMIC THEORY AND APPLICATIONS**   **2+0**

Objective

This course is intended to provide an overview of microeconomic theory and its applications. The course starts with the theory of consumer behaviour consisting of consumer's utility maximization problem and demand theory. It intends to provide fundamental concepts and models in the theory of production and costs and sets out to provide a basic understanding of price and / or output determination under different types of market structures including factor markets. This course will also expose the students to the theory of general equilibrium and welfare economics.

Theory

UNIT I

Theory of Consumer Behaviour - Cardinal Utility Approach - Ordinal Utility Approach - Income effect and substitution effect - Applications of Indifference curve approach - Revealed Preference Hypothesis - Consumer surplus - Derivation of Demand curve - Elasticity of demand.

UNIT II

Theory of Production - Production functions - Returns to scale and economies of scale - Technical progress - Theory of Costs - Cost curves- Profit maximization and cost minimization - Derivation of supply curve - Law of Supply - Producers' surplus.

UNIT III

Market Equilibrium - Behavior of Firms in Competitive Markets - Perfect Competition- Effect of Taxation and Subsidies on market equilibrium - Monopoly- Monopolistic - Oligopoly- Theory of Factor Markets.

UNIT IV

General Equilibrium Theory - Welfare Economics - Pareto Optimality - Social welfare criteria - Social Welfare functions.

Suggested Readings

David M Kreps 1990. *A Course in Microeconomic Theory*. Princeton University Press.

Dewitt KK. 2002. *Modern Economic Theory*. Sultan Chand & Co.

Henderson JM & Quandt RE. 2000. *Microeconomic Theory: A Mathematical Approach*. McGraw-Hill.

Koutsoyiannis A. 2003. Modern Microeconomics. The Macmillan Press.

Silberberg E & Suen W. 2001. *The Structure of Economics - A Mathematical Analysis*. McGraw-Hill.

Varian Hal R. 1999. *Intermediate Microeconomics*. Affiliated East-West Press.

AG ECON 502   **MACRO ECONOMICS AND POLICY**   **2+0**

Objective

Macro economics and Policy course is intended to expose the students to macroeconomic concepts and theory, the application of the macro economic theory, and implication of the macroeconomic policies.

Theory

UNIT I

Nature and Scope of Macro Economics - Methodology and Keynesian Concepts National Income - Concepts and measurement- Classical theory of Employment and Say's Law-Modern theory of Employment and Effective Demand.

UNIT II

Consumption function- Investment and savings - Concept of Multiplier and Accelerator - Output and Employment - Rate of interest - Classical, Neo classical and Keynesian version- Classical theory Vs Keynesian theory - Unemployment and Full employment.

UNIT III

Money and classical theories of Money and Price - Keynesian theory of money and Friedman Restatement theory of money - Supply of Money - Demand for Money -Inflation: Nature, Effects and control.

UNIT IV

IS & LM frame work - General Equilibrium of product and money markets -Monetary policy - Fiscal policy- Effectiveness of Monetary and Fiscal policy - Central banking.

UNIT V

Business cycles - Balance of Payment - Foreign Exchange Rate determination.

Suggested Readings

Ahuja HL. 2007. *Macroeconomics: Theory and Policy*. S. Chand & Co.

Eugene A Diulio 2006. *Macroeconomics*. 4th Ed. Schaums' Outlines.

Gardner Ackely 1987. *Macro Economic: Theory and Policy*. Collier Macmillan.

Dornbusch. 2006. *Macroeconomics*. McGraw Hill Publication

AG ECON 503   EVOLUTION OF ECONOMIC THOUGHT   1+0

Objective

To introduce the students to the evolution of economic thought over a period of time, the background of emanation of thoughts and approaches, as acts of balancing and counter balancing events and criticisms. The course will also in a comprehensive way help the students to know and appreciate the contributions of the Galaxy of Economists.

Theory

UNIT 1

Approaches for the study of history of economic thought - Absolutist vs. Relativist approaches - Evolution of Economic Thought vs. Economic History. Ancient economic thought - medieval economic thought - mercantilism - physiocracy - Forerunners of Classical Political Economy.

UNIT II

Development of Classical Thoughts (Adam Smith, Robert Malthus and David Ricardo) - Critics of Classical Thoughts- Socialist critics - Socialist and Marxian Economic Ideas - Austrian School of Thought - Origins of Formal Microeconomic Analysis - William Stanley Jevons, Cournot and Dupuit.

UNIT III

The birth of neoclassical economic thought - Marshall and Walras - General Equilibrium Theory - Welfare Theory - Keynesian economics.

UNIT IV

The Era of globalization - Experiences of developing world - Rigidity of the past vs. emerging realism - The changing path of international Institutions to economic growth and development approaches.

UNIT V

Economic Thought in India - Naoroji and Gokhale - Gandhian Economics - Economic thought of independent India - Nehru's economic philosophy - Experiences of the Structural adjustment programmes of the post liberalization era.

Suggested Readings

Blaug M. 1964. *Economic Theory in Retrospect*. Heineman.

Blaug M. 1986. *Economic History and the History of Economic Thought*. Wheatsheaf Books, Brighton.

Ekelund RB & Hebert RF. 1975. *A History of Economic Theory and Methods*. McGraw-Hill.

John Mills A. 2002. *Critical History of Economics: Missed Opportunities*. Palgrave Macmillan.

Screpanti E & Zamagni S. 1995. *An Outline of the History of Economic Thought*. Clarendon Press, Oxford.

AG ECON 504   AGRICULTURAL PRODUCTION ECONOMICS   1+1

Objective

To expose the students to the concept, significance and uses of agricultural production economics.

Theory

UNIT I

Nature, scope and significance of agricultural production economics-Agricultural Production processes, character and dimensions-spatial, temporal - Centrality of production functions, assumptions of production functions, commonly used forms - Properties, limitations, specification, estimation and interpretation of commonly used production functions.

UNIT II

Factors of production, classification, interdependence, and factor substitution -Determination of optimal levels of production and factor application -Optimal factor combination and least cost combination of production - Theory of product choice; selection of optimal product combination.

UNIT III

Cost functions and cost curves, components, and cost minimization - Duality theory - cost and production functions and its applications - Derivation of firm's input demand and output supply functions -Economies and diseconomies of scale.

UNIT IV

Technology in agricultural production, nature and effects and measurement - Measuring efficiency in agricultural production; technical, allocative and

economic efficiencies - Yield gap analysis-concepts-types and measurement - Nature and sources of risk, modeling and coping strategies.

Practical

Different forms of production functions - specification, estimation and interpretation of production functions - returns to scale, factor shares, elasticity of production - physical optima-economic optima-least cost combination- optimal product choice- cost function estimation, interpretation-estimation of yield gap - incorporation of technology in production functions- measuring returns to scale-risk analysis through linear programming.

Suggested Readings

Beattie BR & Taylor CR. 1985. *The Economics of Production*. John Wiley & Sons.

Doll JP & Frank O. 1978. *Production Economics - Theory and Applications*. John Wiley & Sons.

Gardner BL & Rausser GC. 2001. *Handbook of Agricultural Economics*. Vol. I. *Agricultural Production*. Elsevier.

Heady EO. *Economics of Agricultural Production and Resource Use*. Prentice-Hall.

Sankayan PL. 1983. *Introduction to Farm Management*. Tata Mc Graw Hill.

AG ECON 505   AGRICULTURALMARKETINGANDPRICEANALYSIS   2+1

Objective

To impart adequate knowledge and analytical skills in the field of agricultural marketing issues, and enhance expertise in improving the performance of the marketing institutions and the players in marketing of agricultural commodities.

