GURU KASHI UNIVERSITY

M.Sc. (Agricultural Economics)

Session : 2024-25

Department of Agricultural Economics

GRADUATE ATRIBUTES

Graduates will have a solid foundation in economic theory and quantitative analysis techniques. They will be able to apply economic principles to analyze and evaluate agricultural markets, policies, and issues. Students will gain a deep understanding of agricultural policies at the local, national, and international levels. They will be able to assess the impact of policies on agricultural production, trade, and sustainability. Graduates will also acquire advanced research skills, including the ability to design and conduct economic research projects in the field of agricultural economics. Additionally, they will actively engage with local communities to promote sustainable agricultural practices and contribute to community development.

PROGRAMME OUTCOMES

1. To provide in-depth knowledge of macroeconomics, microeconomics, econometrics, production economics, agricultural marketing, linear programming and farm management for agricultural research and policy issues.
2. To give in-depth knowledge to students about economic theory regarding utilization and allocation of resources including labour, natural resources and capital.
3. To upgrade students understanding about the function of agri markets for goods and services and income generation, its distribution and investment.
4. To develop understanding of the production systems and allocation of scarce productive resources for optimization of profits under micro and macro conditions.
5. To provide strong grasp of sustainable agricultural practices, natural resource management, and environmental economics.
6. To develop critical thinking and problem-solving abilities to address complex issues and challenges in the agricultural sector.
7. To equip students with comprehensive knowledge of international agricultural trade, focusing on global supply chains, trade policies, and the economic impact of international agreements on agriculture.
8. To develop students' proficiency in planning, executing, and evaluating agricultural projects, ensuring effective project management practices that enhance productivity of the agricultural sector.

Program Structure of the M.Sc. Agricultural Economics

Program Structure							
Sr. No.	**Course Code**	**Course Title**	**Type of course**	**L**	**T**	**P**	**No. of Credits**
Semester-I							
1	MAE101	Micro Economic Theory and Applications	Major	3	0	0	3
2	MAE102	Macro Economics and Policy	Major	2	0	0	2
3	MAE105	Agricultural Production Economics	Major	1	0	0	1
4	MAE106	Agricultural Production Economics-Lab	Major	0	0	2	1
5	MAE107	Agricultural Marketing & Price Analysis	Major	2	0	0	2
6	MAE108	Agricultural Marketing & Price Analysis-Lab	Major	0	0	2	1
7	MAE109	Research Methodology for Social Sciences	Major	1	0	0	1
8	MAE110	Research Methodology for Social Sciences-Lab	Major	0	0	2	1
9	MAR125	Library and Information Services-Lab	Common	0	0	2	1
10	MAR134	Agricultural Research, Research Ethics and Rural Development Programmes	Common	1	0	0	1
11	MAE100	Master Research	Thesis Research	-	-	-	3NC
Total Credit							**14+3NC**
Semester-II							
12	MAE209	Agricultural Finance and Project Management	Major	2	0	0	2
13	MAE210	Agricultural Finance and Project Management-Lab	Major	0	0	2	1
14	MAE211	Linear Programming	Major	1	0	0	1
15	MAE212	Linear Programming-Lab	Major	0	0	2	1
16	MAE213	Development Economics	Minor	2	0	0	2
17	MAE204	Commodity Future Trading	Minor (CBCS)	2	0	0	2
18	MAE205	Rural Marketing					
19	MAE206	Statistical Method for Social Sciences	Supporting	3	0	0	3
20	MAE208	Statistical Method for Social Sciences-Lab	Supporting	0	0	2	1

22	MAE207	Seminar	Seminar	-	-	-	1
23	MAE100	Master Research	Thesis Research	-	-	-	3NC
Total Credit							**14+3NC**
Semester-III							
23	MAE301	Econometrics	Major	2	0	0	2
24	MAE304	Econometrics-Lab	Major	0	0	2	1
25	MAE302	Natural Resource and Environmental Economics	Minor	1	0	0	1
26	MAE305	Natural Resource and Environmental Economics-Lab	Minor	0	0	2	1
27	MAE303	Mathematics for Agricultural Economics	Supporting	3	0	0	3
28	MAR304	Technical Writing and Communication Skills-Lab	Common	0	0	2	1
29	MAE100	Master Research	Thesis Research	-	-	-	9NC
Total Credit							**9+9NC**
Semester-IV							
30	MAE402	Evolution of Economic Thought	Minor (CBCS)	2	0	0	2
31	MAE403	Institutional Economics					
32	MAR402	Intellectual Property and its management in Agriculture	Common	1	0	0	1
33	MAE100	Master Research	Thesis Research	-	-	-	15NC
Total Credit							**3+15NC**
Grand Total							**40+30NC =70**

***CBCS-Choice based credit system**
***NC-Non credit**

Evaluation Criteria for Theory Courses

A. Continuous Assessment: [25 Marks]
Continuous Assessment 1: Two best out of three [10 Marks]
Continuous Assessment 2: Assignment(s) [10 Marks]
Continuous Assessment 3: Term paper/Quiz/Presentation [05 Marks]

B. Mid Semester Test: [30 Marks]
C. End-Term Exam: [40 Marks]
D. Attendance: [5 Marks]

Evaluation Criteria for practical Courses
The syllabus of subject is divided into five experiments, each experiment contain 20 marks (10 lab performance, 5 viva, 5 lab record)- Total marks 100

Evaluation Criteria for Seminar
It is of total Marks-100
Collection of review of literature - 20marks
Data Analysis -20 marks
Power Point Presentation - 20 marks
Presentation skills - 20 marks
Viva voce - 20 marks

Evaluation Criteria for Master Research
The evaluation is Satisfactory or Unsatisfactory on the basis of the performance of the candidate.