Theory

UNIT I

Review of Concepts in Agricultural Marketing - Characteristic of Agricultural product and Production - Problems in Agricultural Marketing from Demand and Supply and Institutions sides. Market intermediaries and their role - Need for regulation in the present context - Marketable & Marketed surplus estimation. Marketing Efficiency - Structure Conduct and Performance analysis - Vertical and Horizontal integration - Integration over space, time and form-Vertical co-ordination.

UNIT II

Marketing Co-operatives - APMC Regulated Markets - Direct marketing, Contract farming and Retailing - Supply Chain Management - State trading, Warehousing and other Government agencies -Performance and Strategies - Market infrastructure needs, performance and Government role - Value Chain Finance.

UNIT III

Role of Information Technology and telecommunication in marketing of agricultural commodities - Market research-Market information service - electronic auctions (e-bay), e-Chaupals, Agmarket and Domestic and Export market Intelligence Cell (DEMIC) - Market extension.

UNIT IV

Spatial and temporal price relationship - price forecasting - time series analysis - time series models - spectral analysis. Price policy and economic development - non-price instruments.

UNIT V

Theory of storage - Introduction to Commodities markets and future trading - Basics of commodity futures - Operation Mechanism of Commodity markets - Price discovery - Hedging and Basis - Fundamental analysis - Technical Analysis - Role of Government in promoting commodity trading and regulatory measures.

Practical

Supply and demand elasticities in relation to problems in agricultural marketing. Price spread and marketing efficiency analysis. Marketing structure analysis through concentration ratios. Performance analysis of Regulated market and marketing societies. Analysis on contract farming and supply chain management of different agricultural commodities, milk and poultry products. Chain Analysis - quantitative estimation of supply chain efficiency - Market Intelligence - Characters, Accessibility, and Availability Price forecasting. Online searches for market information sources and interpretation of market intelligence reports - commodity outlook - Technical Analysis for important agricultural commodities - Fundamental Analysis for important agricultural commodities - Presentation of the survey results and wrap-up discussion.

Suggested Readings

Purecell WD & Koontz SR. 1999. *Agricultural Futures and Options: Principles and Strategies*. 2nd Ed. Prentice-Hall.

Rhodes VJ. 1978. *The Agricultural Marketing System*. Grid Publ., Ohio.

Shepherd SG & Gene AF. 1982. *Marketing Farm Products*. Iowa State Univ. Press.

Singhal AK. 1986. *Agricultural Marketing in India*. Annual Publ., New Delhi.

AG ECON 506   RESEARCHMETHODOLOGYFORSOCIALSCIENCES   1+1

Objective

To expose the students to research methodology used in social sciences. The focus will be on providing knowledge related to research process, data collection and data analysis etc.

Theory

UNIT I

Importance and scope of research in agricultural economics. Types of research - Fundamental vs. Applied. Concept of researchable problem - research prioritization - selection of research problem. Approach to research - research process.

UNIT II

Hypothesis - meaning - characteristics - types of hypothesis - review of literature - setting of Course Objective and hypotheses - testing of hypothesis.

UNIT III

Sampling theory and sampling design - sampling error - methods of sampling - probability and non-probability sampling methods - criteria to

choose. Project proposals - contents and scope - different types of projects to meet different needs - trade-off between scope and cost of the study. Research design and techniques - Types of research design.

UNIT IV

Data collection - assessment of data needs - sources of data collection - discussion of different situations. Mailed questionnaire and interview schedule - structured, unstructured, open ended and closed-ended questions. Scaling Techniques. Preparation of schedule - problems in measurement of variables in agriculture. Interviewing techniques and field problems - methods of conducting survey - Reconnaissance survey and Pre testing.

UNIT V

Coding editing - tabulation - validation of data. Tools of analysis - data processing. Interpretation of results - Preparing research report / thesis - Universal procedures for preparation of bibliography - writing of research articles.

Practical

Exercises in problem identification. Project proposals - contents and scope. Formulation of Objective and hypotheses. Assessment of data needs - sources of data - methods of collection of data. Methods of sampling - criteria to choose - discussion on sampling under different situations. Scaling Techniques - measurement of scales. Preparation of interview schedule - Field testing. Method of conducting survey. Exercise on coding, editing, tabulation and validation of data. Preparing for data entry into computer. Hypothesis testing - Parametric and Non-Parametric Tests. Exercises on format for Thesis / Report writing. Presentation of the results.

Suggested Readings

Black TR. 1993. *Evaluating Social Science Research - An Introduction***.** SAGE Publ.

Creswell JW. 1999. *Research Design - Qualitative and Quantitative Approaches.* SAGE Publ.

Dhondyal SP. 1997. *Research Methodology in Social Sciences and Essentials of Thesis Writing*. Amman Publ. House, New Delhi.

Kothari CR. 2004. *Research Methodology - Methods and Techniques***.** Wishwa Prakashan, Chennai.

Rao KV. 1993. *Research Methodology in Commerce and Management***.** Sterling Publ., New Delhi.

Singh AK. 1993. *Tests, Measurements and Research Methods in Behavioural Sciences***.** Tata McGraw-Hill.

Venkatasubramanian V. 1999. *Introduction to Research Methodology in Agricultural and Biological Sciences*. SAGE Publ.

AG ECON 507   ECONOMETRICS   2+1

Objective

The Course Objective of the course is to impart knowledge on econometric tools to the students of agricultural economics. Training in econometrics will help the student to analyze the economic problem by applying quantitative techniques.

Theory

UNIT I

Introduction - relationship between economic theory, mathematical economics, models and econometrics, methodology of econometrics-regression analysis.

UNIT II

Basic two variable regression - assumptions estimation and interpretation-approaches to estimation - OLS, MLE and their properties - extensions to multi variable models-multiple regression estimation and interpretation.

UNIT III

Violation of assumptions - identification, consequences and remedies for Multicollinearity, heteroscedasticity, autocorrelation - data problems and remedial approaches - model misspecification.

UNIT IV

Use of dummy variables-limited dependent variables - specification, estimation and interpretation.

UNIT V

Simultaneous equation models - structural equations - reduced form equations - identification and approaches to estimation.

Practical

Single equation two variable model specification and estimation - hypothesis testing-   transformations of functional forms and OLS application-estimation of multiple regression model - hypothesis testing - testing and correcting specification errors - testing and managing Multicollinearity - testing and managing heteroscedasticity - testing and managing autocorrelation - estimation of regressions with dummy variables - estimation of regression with limited dependent variable - identification of equations in simultaneous equation systems.

Suggested Readings

Gujarati DN. 2003. *Basic Econometrics*. McGraw Hill.

Johnson AG Jr., Johnson MB & Buse RC. 1990. *Econometrics - Basic and Applied.* MacMillan.

Kelejan HH & Oates WE. 1994.*Introduction to Econometrics Principles and Applications*. Harper and Row Publ.

Koutsoyianis A. 1997. *Theory of Econometrics*. Barner & Noble.

Maddala GS. 1992. *Introduction to Econometrics*. MacMillan.

Maddala GS. 1997. *Econometrics.* McGraw Hill.

Pindyck RS & Rubinfeld DL. 1990. *Econometrics Models and Econometric Forecasts*. McGraw Hill.

AG ECON 508   LINEAR PROGRAMMING   1+1

Objective

The Course Objective of the course is to impart knowledge of Linear programming techniques.

Theory

UNIT I

Decision Making- Concepts of decision making, introduction to quantitative tools, introduction to linear programming, uses of LP in different fields, graphic solution to problems, formulation of problems.

UNIT II

Simplex Method: Concept of simplex Method, solving profit maximization and cost minimizations problems. Formulation of farms and non farm problems as linear programming models and solutions.

UNIT III

Extension of Linear Programming models: Variable resource and price programming, transportation problems, recursive programming, dynamic programming.

UNIT IV

Game Theory- Concepts of game theory, two person constant sum, zero sum game, saddle point, solution to mixed strategies, the rectangular game as Linear Programme.

Practical

Graphical and algebraic formulation of linear programming models. Solving of maximization and minimization problems by simplex method. Formulation of the simplex matrices for typical farm situations.

Suggested Readings

Dorfman R. 1996. *Linear Programming & Economic Analysis*. McGraw Hill.

Loomba NP.2006. *Linear Programming*. Tata McGraw Hill.

Shenoy G. 1989. *Linear Programming-Principles & Applications*. Wiley Eastern Publ.

Vaserstein. 2006. *Introduction to Linear Programming*. Pearson Education Publication

AG ECON 509   AGRICULTURALFINANCEANDPROJECTMANAGEMENT   2+1

Objective

The Course Objective of the course is to impart knowledge on issues related to lending to priority sector credit management and financial risk management. The course would bring in the various appraisal techniques in project - investment of agricultural projects.

Theory

UNIT I

Role and Importance of Agricultural Finance. Financial Institutions and credit flow to rural/priority sector. Agricultural lending - Direct and Indirect Financing - Financing through Co-operatives, NABARD and Commercial Banks and RRBs. District Credit Plan and lending to agriculture/priority sector. Micro-Financing and Role of MFI's - NGO's, and SHG's.

UNIT II

Lending to farmers - The concept of 3 C's, 7 P's and 3 R's of credit. Estimation of Technical feasibility, Economic viability and repaying capacity of borrowers and appraisal of credit proposals. Understanding lenders and developing better working relationship and supervisory credit system. Credit inclusions - credit widening and credit deepening.

UNIT III

Financial Decisions - Investment, Financing, Liquidity and Solvency. Preparation of financial statements - Balance Sheet, Cash Flow Statement and Profit and Loss Account. Ratio Analysis and Assessing the performance of farm/firm.

UNIT IV

Project Approach in financing agriculture. Financial, economic and environmental appraisal of investment projects. Identification, preparation, appraisal, financing and implementation of projects. Project Appraisal techniques - Undiscounted measures. Time value of money - Use of discounted measures - B-C ratio, NPV and IRR. Agreements, supervision, monitoring and evaluation phases in appraising agricultural investment projects. Net work Techniques - PERT and CPM.

UNIT V

Risks in financing agriculture. Risk management strategies and coping mechanism. Crop Insurance programmes - review of different crop insurance schemes - yield loss and weather based insurance and their applications.

Practical

Development of Rural Institutional Lending - Branch expansion, demand and supply of institutional agricultural credit and Over dues and Loan waiving- : An overview, Rural Lending Programmes of Commercial Banks, Lead Bank Scheme- Preparation of District Credit Plan, Rural Lending Programmes of Co-operative Lending Institutions, Preparation of financial statements using farm/firm level data, Farm credit appraisal techniques and farm financial analysis through financial statements, Performance of Micro Financing Institutions - NGO's and Self-Help Groups, Identification and formulation of investment projects, Project appraisal techniques - Undiscounted Measures and their limitations. Project appraisal techniques - Discounted Measures, Network techniques - PERT and CPM for project management, Case Study Analysis of an Agricultural project, Financial Risk and risk management strategies - crop insurance schemes, Financial instruments and methods - E banking, Kisan Cards and core banking.

Suggested Readings

Dhubashi PR. 1986. *Policy and Performance - Agricultural and Rural Development in Post Independent India*. Sage Publ.

Gittinger JP 1982. *Economic Analysis of Agricultural Projects*. The Johns Hopkins Univ. Press.

Gupta SC. 1987. *Development Banking for Rural Development*. Deep & Deep Publ.

Little IMD & Mirlees JA. 1974. *Project Appraisal and Planning for Developing Countries*. Oxford & IBH Publ.

Muniraj R. 1987. *Farm Finance for Development*. Oxford & IBH Publ.

AG ECON 510   INTERNATIONAL ECONOMICS   1+1

Objective

The expected outcome of this course will be creating awareness among the students about the role of International Economics on National welfare.

Theory

UNIT I

Scope and Significance of International Economics - The role of trade-General Equilibrium in a Closed Economy (Autarky Equilibrium) - Equilibrium in a Simple Open Economy - Possibility of World Trade - Trade gains and Trade Equilibrium.

Tariff, Producer Subsidy, Export Subsidy, Import Quota and Export Voluntary Restraints- The Case of Small Country and Large Country Case.

UNIT III

Ricardian Model of Trade- Specific Factors Model- Heckscher - Ohlin Model - Trade Creation and Trade Diversion - Offer Curve - Export Supply Elasticity and Import Demand Elasticity - Comparative Advantage and Absolute Advantage.

UNIT IV

Official Exchange Rate and Shadow Exchange Rate - Walra's Law and Terms of Trade - Trade Blocks.

UNIT V

IMF, World Bank, IDA, IFC, ADB - International Trade agreements - Uruguay Round - GATT - WTO.

Practical

Producer's Surplus, Consumer's Surplus, National Welfare under Autarky and Free Trade Equilibrium with small and large country assumption- Estimation of Trade Gains- Estimation of competitive and comparative measures like NPC, EPC, ERP and DRC- Estimation of Offer Curve Elasticity- Estimation of Effect of Tariff, Export Subsidy, Producer Subsidy, Import Quota and Export Voluntary Restraints on National Welfare- Estimation of Ricardian Model - Estimation of Effect of Trade under Specific Factor Model- Estimation of trade Equilibrium under Heckscher -Ohlin model - Trade Creation and Diversion.

Suggested Readings

Apple Yard DR & Field AJ Jr. 1995. *International Economics - Trade, Theory and Policy.* Irwin, Chicago.

Cherunilam F. 1998. *International Economics.* Tata McGraw Hill.

Krugman PR & Obstfeld M. 2000. *International Economics - Theory and Policy.* Addison-Wesley.

AG ECON 511   AGRICULTURAL DEVELOPMENT AND POLICIES 2+0

Objectives

- to provide orientation to the students regarding the concepts and measures of economic development
- to provide orientation on theories of economic growth and relevance of theories in developing countries.
- to make them to understand the agricultural policies and its effect on sustainable agricultural development
- to make them to understand the globalization and its impact on agricultural development.

Theory

UNIT I

Development Economics - Scope and Importance - Economic development and economic growth - divergence in concept and approach - Indicators and Measurement of Economic Development - GNP as a measure of economic growth - New Measures of Welfare - NEW and MEW - PQLI - HDI - Green GNP - Criteria for under development - Obstacles to economic development - Economic and Non-Economic factors of economic growth.

UNIT II

Economic development - meaning, stages of economic development, determinants of economic growth. Theories of economic growth - Ricardian growth model - The Harrod - Domar Model - The Neo classical Model of Growth - The Kaldor Model - Optimal Economic Growth - Recent Experiences of developing country economies in transition - Role of state in economic development - Government measures to promote economic development. Introduction to development planning.