Semester-I

Course Title: MICRO ECONOMIC THEORY AND APPLICATIONS

Course Code: MAE101

L	T	P	Credits
3	0	0	3

Total Hours-45

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Demonstrate an understanding, usage and application of basic economic principles.
2. Describe and apply the methods for analyzing consumer behavior through demand and supply, elasticity and marginal utility.
3. Understand the production function in resource allocation
4. Application of economic models and theories to real-world situations, enabling them to analyze market trends, pricing decisions, and policy implications.

Course Contents

UNIT I **12 hours**

Scarcity and Choice; Production possibility frontier, Positive and normative economics; concepts of opportunity cost, Demand and Supply: determinants of individual demand/supply; demand/ supply schedule and demand/ supply curve; market versus individual demand/ supply; shifts in the demand/ supply curve Cardinal Utility Approach – Ordinal Utility Approach -Budget sets and Preferences under different situations – Hicks and Slutsky income and substitution effects –Applications of Indifference curve approach – Revealed Preference Hypothesis – Consumer surplus – Derivation of Demand curve – Elasticity of demand – Demand and supply together; how prices allocate resources; controls on prices – price floor and price ceiling – applications in agriculture.

UNIT II **12 hours**

Production functions: single variable - average and marginal product, variable proportions, stages of production. Two variables - isoquants, returns to scale and to a factor; factor prices; Technical progress; cost minimization and output maximization; Elasticity of substitution. Expansion path and the cost function Concept of economic cost; Short run and long run cost curves; increasing and decreasing cost industries; envelope curve; L-shaped cost curves; economies of scale; revenue and expenditure, elasticity and marginal revenue; Firm equilibrium and profit.

UNIT III **10 hours**

Behaviour of profit maximizing firms and the production process- Perfect competition: Equilibrium of the market. Long run industry supply, applications: effects of taxes and subsidies; Monopoly: Equilibrium; supply; multiplant firm; monopoly power; deadweight loss; price discrimination; Monopolistic Competition: Product differentiation; equilibrium of the firm in the industry-with entry of new firms and with price competition. Comparison with pure competition. Duoploy: Cournot model and reaction curves; Stackelberg‘s model, Bertrand model; Oligopoly.

UNIT IV **11 hours**

Labour, land and capital markets - basic concepts (derived demand, productivity of an input, marginal productivity of labour, marginal revenue product, net profit, gross profit) and its theories ; demand for labour; input demand curves; shifts in input demand curves; competitive labour markets; Economic rent and quasi rent.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested Readings

David M Kreps 1990. A Course in Microeconomic Theory. Princeton UniversityPress.

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.

Web Sources
https://link.springer.com/book/10.1007/978-3-642-37434-0

https://www.vedantu.com/commerce/microeconomics

Course Title: MACRO ECONOMICS AND POLICY
Course Code: MAE102

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:
On successful completion of this course, the students will able to:

1. Understand the fundamental principles and concepts of macroeconomics, including aggregate demand and supply, national income accounting, inflation, unemployment, and economic growth.
2. Analyze and interpret macroeconomic data, such as GDP, inflation rates, and unemployment rates, to evaluate the performance of an economy and identify trends and patterns.
3. Learn the causes and consequences of economic fluctuations, including business cycles, recessions, and economic crises, and understand how these fluctuations impact various economic agents.
4. Knowledge of monetary policy and its effects on interest rates, money supply, and aggregate demand. Analyze how changes in monetary policy affect the overall economy.

Course Contents

UNIT I **7 hours**

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 **8 hours**

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 **7 hours**

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 **8 hours**

IS & LM frame work - General Equilibrium of product and money markets - Monetary policy - Fiscal policy- Effectiveness of Monetary and Fiscal policy - Central banking. Business cycles - Balance of Payment - Foreign Exchange Rate determination.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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

Web Sources
https://www.worldbank.org/en/topic/macroeconomics#:~:text=Macroeconomics%20focuses%20on%20the%20performance,Overview

https://www.khanacademy.org/economics-finance-domain/macroeconomics.

https://www.britannica.com/topic/macroeconomic

Course Title: AGRICULTURAL PRODUCTION ECONOMICS
Course Code: MAE105

L	T	P	Credits
1	0	0	1

Total Hours-15

Learning Outcomes:
On successful completion of this course, the students will able to:
1. Understanding the various concepts of production economics and farm management.
2. Acquiring technical skills on measurement issues related to Total Factor Productivity
3. Gathering knowledge about several production functions.
4. Evaluate sustainable agricultural practices and their economic implications for long-term resource management.