UNIT III

Role of agriculture in economic / rural development - theories of agricultural development - Population and food supply - need for sound agricultural policies - resource policies - credit policies - input and product marketing policies - price policies.

UNIT IV

Development issues, poverty, inequality, unemployment and environmental degradation - Models of Agricultural Development - Induced Innovation Model - policy options for sustainable agricultural development.

UNIT V

Globalization and the relevance of development policy analysis - The dilemma of free trade? - Free trade versus Protectionism- Arguments for protection. Arguments against protection. Role of protection in Developing Countries. WTO - Agreement on Agriculture - Contradictions of free trade - proponents and opponents policies in vulnerable sectors like agriculture - Lessons for developing countries.

Suggested Readings

Chakaravathi RM. 1986. *Under Development and Choices in Agriculture*. Heritage Publ., New Delhi.

Diwett KK. 2002. *Modern Economic Theory*. S. Chand & Co.

Eicher KC & Staatz JM. 1998. *International Agricultural Development*. Johns Hopkins Univ. Press.

Frank E. 1992. *Agricultural Polices in Developing Countries*. Cambridge Univ. Press.

Ghatak S & Ingersent K. 1984. *Agriculture and Economic Development*. Select Book Service Syndicate, New Delhi.

Jhingan ML. 1998. *The Economics of Development and Planning*. Vrinda Publ.

Jules PN. 1995. *Regenerating Agriculture - Polices and Practice for Sustainability and Self Reliance*. Vikas Publ. House.

Naqvi SNH. 2002. *Development Economics - Nature and Significance*. Sage Publ.

AG ECON 512   INSTITUTIONAL ECONOMICS   1+0

Objective

The course exposes the students to the institutional problems and remedies.

Theory

UNIT I

Old and New Institutional Economics - Institutional Economics Vs Neo-classical Economics. Definition of institutions - Distinction between institutions and organizations - Institutional evolution

UNIT II

Institutional change and economic performance - national and international economic institutions. Transaction cost economics - Transaction costs and the allocation of resources. Transaction costs and efficiency. Asymmetric information - Moral hazard and Principal-Agent problem.

UNIT III

Free rider problem - path dependency - Interlinked transactions. Collective action and the elimination of free-rider problem - The logic of collective action and its role in reducing free rider problem - theory of Groups. Rent seeking - interest groups and policy formulation.

UNIT IV

Economic analysis of property rights- property rights regimes - private property - State Property - Common property Resources (CPRs) - public goods and club goods.

UNIT V

Special features of institutional arrangements in agriculture - Transaction costs in agriculture - Case Studies - Theories of agrarian institutions - tenancy institutions.

Suggested Readings

Barzel, Y. 1990. *Economic Analysis of Property Rights*. Cambridge Univ. Press.

Bhardhan P. (Ed.). 1989. *The Economic Theory of Agrarian Institutions*. Clarendon Press, Oxford.

Bromley DW. 1989. *Economic Interests and Institutions: The Conceptual Foundations of Public Policy*. Basil Blackwell, Cambridge.

Eggertsson T. 1990. *Economic Behaviour and Institutions*. Cambridge Univ. Press.

Greif A. 2006. *Institutions and the Path to the Modern Economy: Lessons from Medieval Trade (Political Economy of Institutions & Decisions)*. Cambridge Univ. Press.

Neelakandan S. 1992. *New Institutional Economics and Agrarian Change - A Primer*. Indian Economic Association Trust for Research and Development, New Delhi.

North DC. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge Univ. Press.

Ostrom E. 1990. *Governing the Commons: The Evolutions of Institutions for Collective Actions*. Cambridge Univ. Press.

AG ECON 513   NATURALRESOURCEANDENVIRONMENTAL   1+1 ECONOMICS

Objectives

- To introduce economics principles related to natural resource and environmental economics
- To explore the concept of efficiency and the efficient allocation of natural resources
- To understand the economics of why environmental problems occur.
- To explore the concept of efficiency and the efficient allocation of pollution control and pollution prevention decisions.

- To understand the environmental policy issues and alternative instruments of environmental policies

Theory

UNIT I

Concepts, Classification and Problems of Natural Resource Economics - Economy - Environment interaction - The Material Balance principle, Entropy law- Resources Scarcity - Limits to Growth - Measuring and mitigating natural resource scarcity - Malthusian and Recardian scarcity - scarcity indices - Resource Scarcity and Technical Change.

UNIT II

Theory of optimal extraction renewable resources -economic models of oil extraction- efficiency - time path of prices and extraction - Hotelling's rule, Solow-Harwick's Rule. Theory of optimal extraction exhaustible resources -economic models of forestry and fishery.

UNIT III

Efficiency and markets - market failures - externalities - types - property rights - transaction costs - Coase's theorem and its critique - public goods - common property and open access resource management - Collective action.

UNIT IV

Environmental perspectives - biocentrism, sustainability, anthropocentrism - Environmental problems and quality of environment - Sources and types of pollution -air, water, solid waste, land degradation - environmental and economic impacts - Economics of pollution control - efficient reduction in environmental pollution.

UNIT V

Environmental regulation - economic instruments - pollution charges - Pigovian tax - tradable permits - indirect instruments - environmental legislations in India.

UNIT VI

Concept of sustainable development - Economic Perspective - Indicators of sustainability Relation between development and environment stress- Environmental Kuznet's curve Environmental Accounting - resource accounting methods - International Environmental Issues - climate change - likely impacts -mitigation efforts and international treaties.

Practical

Exhaustible resource management -optimum rate of oil extraction. Renewable resource management - optimum harvest of Forestry/fishery. Exercise on pollution abatement -I. Exercise on pollution abatement -II. Concepts in valuing the environment. Taxonomy of valuation techniques. Productivity change method - substitute cost method - Hedonic price method - Travel cost method -Contingent valuation methods. Discount rate in natural resource management. Environment impact assessment Visit to Pollution Control Board.

Suggested Readings

Ahmad Y, El Serafy S & Lutz E. (Eds.). 1989.Environmental Accounting for Sustainable Development. World Bank.

Freeman AM. 1993. *The Measurement of Environmental and Resource Values*. Resources for the Future Press, Baltimore.

Hackett SC. 2001. *Environmental and Natural Resource Economics:*

Theory, Policy, and the Sustainable Society. M. E. Sharpe, Armonk, NY.

Hartwick JM & Olewiler ND. 1998. *The Economics of Natural Resource Use*. 2nd Ed. Addison-Wesley Educational Publ.

Kerr JM, Marothia DK, Katar Singh, Ramasamy C & Bentley WR. 1997. *Natural Resource Economics: Theory and Applications in India.* Oxford & IBH.

Kolstad CD. 2000. Environmental Economics. Oxford Univ. Press.

Pearce DW & Turner K. 1990. *Economics of Natural Resources and the Environment*. John Hopkins Univ. Press.

Prato T. 1998. *Natural Resource and Environmental Economics*. Iowa State Univ. Press.

Sankar U. 2001. Environmental Economics. Oxford Univ. Press.

Sengupta R. 2000. *Ecology and Economy, an Indian Perspective*. Oxford Univ. Press.

Tietenberg T. 2003. *Environmental and Natural Resource Economics*. 6th Ed. Addison Wesley.

AG ECON 514   INTELLECTUAL PROPERTY MANAGEMENT   1+0

Objective

The Course Objective of the course is to create awareness about intellectual property rights in agriculture. The course deals with management of patents, trademark, geographical indications, copy rights, designs, plant variety protection and bio-diversity protection. The students will be taught on the Marketing and Commercialization of Intellectual Properties.