Theory Contents

UNIT I **5 hours**
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 **4 hours**
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 **4 hours**
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 **2 hours**

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.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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 Hil

Web Sources

https://www.britannica.com/topic/agricultural-economics

https://academic.oup.com/erae

https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: AGRICULTURAL PRODUCTION ECONOMICS-LAB
Course Code: MAE106

L	T	P	Credits
0	0	2	1

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Understanding the various concepts of production economics and farm management.
2. Acquiring technical skills on measurement issues related to Total Factor Productivity
3. Gathering knowledge about several production function.
4. Understand the various constraints specific to less developed agriculture.
5. Learning about technology in agricultural production, nature and effects and measurement

Course Contents

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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

Course Title: AGRICULTURAL MARKETING AND PRICE ANALYSIS

Course Code: MAE107

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Understand the concepts and principles of agricultural marketing, including the functions of marketing channels, market structure, and market integration in the agricultural sector.
2. Analyze the factors influencing supply and demand in agricultural markets, including production levels, input costs, market competition, consumer preferences, and government policies.
3. Evaluate the role of price analysis in agricultural markets, including price determination, price volatility, and price transmission mechanisms across different levels of the supply chain.
4. Apply economic models and tools to analyze price trends, price forecasting, and price risk management strategies in agricultural markets.

Theory Contents

UNIT I **8 hours**

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 – Regulation of markets and its position in present - Marketable & Marketed surplus estimation. Marketing Efficiency - Structure Conduct and Performance analysis - Vertical and Horizontal integration - Integration over space, time and form-Vertical coordination.

UNIT II **7 hours**

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 **8 hours**

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 **7 hours**

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

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

Web Sources

https://www.britannica.com/topic/agricultural-economics

https://academic.oup.com/erae

https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: AGRICULTURAL MARKETING AND PRICE ANALYSIS-LAB
Course Code: MAE108

L	T	P	Credits
0	0	2	1

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Acquire basic information marketing, agricultural marketing and classification of markets.
2. Information of regulated markets and their structure.
3. Acquaintance with various aspects of agricultural marketing with special reference to developing countries
4. Understand the role of Information Technology and telecommunication in marketing of agricultural commodities.
5. Investigate about the importance time series analysis in price forecasting.

Course Contents

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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

Course Title: RESEARCH METHODOLOGY FOR SOCIAL SCIENCES

Course Code: MAE109

L	T	P	Credits
1	0	0	1

Total Hours-15

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Acquire basic information regarding types and approaches to research.
2. Classify the types of hypothesis, setting of Course Objective and hypotheses
3. Learn the different types of sampling techniques.
4. Understand the collection and analysis of data.

Theory Contents

UNIT I **5 hours**

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 **2 hours**

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

UNIT III **3 hours**

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 **5 hours**

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.
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.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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 Behavioral Sciences. Tata McGraw-Hill.
Venkatasubramanian V. 1999. Introduction to Research Methodology in Agricultural and Biological Sciences. SAGE Publ.

Web Sources

https://www.britannica.com/topic/agricultural-economics

https://academic.oup.com/erae

https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: RESEARCH METHODOLOGY FOR SOCIAL SCIENCES-LAB

Course Code: MAE110

L	T	P	Credits
0	0	2	1

Total Hours-30

Learning Outcomes:
On successful completion of this course, the students will able to:

1. Acquire basic information regarding types and approaches to research.
2. Classify the types of hypothesis setting of Course Objective and hypotheses
3. Learn the different types of sampling techniques.
4. Understand the collection and analysis of data.
5. Investigate about the importance of research methodology in social sciences.

Course Contents

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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested Readings

Black TR. 1993. *Evaluating Social Science Research - An Introduction***.** SAGE Publ.
Creswell JW. 1999. *Research Design - Qualitative and Quantitative Approaches***.** SAGE Publ.
Singh AK. 1993. *Tests, Measurements and Research Methods in Behavioral Sciences***.** Tata McGraw-Hill.
Venkatasubramanian V. 1999. *Introduction to Research Methodology in Agricultural and Biological Sciences*. SAGE Publ.

Course Title: AGRICULTURAL RESEARCH, RESEARCH ETHICS AND RURAL DEVELOPMENT PROGRAMMES

Course Code: MAR134

L	T	P	Credits
1	0	0	0

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to**:**

1. Identify library services and availability of resources in order to develop a realistic overall plan for research
2. Use general information resources to increase familiarity with the topic and disciplinary vocabulary
3. Learn about the research topic, question or thesis to achieve a manageable focus appropriate to the assignment criteria, available resources, and evidence needed to support thesis
4. Identify keywords, synonyms and related terms in order to flexibly

UNIT I **9 hours**

History of agriculture in brief; Global agricultural research system: need, scope, opportunities; Role in promoting food security, reducing poverty and protecting the environment; National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions; Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility.

UNIT II **7 hours**

Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

UNIT III **7 hours**

Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group – Area Specific Programme

UNIT IV **7 hours**

Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/ Non-Governmental Organisations. Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested readings:

1. Bhalla GS and Singh G. 2001. Indian Agriculture - Four Decades of Development. Sage Publ.
2. Punia MS. Manual on International Research and Research Ethics. CCS Haryana Agricultural University, Hisar.
3. Rao BSV. 2007. Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives. Mittal Publ.

Course Title: Library and Information Services –Lab

L	T	P	Credits
0	0	2	1

Course Code: MAR125

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to**:**

5. Identify library services and availability of resources in order to develop a realistic overall plan for research
6. Use general information resources to increase familiarity with the topic and disciplinary vocabulary
7. Learn about the research topic, question or thesis to achieve a manageable focus appropriate to the assignment criteria, available resources, and evidence needed to support thesis
8. Identify keywords, synonyms and related terms in order to flexibly

Unit I **7 hours**

Introduction to Library and its services; five laws of library science; type of documents; classification and cataloguing; organization of documents;

Unit II **8 hours**

Sources of information primary, secondary and tertiary; current awareness and SDI services

Unit III **8 hours**

Tracing information from reference sources; library survey; preparation of bibliography.

Unit IV **7 hours**

Use of Online Public Access Catalogue; use of CD-ROM databases and other computerized library services, CeRA, J-Gate; use of Internet including search engines and its resources; e-resources.

Suggested readings:

1. Gita, S. 2012. *Library and Information Services.* LAP Lambert Academic Publishing.USA. pp. 76.
2. Kishore, A. 2021. *A Conceptual approach to library and information science A complete selfstudy guide.*2nd edition. AKB Publication. Jaipur. pp. 250.
3. Pandey, D.K. 2004. *Library and Information Science.*Atlantic Publishers & Distributors. New Delhi. pp. 272

Course Title: Master's Research
Course Code: MAE100

L	T	P	Credits
-	-	-	3 (NC)

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Conduct an investigation and solve scientific problems using a range of methods, and apply appropriate and/or theoretical techniques
2. Negotiate, plan, design and execute a research-based project,
3. Analyze data and provide a written report or thesis on the methodology and outcomes in an appropriate format
4. Learn the methodology of planning, layout, data recording, analysis, interpretation and report writing of agricultural economics experiments

Semester-II

Course Title: AGRICULTURAL FINANCE AND PROJECT MANAGEMENT

Course Code: MAE209

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Acquire basic information regarding the role and importance of agriculture finance.
2. Impart the importance of economic feasibility test of credit.
3. Learn the different types of financial statements.
4. Investigate about the importance of project Approach in financing agriculture.

Theory Contents

UNIT I **8 hours**

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, FPO's and SHG's.

UNIT II **8 hours**

Lending to farmers – The concept of 5 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 inclusion – credit widening and credit deepening.

UNIT III **7 hours**

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 **7 hours**

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. 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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

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https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: AGRICULTURAL FINANCE AND PROJECT MANAGEMENT-LAB

Course Code: MAE210

L	T	P	Credits
0	0	2	1

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Acquire basic information regarding the role and importance of agriculture finanace.
2. Classify the importance of economic feasibility test of crdit.
3. Learn the different types of financial statements.
4. Understand the concept of project evaluation.
5. Investigate about the importance of project Approach in financing agriculture.

Course Contents

Development of Rural Institutional Lending - Branch expansion, demand and supply of institutional agricultural credit and Over dues, 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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

Course Title: LINEAR PROGRAMMING
Course Code: MAE211

L	T	P	Credits
1	0	0	1

Total Hours-15

Learning Outcomes:
On successful completion of this course, the students will able to:

1. Understanding of linear programming as an optimization technique for maximizing or minimizing linear objective functions.
2. Ability to formulate real-world problems into mathematical models using decision variables, objective functions, and linear constraints.
3. Proficiency in solving linear programming problems graphically through the graphical method.
4. Familiarity with the simplex method, including concepts of basic feasible solutions, pivot operations, and optimality conditions.

Theory Contents

UNIT I **4 hours**
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 **4 hours**
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 **4 hours**
Extension of Linear Programming models: Variable resource and price programming, transportation problems, recursive programming, dynamic programming.

UNIT IV **3 hours**
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.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.46
Vaserstein. 2006. Introduction to Linear Programming. Pearson Education Publication
Web Sources

https://www.britannica.com/topic/agricultural-economics

https://academic.oup.com/erae

Course Title: LINEAR PROGRAMMING-LAB
Course Code: MAE212

L	T	P	Credits
0	0	2	1

Total Hours-30

Learning Outcomes: On successful completion of this course, the students will able to:

1. Knowledge about quantitative tools and introduction to linear programming.
2. Importance of solving profit maximization and cost minimizations problems.
3. Learn about concept and methods of simplex method.
4. Understand the concept of game theory.
5. Investigate about the recursive programming and dynamic programming.