Theory

UNIT I

World Trade Organization- Agreement on Agriculture (AoA) and Intellectual Property Rights (IPR) - Importance of Intellectual Property Management - IPR and Economic growth- IPR and Bio diversity -Major areas of concern in Intellectual Property Management -Technology Transfer and Commercialization-Forms of different Intellectual Properties generated by agricultural research.

UNIT II

Discovery *versus* Invention - Patentability of Biological Inventions - Method of Agriculture and Horticulture- procedure for patent protection: Preparatory work. Record keeping, writing a patent document, filing the patent document -Types of patent application-patent application under the Patent cooperation treaty (PCT).

UNIT III

Plant genetic resources -Importance and conservation - Sui Generic System -Plant Varieties Protection and Farmers Rights Act- Registration of Extant varieties - Registration and protection of New Varieties / Hybrids / Essentially Derived Varieties - Dispute prevention and settlement -Farmers' Rights.

UNIT IV

Trademark- Geographical Indications of Goods and Commodities - Copy rights-Designs - Biodiversity Protection.

UNIT V

Procedures for commercialization of technology - Valuation, Costs and Pricing of Technology- Licensing and implementation of Intellectual Properties- Procedures for commercialization - Exclusive and non exclusive marketing rights-Research Exemption and benefit sharing .

Suggested Readings

Ganguli P. 2001. *Intellectual Property Rights -Unleashing the Knowledge Economy*. Tata McGraw Hill.

Gupta AK. 2003. *Rewarding Conservation of Biological and Genetic Resources and Associated Traditional Knowledge and Contemporary Grass Roots Creativity*. Indian Institute of Management, Ahmedabad.

Khan SA & Mashelkar R. 2004. *Intellectual Property and Competitive Strategies in the 21st Century*. Kluwer Law International, The Hague.

AG ECON 515   RURAL MARKETING   2+0

Objective

To provide understanding regarding issues in rural markets like marketing environment, consumer behaviour, distribution channels, marketing strategies, etc.

Theory

UNIT I

Concept and scope of rural marketing, nature and characteristics of rural markets, potential of rural markets in India.

UNIT II

Environmental factors - socio-cultural, economic and other environmental factors affecting rural marketing.

UNIT III

Rural consumer's behaviour - behavior of rural consumers and farmers; buyer characteristics and buying behaviour; Rural v/s urban markets.

UNIT IV

Rural marketing strategy - Marketing of consumer durable and non-durable goods and services in the rural markets with special reference to product planning; product mix, pricing Course Objective, pricing policy and pricing strategy.

UNIT V

Product promotion - Media planning, planning of distribution channels, and organizing personal selling in rural market in India.

Suggested Readings

Krishnamacharyulu CSG & Ramakrishan L. 2002. *Rural Marketing.* Pearson Edu.

Ramaswamy VS & Nanakumari S. 2006. *Marketing Management.* 3rd Ed. MacMillan.

Singh AK & Pandey S. 2005. *Rural Marketing*. New Age.

Singh Sukhpal. 2004. *Rural Marketing*. Vikas Publ. House.

AG ECON 516   **COMMODITY FUTURES TRADING**   **2+0**

Objective

This course is aimed at providing the basic understanding and the mechanics and value of futures markets for speculators and hedgers who in turn will serve as price risk management activities of agribusiness firms.

Theory

UNIT I

History and Evolution of commodity markets - Terms and concepts: spot, forward and futures Markets - factors influencing spot and future markets. Speculatory mechanism in commodity futures.

UNIT II

Transaction and settlement - delivery mechanism - role of different agents - trading strategies - potential impact of interest rate, Foreign Exchange, FDI in Commodity Markets.

UNIT III

Risk in commodity trading, importance and need for risk management measures - managing market price risk: hedging, speculation, arbitrage, swaps - pricing and their features.

UNIT IV

Important global and Indian commodity exchanges - contracts traded - special features -Regulation of Indian commodity exchanges - FMC and its role.

UNIT V

Fundamental Vs Technical analysis - construction and interpretation of charts and chart patterns for analyzing the market trend - Market indicators - back testing. Introduction to technical analysis software - analyzing trading pattern of different commodity groups.

Suggested Readings

Kaufman PJ. 1986. *The Concise Handbook of Futures Markets*. John Wiley & Sons.

Leuthold RM, Junkus JC & Cordier JE. 1989. *The Theory and Practice of Futures Markets*. Lexington Books.

Lofton T. 1993. *Getting Started in Futures*. 3 Ed. John Wiley & Sons, 1993.

Purcell WD. 1991. *Agricultural Futures and Options: Principles and Strategies*. Macmillan Publ.

Wasendorf RR & McCafferty 1993. *All about Commodities from the Inside Out*. McGraw-Hill.

AG ECON 601   **ADVANCED MICRO ECONOMIC ANALYSIS**   **1+1**

Objectives

The Course Objective of this course is to introduce the theoretical models and applications of microeconomic theory. In particular, the basic comparative statistical techniques and the more modern duality theory will be developed and applied to the models of maximization, unconstrained and constrained utility maximization, expenditure minimization, constrained profit maximization, and cost and expenditure minimization. These mathematical structures form the basic building blocks of neoclassical economics; this course will stress the development and application of these important models. We follow a calculus rather than a

graphical approach to the theory. In the subsequent sections of the course, we provide a fairly rigorous exposure to price determination under different market situations, general equilibrium theory, causes and consequences of market failure and welfare economics including the theory of public choice.

Theory

UNIT I

Theory of consumer behaviour - Duality in consumer theory - expenditure function and indirect utility function - Measurement of Income Effect and Substitution Effect. Measurement of Changes in Consumers' Welfare - Consumer's Surplus, Compensating Variation and Equivalent Variation - Dynamic versions of demand functions - Integrability of demand functions. Demand Models - Linear Expenditure System, Almost Ideal Demand System. Applications of consumer theory - Household model and time allocation - Labour supply decisions by households.

UNIT II

Perfect competition - Monopoly, monopolistic competition and oligopoly. Oligopoly models - collusive and non-collusive models of oligopoly - Cournot model, Chamberlin model, Stackleberg solution.

UNIT III

General equilibrium theory - Conceptual overview - General equilibrium conditions with Production and Consumption. Existence, Uniqueness and Stability of general competitive equilibrium. Walrasian general equilibrium - Mathematical derivation of conditions for general equilibrium.

UNIT IV

Market failure - Incomplete markets - Asymmetric information - Principal-Agent problem, adverse selection and moral hazard. Externalities - Network externalities - Public goods - Optimal provision of public goods.

UNIT V

Welfare Economics - Concepts, problems, approaches and limitations of Welfare Economics, Pareto conditions of maximum welfare - Criteria for social welfare - Social Welfare functions, Social versus Private costs and benefits.

Practical

Problems in consumer utility maximization - Estimation of income and substitution effects; Estimation and comparison of Consumer's surplus, equivalent variation and compensating variation. Estimation of demand models - Derivation and estimation of labour supply equations from household models comparative static analysis in consumption. Advanced problem solving in price determination under perfect competition, monopoly, oligopoly and monopolistic competition. Game theory models. Problems solving in General Equilibrium Theory and Welfare Economics. Problems in public goods provision.

Suggested Readings

Chiang AC. 1981. *Fundamental Methods of Mathematical Economics*. McGraw-Hill.

Henderson JM & Quandt RE. *Microeconomic Theory: A Mathematical Approach*. McGraw-Hill.

Koutsoyiannis A. 2003. Modern Microeconomics. The Macmillan Press.

Kreps DM. 1990. *A Course in Microeconomic Theory*. Princeton Univ.
    Press.
Silberberg E & Suen W. 2001. *The Structure of Economics - A
    Mathematical Analysis*. McGraw-Hill.
Varian HR. 1992. *Microeconomic Analysis*. WW Norton & Co.
Varian HR. 1999. *Intermediate Microeconomics*. Affiliated East-West
    Press.

AG ECON 602   ADVANCED MACRO ECONOMICS ANALYSIS   2+0

Objective

Advanced macroeconomics course will be offered to PhD students of
Agricultural Economics with the following Course Objective.

- to understand the macroeconomic theory
- to examine the macroeconomic Policy issues
- to analyze the macroeconomic Policy implications

Theory

UNIT I

Review of Macro Economics concepts-Comparative statistics- Keynesian
theory- Consumption Function and Theories of Consumption -Saving
Function and Theories of Saving.

UNIT II

Theories of Investment-Savings and Investment Equality - IS - LM
Framework and its mand for and Supply of Money-Monetary Policy in the
static model - Inflation.

UNIT III

Stagflation and Supply side Economics - Theory of Unemployment -
Phillips Curve controversy - Inflation, Productivity and distribution - Fiscal
policy: Effectiveness and Problems.

UNIT IV

Social Accounting Matrix Framework - General Equilibrium Analysis -
Neo classical Macro Economics - Stochastic Macro Economics.

UNIT V

BOP & Adjustment Policies - Foreign Exchange Policy - Foreign sector :
Capital and Current Account - Impact of WTO on Indian Economy -
Impact of IMF & IBRD on Indian Economy - Review of Macro Economic
Policies in India.

Suggested Readings

Diulio EA. 2006. *Macroeconomics*. 4th Ed. Schaums' Outlines.

Frogen RT. 1999. *Macro Economic: Theory and Policies*. 6th Ed. Prentice
    Hall.

Samuelson PA & Nordhaus WD. 2004. *Economics*. McGraw-Hill.

Shapiro E. 1989. Macro Economic Analysis. Galgotia Publ.

AG ECON 603   ADVANCED ECONOMETRICS   2+1

Objective

The Course Objective of the course is to impart knowledge on advanced
econometric tools to the Research Scholars of agricultural economics.
Training in advanced econometrics will help the Research Scholars to
analyze the economic problem by applying quantitative techniques.

Theory

UNIT I

Review of classical regression model - review of hypothesis testing - restrictions on parameters - single equation techniques.

UNIT II

Ordinary least squares - weighted least squares - generalized least squares -method of principal components - instrumental variables method - maximum likelihood method - errors in variables, non-linearity and specification tests - non spherical error terms.

UNIT III

Dummy variables - Qualitative and truncated dependent variables - limited dependent variables -LPM, probit and logit models, their multinomial extensions.

UNIT IV

Autoregressive distributed lag models - panel data fixed and random effects models and their extensions.

UNIT V

Simultaneous equation methods -identification - estimation by indirect least squares 2SLS, PIML, SURE, 3SLS.

Practical

Estimation of multiple regression model - GLS estimation methods - testing misspecification errors - Testing and Managing multicollinearity, heteroscedasticity and autocorrelation - estimation of LPM, Logit and Probit models - comparing two regressions - Chow test - estimation of distributed lag models - panel data random and fixed effects models - Indirect least squares 2SLS, SURE, 3SLS, estimation of simultaneous equation models

Suggested Readings

Greene WH. 2002. *Econometric Analysis*. Pearson Edu.

Johnston J & Dinardo J. 2000. *Econometric Methods*. McGraw-Hill.

Kelejan HH & Oates WE. 2001. *Introduction to Econometrics Principles and Applications*. Harper & Row.

Maddala GS. 2002. *Econometrics*. McGraw Hill.

AG ECON 604   ADVANCED PRODUCTION ECONOMICS   2+1

Objective

To expose the students to the concept, significance and uses of advance production economics.

Theory

UNIT I

Agricultural Production process - Relationship between farm planning and production economics-scope of agricultural production and planning-methods/procedures in agro-economic research and planning.

UNIT II

Production functions, components, assumptions, properties and their economic interpretation - Concepts of homogeneity, homotheticity, APP, MPP, elasticities of substitution and their economic relevance - Production relations -optimality-Commonly used functional forms, nature, properties, limitations, estimation and interpretation -linear, Spillman -Cobb Douglas, quadratic, multiplicative (power) functional forms - Translog, and

transcendental functional forms -CES, production functional forms-Conceptual and empirical issues in specification, estimation and application of production functions- Analytical approaches to economic optimum - Economic optimum - determination of economic optimum with constant and varying input and output prices- Economic optimum with production function analysis - input use behaviour.

UNIT III

Decision making with multiple inputs and outputs - MRT and product relationship-cost of production and adjustment in output prices-single input and multiple product decisions- Multi input, and multi product production decisions - Decision making with no risk -Cost of wrong decisions - Cost curves - Principles and importance of duality theory - Correspondence of production, cost, and profit functions - Principles and derivation of demand and supply functions .

UNIT IV

Technology, input use and factor shares -effect of technology on input use-decomposition analysis-factor shares-estimation methods- Economic efficiency in agricultural production - technical, allocative and economic efficiency - measurement -Yield gaps analysis - concepts and measurement - Risk and uncertainty in agriculture - incorporation of risk and uncertainty in decision making - risk and uncertainty and input use level-risk programming.

UNIT V

Simulation and programming techniques in agricultural production-Multiple Course Objective Programming - Goal programming and Compromise programming - applications.

Practical

Estimation of different forms of production functions- Optimal input and product choice from estimated functions-Derivation of demand and supply functions and estimation-Estimation of cost function and interpretations-Optimal product and input choice under multi input and output system-Estimation of factor shares from empirical functions estimated-Estimating production functions incorporating technology changes: Decomposition analysis and incorporation of technology-Estimation of efficiency measures - Stochastic, probabilistic and deterministic frontier production functions-Risk programming - MOTAD-Quadratic programming-Simulation models for agricultural production decisions-Goal programming - Weighted, lexicographic and fuzzy goal programming-Compromise programming.

Suggested Readings

Chambers RG. 1988. *Applied Production Analysis*. Cambridge Univ. Press.

Gardner BL & Rausser GC. 2001. *Handbook of Agricultural Economics*. Vol. IA *Agricultural Production*. Elsevier.

Palanisami KP, Paramasivam & Ranganathan CR. 2002. *Agricultural Production Economics: Analytical Methods and Applications*. Associated Publishing Co.

AG ECON 605 **QUANTITATIVEDEVELOPMENTPOLICYANALYSIS** **1+1**

Objective

- The course trains the Scholars in the art of informed decision making and helps them to appreciate the value of the analytical basis in policy decisions.
- They are given hands on training on the estimation and use of various criteria such as elasticities in making QDPA more meaningful
- The scholars make extensive reviews to get acquainted with the analytical relevance and in drawing inferences.

Theory

UNIT I

Policy framework - goals, value, beliefs and welfare maximization. Market - Policy and State - State vs. Market - Failure of Policy - Failure of Markets - Rationale for Government Intervention. Role of Quantitative Policy Analysis.

UNIT II

Demand analysis for policymaking - Alternative approaches to demand analysis - Policy implications. Supply response - Alternative approaches to measurement of supply response - Nerlovian models of supply response - Policy implications.