Course Contents

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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.46
Vaserstein. 2006. *Introduction to Linear Programming*. Pearson Education Publication

Course Title: DEVELOPMENT ECONOMICS
Course Code: MAE213

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Acquire basic information to understand the evolution of the measures of development.
2. Gaining awareness of problems of economic growth in the phase of globalization exploring major growth strategies and development.
3. Understanding of the growth trajectory of the Indian economy in the post-reform period with critical review of poverty, inequality and unemployment issues
4. Understand the Role of agriculture in economic / rural development.

Course Contents

UNIT I **8 hours**

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- Development issues, poverty, inequality, unemployment and environmental degradation.

Unit II **7 hours**

Theories of Economic growth and development Classical theories- Adam smith - Ricardo-Malthus, Marx's theory of economic development; Schumpeter's theory, Approaches to development- low income equilibrium trap - critical minimum effort- The Strategy of economic

development- Balanced vs. Unbalanced growth, choice of technique, investment criteria, big push theory,

Unit III **8 hours**

Rostow's stages of Economic Growth, unlimited supply of labour; social and technological dualisms; roles of capital accumulation, human capital and
technological change in economic development, Models of economic growth Harrod- Domar, Kaldor, Mahalanobis, Lewis, FeiRanis, Input-Output, multisectoral models.

Unit IV **7 hours**

Comparative Economic Development; Countries selected for case studies -USA, Japan, China and India; Overview of economic development is selected countries; agrarian surplus and the role of the peasantry in economic development; industrial revolution; division of labour, organisation of work and industrial production, the role of the State in developmental transition

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.*

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https://www.jstor.org/stable/1243090

Course Title: COMMODITY FUTURE TRADING
Course Code: MAE204

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:
On successful completion of this course, the students will able to:

1. Gain insights into the structure and function of commodity futures markets, including major exchanges and the trading process.
2. Learn how global supply and demand, along with economic indicators, impact commodity
3. Develop skills in using futures contracts for hedging to manage price risk in various commodities, safeguarding against market volatility.
4. Enhance analytical abilities to interpret market trends and data, and formulate trading strategies based on technical and fundamental analysis.

Unit I **15 hours**
Concepts of commodity future trading 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. Block 2- Techniques and Risks in Commodity Market

Unit II **10 hours**
Technical aspects Transaction and settlement – delivery mechanism - role of different agents – trading strategies -potential impact of interest rate, Foreign Exchange, FDI in Commodity Markets.

Unit III **15 hours**
Risk in commodity trading, importance and need for risk management measures - managing market price risk: hedging, speculation, arbitrage, swaps - pricing and their features. Commodity Exchange – A review Important global and Indian commodity exchanges - contracts traded – special features -Regulation of Indian commodity exchanges - FMC and its role.

Unit IV **5 hours**
Analysis of commodity market 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.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested Readings

- *Kaufman PJ. The Concise Handbook of Futures Markets: Jhon Wiley & Sons*
- *Purcell WD. Agricultural Futures and Options: Principles and Strategies: MacMillan Publications*
- *Wasendorf RR & McCaffery All About Commodities from the Inside Out. McGraw Hill*

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https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: RURAL MARKETING
Course Code: MAE205

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:
On successful completion of this course, the students will able to:

1. Gain insights into the unique cultural, social, and economic factors that influence rural consumer behavior.
2. Learn about the specific needs, preferences, and consumption patterns of rural consumers, which often differ significantly from urban consumers.
3. Develop skills in crafting marketing messages that resonate with rural audiences, utilizing local languages and culturally relevant themes.
4. Understand the logistics of distributing products in rural areas, including the challenges of infrastructure and the importance of local distribution networks.

UNIT I **10 hours**
Concept and scope of rural marketing: nature, characteristics and potential. Environmental factors: sociocultural, economic and other environmental factors affecting rural marketing.

UNIT II **5 hours**

Rural consumer's behavior : behavior of rural consumers and farmers, buyer characteristics and buying behavior. Rural v/s urban markets.

UNIT III **10 hours**
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. Input marketing in the rural areas.

UNIT IV **10 hours**
Inter linkage of rural marketing with credit. Product promotion : media planning, planning of distribution channels, and organizing personal selling in
rural market in India.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

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https://www.jstor.org/stable/1243090

Course Title: STATISTICAL METHOD FOR SOCIAL SCIENCES
Course Code: MAE206

L	T	P	Credits
3	0	0	3

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Gain a solid foundation in basic statistical principles, including descriptive statistics, probability distributions, and inferential statistics.
2. Learn how to design surveys and experiments, collect data effectively, and use statistical software to analyze data sets accurately.
3. Develop skills in formulating hypotheses, conducting hypothesis tests, and interpreting the results to draw meaningful conclusions about social phenomena.
4. Apply statistical techniques to real-world social science problems, enhancing the ability to critically evaluate research findings and support decision-making with quantitative evidence.

Theory Content

UNIT I **7 hours**

Box-plot, Descriptive statistics, Exploratory data analysis, Theory of probability, Random variable and mathematical expectation.