UNIT III

Household behaviour and policy analysis - Household models.

UNIT IV

Partial equilibrium analysis - Concept of reference prices - Price distortions - indicators and impact. Transaction costs - Implications for efficiency and productivity - Institutional solutions - Multi market approach to policy analysis.

UNIT V

Social Accounting Matrices and multipliers -- Computable General Equilibrium models to assess economy wide impact of policy changes.

Practical

Review of criteria for policy evaluation - Estimation of price elasticities - Review of estimation of complete demand systems - Estimation of Nerlovian supply Response model - Review of Household models - Specification and estimation of household models - Partial equilibrium analysis - Input-output table - Social Accounting Matrix - Construction of a SAM - computation of Multipliers - Multi Market Analysis - Review of Computable General Equilibrium Models.

Suggested Readings

Chenery H & Srinivasan TN. (Eds.). 1988. *Hand book of Development Economics*. North-Holland.

Eicher KC & Staatz JM. 1998. *International Agricultural Development*. Johns Hopkins Univ. Press.

Fischer G, Miller J & Sidney MS. (Eds.). 2007. *Handbook of Public Policy Analysis: Theory, Politics and Methods*. CRC Press.

Frank E. 1992. *Agricultural Polices in Developing Countries*. Cambridge Univ. Press.

Ghatak S & Ingersent K. 1984. *Agriculture and Economic Development*. Select Book Service Syndicate.

Kindleberger PC. 1977. Economic Development. McGraw Hill.

Meier MG & Stigilitz JE. 2001. *Frontiers of Development Economics- the Future Perspective*. Oxford Univ. Press.

Sadoulet E & de Janvry A. 1995. *Quantitative Development Policy Analysis*. (London: John Hopkins Univ. Press.

Shoven Neck R, Christian R & Mooslechner P. (Eds.). 2008. *Quantitative Economic Policy Essays in Honour of Andrew Hughes Hallett.*

AG ECON 606   ADVANCED AGRICULTURAL MARKETING AND   2+1 PRICE ANALYSIS

Objective

The main Course Objective of this course is to critically analyze the important marketing concepts, models, properties of agricultural commodity prices and forecasting, data collection and analysis using current software etc., in order to make them policy decisions in the field of agricultural marketing.

Theory

UNIT I

Importance of market analysis in the agricultural system - types of marketing- advantages and disadvantages - quantitative estimation - the distinguishing characteristics and role of agricultural prices - data sources for agricultural products and prices - softwares used in market analysis.

UNIT II

Role of various formal institutions in agricultural marketing - and functions - measuring their efficiency - public - private partnership - institutional arrangements. Successful case studies.

UNIT III

Multi market estimation, supply response models. Market integration and price transmission - supply / value chain management. GAP analysis. Current trends in information in the changing agrifood system.

UNIT IV

Agricultural commodity marketing - spot and futures- marketing of derivatives-speculation, hedging, swap, arbitrage etc. commodity exchanges - price discovery and risk management in commodity markets- Regulatory mechanism of futures trading.

UNIT V

Lag operators and difference equations; stationary and stochastic processes; UNIT roots and cointegration; conditional heteroscedasticity: ARCH and GARCH models - forecast evaluation; methods of forecasting. price indices and econometric estimation and simulation.

Practical

Estimation of demand/ supply forecasting, supply chain / value chain analysis for different commodities - Commodity models-multi market estimation- time series analysis - market integration studies- price discovery price volatility estimation - commodity price forecasting using econometric softwares.

Suggested Readings

Ferris JN. 1998. *Agricultural Prices and Commodity Market Analysis.* McGraw-Hill.

Goodwin JW. 1994. *Agricultural Price Analysis and Forecasting*. Wiley.

Hallam D. 1990. *Econometric Modeling of Agricultural Commodity Markets*. New Routledge.

Martimort D. (Ed.). 1996. *Agricultural Markets: Mechanisms, Failures, and Regulations*. Elsevier.

Schrimper RA. 2001. *Economics of Agricultural Markets*. Pearson.

Timmer CP. 1986. *Getting Prices Right*. Cornell University Press.

Tomek WG & Robinson KL. 2003. *Agricultural Product Prices*. 4th Ed. Cornell University Press.

AG ECON 607   COMMODITY FUTURES TRADING   2+0

Objective

This course is aimed at providing the basic understanding and the mechanics and value of futures markets for speculators and hedgers which in turn will serve as price risk management activities of agribusiness firms.

Theory

UNIT I

History and Evolution of commodity markets - Terms and concepts: spot, forward and futures Markets - factors influencing spot and future markets. Speculatory mechanism in commodity futures.

UNIT II

Transaction and settlement - delivery mechanism - role of different agents - trading strategies - potential impact of interest rate, Foreign Exchange, FDI in Commodity Markets.

UNIT III

Risk in commodity trading, importance and need for risk management measures - managing market price risk: hedging, speculation, arbitrage, swaps - pricing and their features.

UNIT IV

Important global and Indian commodity exchanges - contracts traded - special features -Regulation of Indian commodity exchanges - FMC and its role.

UNIT V

Fundamental Vs Technical analysis - construction and interpretation of charts and chart patterns for analyzing the market trend - Market indicators - back testing. Introduction to technical analysis software - analyzing trading pattern of different commodity groups.

Suggested Readings

Kaufman PJ**.** *1986. The Concise Handbook of Futures Markets*. John Wiley & Sons.

Leuthold RM, Junkus JC & Cordier JE. 1989. *The Theory and Practice of Futures Markets***.** Lexington Books.

Lofton T. 1993. *Getting Started in Futures*. 3rd Ed. John Wiley & Sons.

Purcell WD. 1991. *Agricultural Futures and Options: Principles and Strategies***.** Macmillan Publ.

Wasendorf RR & McCafferty. 1993. *All about Commodities from the Inside Out*. McGraw-Hill.

AG ECON 608 **NATURAL RESOURCE MANAGEMENT** **1+1**

Objectives

This is an applied economics course that focuses on the economic analysis of natural resources, and seeks to identify and solve natural resource management problems via mathematical approach using dynamic optimization techniques. During the course, we will encounter bio-economic models of natural resources including the classic and more recent forestry and fisheries models, models of land and water use and extraction of non-renewable resources (such as from a mineral deposit). We will focus on intuition and understanding of the economic analysis rather than complicated mathematical models in this class. That said, natural resource problems are inherently dynamic, so some mathematical modeling of biophysical and economic processes will be required. Using computers as an aid to understanding the models will be an important part of the class. The primary tool will be Microsoft Excel, which is the easiest introduction to computational optimization and graphical representation of the results.

Theory

UNIT I

Natural resources - definition - characteristics and classification. Stock dynamics of renewable and non-renewable resources. Equation of motion for renewable and non-renewable resources. Fundamental equation of renewable resources.

UNIT II

Growth curves of fishery and forest resources. The role of time preference in natural resource use. Simple two-period model of optimal use of renewable and non-renewable resources. Advanced models of optimal resource use - Static Vs. dynamic efficiency in natural resource use Applications of dynamic programming and optimal control.

UNIT III

Economics of groundwater use - optimal extraction of groundwater. Analytical and numerical solutions for optimal inter-temporal allocation of natural resources. Optimal harvesting of single rotation and multiple rotation forests. Optimal management of fishery.

UNIT IV

Property rights in natural resources and their implication for conservation and management of natural resources. Management of common property natural resources - Institutional arrangements for conservation and management of common pool fishery, groundwater and forestry resource.