UNIT II **8 hours**

Discrete and continuous probability distributions, Binomial, Poisson, Negative
Binomial, Normal distribution, Beta and Gamma distributions and their applications. Concept of sampling distribution: chi-square, t and F distributions. Tests of significance based on Normal, chi-square, t and F distributions.

UNIT III **7 hours**

Introduction to theory of estimation and confidence-intervals, Simple and multiple correlation coefficient, partial correlation, rank correlation, Simple and multiple linear regression model, test of significance of correlation coefficient and regression coefficients, Coefficient of determination, Fitting of quadratic models.

UNIT IV **8 hours**

Non-parametric tests – sign, Wilcoxon, Mann-Whitney U-test, Run test for the

randomness of a sequence. Median test. Introduction to ANOVA: One way and Two Way, Introduction to Sampling Techniques, Introduction to Multivariate Analysis, Transformation of Data.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested readings:

Panse, V.G. and Sukhatme, P.V. 1954. Statistical methods for agricultural workers. pp. 361.

Gupta, S.C. and Kapoor, V.K. 2014. Fundamentals of Mathematical Statistics. Sultan Chand & Sons, New Delhi.pp. 230.

Snecdecor, G.W. and Cochran, W.G. 1989. Statistical Methods, 8th Edition. Wiley-Blackwell. Pp.524.

Rangaswamy, R. 2016. Textbook of Agricultural Statistics.New Age International (P) Ltd. New Delhi. pp. 531.

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https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: STATISTICAL METHOD FOR SOCIAL SCIENCES-LAB

Course Code: MAE209

	L	T	P	Credits
	0	0	2	1

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Study about statistical principles apply in all the areas of experimental work
2. Understand the requirement at the national level and farm level for agriculture policy making,
3. Helps to develop decision making, agriculture development and estimates agriculture and national income
4. Study the importance of statistics in agriculture, helps to ascertain the volume of crop that needs to be produced based on output and demand of previous year

Practical Contents

30 hours

Exploratory data analysis, fitting of distributions ~ Binomial, Poisson, Negative Binomial, Normal. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F.Confidence interval estimation and Correlation and regression analysis, fitting of Linear and Quadratic Model.Non-parametric tests. ANOVA: One way, Two Way, SRS.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested readings:

Panse, V.G. and Sukhatme, P.V. 1954. Statistical methods for agricultural workers. pp. 361.

Gupta, S.C. and Kapoor, V.K. 2014. Fundamentals of Mathematical Statistics. Sultan Chand & Sons, New Delhi.pp. 230.

Snecdecor, G.W. and Cochran, W.G. 1989. Statistical Methods, 8th Edition. Wiley-Blackwell. Pp.524.

Rangaswamy, R. 2016. Textbook of Agricultural Statistics.New Age International (P) Ltd. New Delhi. pp. 531.

Course Title: Seminar
Course Code: MAE207

L	T	P	Credits
-	-	-	1

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Show competence in identifying relevant information, defining and explaining topics under discussion
2. Present the classical and innovative work related to plant pathology subject.
3. Reach across diverse disciplines to apply theories, methods and knowledge bases from multiple fields to a single question or problem
4. Judge when to speak and how much to say, speak clearly and audibly in a manner appropriate to the subject

Course Content

Seminar topic will be suggested by faculty

Course Title: Master's Research
Course Code: MAE100

L	T	P	Credits
-	-	-	3 (NC)

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Conduct an investigation and solve scientific problems using a range of methods, and apply appropriate and/or theoretical techniques
2. Negotiate, plan, design and execute a research-based project,
3. Analyze data and provide a written report or thesis on the methodology and outcomes in an appropriate format
4. Learn the methodology of planning, layout, data recording, analysis, interpretation and report writing of agricultural economics experiments

Semester-III

Course Title: ECONOMETRICS
Course Code: MAE301

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:
On successful completion of this course, the students will able to:

1. Skill to judge the reliability of estimation in case of violation of basic assumptions for the application of ordinary linear regression method.
2. Application of regression model for empirical data and try to compare the theoretical validity with empirical findings
3. Learn the Various tests to understand the presence of Heteroscedasticity and multicollinearity.
4. Gained the knowledge related to various dynamic econometric models Problems related to estimation of distributed lag model.

Theory Contents

UNIT I **8 hours**

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

UNIT II **7 hours**

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 **8 hours**

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

UNIT IV **7 hours**

Use of dummy variables-limited dependent variables – specification, estimation and interpretation. Simultaneous equation models – structural equations - reduced form equations - identification and approaches to estimation.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

Web Sources

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https://academic.oup.com/erae

https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: ECONOMETRICS-LAB
Course Code: MAE304

L	T	P	Credits
0	0	2	1

Total Hours-30

Learning Outcomes:
On successful completion of this course, the students will able to:

5. Skill to judge the reliability of estimation in case of violation of basic assumptions for the application of ordinary linear regression method.
6. Application of regression model for empirical data and try to compare the theoretical validity with empirical findings
7. Learn the Various tests to understand the presence of Heteroscedasticity and multicollinearity.
8. Gained the knowledge related to various dynamic econometric models Problems related to estimation of distributed lag model.

Practical Contents

30 hours

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.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

Web Sources

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https://www.jstor.org/stable/1243090

Course Title: NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS

Course Code: MAE302

L	T	P	Credits
1	0	0	1

Total Hours-15

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Acquire basic information regarding Natural Resource Economic.
2. Classify the importance of Resource Scarcity and Technical Change.
3. Learn to identify the various policy alternatives that can be applied to address an environmental problem
4. Understand market and non-market methods and apply them to estimate the extent of welfare gain or loss associated with any development and conservation programmes.

Theory Contents

UNIT I **4 hours**

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 **4 hours**

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 **3 hours**

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. 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 IV **4 hours**

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

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested Reading

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.

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https://www.jstor.org/stable/1243090

Course Title: NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS-LAB

Course Code: MAE305

L	T	P	Credits
0	0	2	1

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Acquire basic information regarding Natural Resource Economic.
2. Classify the importance of Resource Scarcity and Technical Change.
3. Learn to identify the various policy alternatives that can be applied to address an environmental problem

4. Understand market and non-market methods and apply them to estimate the extent of welfare gain or loss associated with any development and conservation programmes.

30 hours

• 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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

Suggested Reading

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.

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https://www.jstor.org/stable/1243090

Course Title: Mathematics For Agricultural Economics
Course Code: MAE303

L	T	P	Credits
3	0	0	3

Total Hours-45

Learning Outcomes:

On successful completion of this course, the students will able to**:**

1. Learn and understand about basics of MS-Word, Excel, preparation of Graphs
2. Read, understand, and interpret material on technology. They will have an appreciation for some of the ideas, issues, and problems involved in writing about technology and in workplace writing.
3. Understand the operating systems, peripheral devices, networking, multimedia and internet
4. Familiarize with basic sources and methods of research and documentation on topics in technology, including on-line research.

Course Content

Unit I **10 hours**

Preliminaries: Logic and proof techniques; sets and set operations; relations; functions and their properties; number systems. Variables and functions Specific functions is economic theory. Elementary analytical geometry-gradient and equation of straight line. Standard equations and simple properties of circle, parabola and rectangular hyperbola.

Unit II **12 hours**

Differentiation of functions Limit and continuity. Differentiation, theorems of differentiation, differentiation of logarithmic and exponential functions, function of a function, derivative of higher order, partial derivatives. Application of derivatives to determine average and marginal values in economic analysis; determination of elasticities; points of inflexion; linear homogenous production functions; derivation of average and marginal curves.

Unit III **12 hours**

Linear Algebra, Determinants, evaluation and properties of determinants, Vectors and vector spaces, Matrices, notations and operations, laws of matrix algebra; transpose and inverse of matrix; Solution of linear and quadratic equations involving one variable, simultaneous equations, application of determinants and matrices in solution of equation for economic analysis.

Unit IV **11 hours**

Optimization of functions Optimization- unconstrained, maxima and minima, constrained optimization, Lagrange multiplier and their economic applications for optimization problems of cost, production, demand and supply. Integration of functions Integration as a reverse process of differentiation, methods of integration, reduction formulae, definite integral, use of integration to determine relation between average and marginal value. Capitalization over time, estimation of returns from capital goods over time. Pareto distribution.

Suggested Readings:

Salaria, R.S. 2017. Computer Fundamentals.Daryaganj, New Delhi. pp. 486.

Manish, S. and Bhatt, A. 2016. Computers in Agriculture: Fundamentals and Applications. New India Publishing Agency.New Delhi. pp. 190.

Manjunath, B.E. 2010.Computer Basics.Vasan Publications, Bengaluru, Karnataka. pp. 356.

Course Title: Technical Writing and Communication Skills-Lab

Course Code: MAR304

L	T	P	Credits
0	0	2	1

Total Hours-60

Learning Outcomes:

On successful completion of this course, the students will able to**:**

1. Understand and know how to follow the stages of the writing process (prewriting/writing/rewriting) and
2. Apply them to technical and workplace writing tasks
3. Produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly and accurately
4. Understand the basic components of definitions, descriptions, process explanations, and other common forms of technical writing

Course Content

- Various forms of scientific writings- theses, technical papers, reviews, manuals, etc.;
- Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion);
- Writing of abstracts, summaries, précis, citations, etc.;
- Commonly used abbreviations in the theses and research communications;
- Illustrations, photographs and drawings with suitable captions; pagination, numbering of tables and illustrations;
- Writing of numbers and dates in scientific write-ups;
- Editing and proof-reading;
- Writing of a review article;
- Communication Skills - Grammar (Tenses, parts of speech, clauses, punctuation marks);
- Error analysis (Common errors), Concord, Collocation, Phonetic symbols and transcription;
- Accentual pattern: Weak forms in connected speech;
- Participation in group discussion;
- Facing an interview;
- Presentation of scientific papers.