UNIT V

Resource scarcity - Natural resource degradation - Poverty and resource degradation - Natural resource accounting - Pricing and valuation of natural resources - Natural resources policy.

Practical

Derivation of the fundamental equation of renewable resources-Estimation of growth curves and stock dynamics for fishery and forestry resources. Simple two period problem of optimal resource use - Numerical solution for simple two-period model of dynamic efficiency in natural resource extraction. Multi-period dynamic efficiency - Using Excel Solver in solving dynamic natural resource harvesting problems. Using analytical

solution procedures for solving natural resource management problems - Optimal control.

Suggested Readings

Baland J-M & Platteau JP. 1996. *Halting Degradation of Natural Resources: Is There a Role for Rural Communities?* Clarendon Press and FAO.

Carlson GA, Miranowski J & Zilberman D. 1998. *Agricultural and Environmental Resource Economics*. Oxford Univ. Press.

Chiang AC. 1992. *Elements of Dynamic Optimization*. Waveland Press.

Clark CW. 1976. *Mathematical Bioeconomics: The Optimal Management of Renewable Resources*. John Wiley and Sons.

Conrad JM & Clark CW. 1997. *Natural Resource Economics: Notes and Problems*. Cambridge Univ. Press.

Conrad JM. 1999. *Resource Economics*. Cambridge University Press.

Fisher AC. 1981. *Resource and Environmental Economics*. Cambridge Univ. Press.

Prato T. 1998. *Natural Resource and Environmental Economics*. Iowa State Univ. Press.

Sterner T. 2003. Policy Instruments for Environmental and Natural Resource Management. Resources for the Future, Washington DC.

AG ECON 609   ENVIRONMENTAL ECONOMICS   2+1

Objective

The main objective of this course is to provide an advanced treatment of the economic theory of environmental management and policy, externalities and market and non-market approaches to environmental improvement. Topics in economic growth and environmental problems, poverty and environmental degradation, conservation and sustainable economic growth, intergenerational and global environmental problems, policy issues in environmental regulation and management will be covered at a sufficient depth so as to equip the students with the recent developments in the field.

Theory

UNIT I

Environmental pollution as a consequence of market failure - Causes and consequences of market failure - Externalities - Public goods and externalities - Economics of pollution - Private vs. Social cost of environmental pollution - Property rights, environment and development - Theory of environmental policy.

UNIT II

Environmental cost benefit analysis - Environmental impact assessment techniques - Non-market valuation of environmental resources (WTP / WTA) - Environment, market and social welfare.

UNIT III

Economic growth and environmental cost - Growth oriented economic policies and their environmental impacts - Population and environmental quality - poverty and environmental degradation - Sustainable development - Indicators of sustainable development - Issues in sustainable development.

UNIT IV

Environment, ecology and environmental accounting - Environmental pollution with respect to water and air - Land and forest resources related environmental pollution - Coastal externalities - Urbanization and environment - Basic approaches to environmental policy (Tax, subsidy, pollution permits etc.) Green taxes - Political economy of environmental regulation and management.

UNIT V

Transboundary environmental problems - Economics of global warming, climate change and emission trading - Environment, international trade and development.

Practical

Contemporary global environmental global environmental issues, movement, policies, programmes, laws and other regulatory mechanisms - Criteria for evaluating the environment related projects and review of Environmental Impact Assessment (EIA) techniques - Recreation demand models of environmental valuation - Contingent valuation techniques - Environmental Resource Accounting Techniques - Discussion on the techniques dealing with air pollution and review of case studies on air pollution and its impacts - forest environment and wild life conservation - Green GDP and Green house insurance - Practical considerations and comparison of instruments of environmental policy - Non-point source pollution control methodologies - Environment in macroeconomic modeling - Meta-analysis, economic valuation and environmental economics - Multi-criteria methods for quantitative, qualitative and fuzzy evaluation problems related to environment - Input output analysis, technology and the environment - Computable general equilibrium models for environmental economics and policy analysis.

Suggested Readings

Carlson GA, Miranowski J & Zilberman D. 1998. *Agricultural and Environmental Resource Economics*. Oxford Univ. Press.

Hanley N, Shogren J & White B. 2007. *Environmental Economics in Theory and Practice*. Palgrave, London.

Kolstad C. 1999. *Environmental Economics*. Oxford Univ. Press.

Prato T. 1998. *Natural Resource and Environmental Economics*. Iowa State Univ. Press.

Sterner T. 2003. *Policy Instruments for Environmental and Natural Resource Management. Resources for the Future*. The World Bank and SIDA.

AGRICULTURAL ECONOMICS

List of Journals

- Agricultural Economics Research Review
- Agricultural Finance Review
- Agricultural Marketing
- Agriculture and Agro-industries Journal
- Agriculture Statistics at a Glance
- APEDA Trade yearbook
- Asian Economic and Social Review (Old Series)
- Bulletin of Agricultural Prices
- Economic and Political Weekly
- Economic Survey of Asia and Far East
- FAO Commodity Review and Outlook
- FAO Production Year book
- FAO Trade year book
- Indian Cooperative Review
- Indian Economic Journal
- Indian Journal of Agricultural Economics
- Indian Journal of Agricultural Marketing
- Indian Journal of Economics
- International Food Policy Research Institute Research Report
- Journal of Agricultural Development and Policy
- Journal of Agricultural Economics
- Journal of Agricultural Economics and Development
- Journal of Farm Economics
- Land Economics
- Productivity
- Reserve Bank of India Bulletin
- Rural Economics and Management
- World Agricultural Economics and Rural Sociology Abstracts
- World Agricultural Production and Trade: Statistical Report
- Yojana
- Agricultural Situation in India

e- Resources

- www.pearsoned.com (Pearson Education Publication)
- www.mcgraw-hill.com (McGraw-Hill Publishing Company)
- www.oup.com (Oxford University Press)
- www.emeraldinsight.com (Emerald Group Publishing)
- www.sagepub.com (Sage publications)
- www.isaeindia.org (Indian Society of Agricultural Economics)
- www.macmillanindia.com (Macmillan Publishing)
- www.icar.org.in (Indian Council of Agricultural Research)
- www.khoj.com (Directory for Agricultural Economics)

- www.ncap.res.in (National Centre for Agricultural Economics and Policy Research)
- www.ncdex.com (National Commodity & Derivatives Exchange Limited)
- www.phdcci.in (PHD Chamber of Commerce and Industry)
- www.ficci.com (Federation of Indian Chambers of Commerce and Industry)
- www.assocham.org (Associated Chambers of Commerce and Industry of India)
- www.apeda.com (Agricultural and Processed Food Products Export Development Authority)
- www.mpeda.com (Marine Products Export Development Authority)

Suggested Broad Topics for Master's and Doctoral Research

- Economics of Irrigation water in different agro-climatic conditions
- Potential of exports of agri-products
- Potential domestic as well as international markets for value added agriproducts
- Demand & supply gap of different agri-products and agri-inputs
- Economic analysis of new agri-technologies
- Input use efficiency in different agro-climatic conditions
- Income and expenditure pattern in rural areas
- Saving and investment pattern in rural areas
- Return from investment in agriculture research
- Marketing of agri-products in WTO regime
- Impact of WTO on agricultural economy
- Impact of Agricultural credit on socio-economic condition of the farmers
- Optimization of production process to reduce the cost of production
- Economic analysis of diversification, processing and value addition in agriculture sector
- Emerging international marketing scenario of agri-products
- Extent of farmers' indebtedness in different agro-climatic conditions

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