Suggested readings:

1. Day, R.A. and Gastel, B. 2011. *How to Write and Publish a Scientific Paper*, 7th Edition.GreenwoodPress,United States. pp. 300.
2. Laplante, P.A. 2011. *Technical Writing: A Practical Guide for Engineers and Scientists.*CRC Press, London. pp. 250.
3. Greenlaw,R. 2012. *Technical Writing, Presentational Skills and Online Communication: Professional Tools and Insights*. Idea Group,U.S. pp. 247

Course Title: Master's Research

Course Code: MAE100

L	T	P	Credits
-	-	-	9(NC)

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Conduct an investigation and solve scientific problems using a range of methods, and apply appropriate and/or theoretical techniques
2. Negotiate, plan, design and execute a research-based project,
3. Analyze data and provide a written report or thesis on the methodology and outcomes in an appropriate format
4. Learn the methodology of planning, layout, data recording, analysis, interpretation and report writing of agricultural economics experiments

Semester-IV

Course Title: EVOLUTION OF ECONOMIC THOUGHT
Course Code: MAE402

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Gain a comprehensive understanding of key economic theories and philosophies from ancient to modern times.
2. Analyze the contributions of prominent economic thinkers such as Adam Smith, Karl Marx, John Maynard Keynes, and others.
3. Evaluate how historical, social, and political contexts have shaped the development and acceptance of various economic ideas.
4. Develop the ability to compare and critically assess different economic theories and their relevance to contemporary economic issues.

Course Contents

UNIT I **7 hours**

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 **8 hours**

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 **7 hours**

The birth of neoclassical economic thought – Marshall and Walras – General Equilibrium Theory - Welfare Theory – Keynesian economics. 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 IV **8 hours**

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.

Transaction Mode

Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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.

Web Sources

https://www.britannica.com/topic/agricultural-economics

https://academic.oup.com/erae

https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: INSTITUTIONAL ECONOMICS
Course Code: MAE403

L	T	P	Credits
2	0	0	2

Total Hours-30

Learning Outcomes:
On successful completion of this course, the students will able to:
1. Acquire basic information regarding Old and New Institutional Economics.
2. Knowledge of transaction costs and the allocation of resources.
3. Learn the different structures of Moral hazard and Principal-Agent problem.
4. Understand the logic of collective action and its role in reducing free rider problem.

Course Contents

UNIT I **7 hours**

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

UNIT II **8 hours**

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 **7 hours**

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 **8 hours**

Economic analysis of property rights- property rights regimes – private property – State Property - Common property Resources (CPRs) – public goods and club goods.
Special features of institutional arrangements in agriculture – Transaction costs in agriculture - Case Studies - Theories of agrarian institutions - tenancy institutions.

Transaction Mode
Lecture, Seminar, e-Team Teaching, e-Tutoring, Dialogue, Peer Group Discussion, Mobile Teaching, Self-Learning, Collaborative Learning and Cooperative Learning

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 Behavior 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.

Web Sources

https://www.britannica.com/topic/agricultural-economics

https://academic.oup.com/erae

https://www.coursera.org/learn/agriculture-economics-nature

https://www.jstor.org/stable/1243090

Course Title: INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE
Course Code: MAR402

L	T	P	Credits
1	0	0	1

Total Hours-15

Learning Outcomes: On successful completion of this course, the students will able to:
1. Equip students and stakeholders with

2. Know about Intellectual Property Rights (IPR) related protection systems

3. Make use of IPR as a tool for wealth and value creation in a knowledge-based economy.

4. Acquire basic knowledge about Intellectual Property Rights in agriculture.

Course Content

Unit-I **4 hours**

Historical perspectives and need for the introduction of Intellectual Property Rightregime; TRIPs and various provisions in TRIPS Agreement; Intellectual Propertyand Intellectual Property Rights (IPR), benefits of securing IPRs.

Unit-I **4 hours**

Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks.

Unit-I **3 hours**

Protection of plant varieties and farmers' rights and biodiversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection.

Unit-I **4 hours**

National Biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement,License Agreement.

Suggested readings:

- *Erbisch FH and Maredia K.1998. Intellectual Property Rights in Agricultural Biotechnology. CABI.*
- *Ganguli P. 2001. Intellectual Property Rights: Unleashing Knowledge Economy.McGraw-Hill.*
- *Intellectual Property Rights: Key to New Wealth Generation. 2001. NRDC and Aesthetic Technologies.*

Course Title: Master's Research

Course Code: MAE100

L	T	P	Credits
-	-	-	15(NC)

Learning Outcomes:

On successful completion of this course, the students will able to:

1. Conduct an investigation and solve scientific problems using a range of methods, and apply appropriate and/or theoretical techniques
2. Negotiate, plan, design and execute a research-based project,
3. Analyze data and provide a written report or thesis on the methodology and outcomes in an appropriate format
4. Learn the methodology of planning, layout, data recording, analysis, interpretation and report writing of agricultural economics experiments
5. Familiarize with indexing databases, citation databases: web of science, Scopus, etc.