GURU KASHI UNIVERSITY

M.Sc. (Agricultural Economics)

Session : 2022-23

Department of Agricultural Economics

Programme Outcomes (POs)

1. Develop proficiency in quantitative methods and effective use of these techniques to socio economic and resource utilization problems
2. Cultivate rational thinking in the students by the introduction of the conditions of rationality in the areas of consumption, production and distribution
3. Understand firm and farm level decision rules for the efficient operation of enterprises and the institutional structure and use of agricultural marketing systems.
4. Be able to analyze changes in market and general economic conditions in a broad array of settings and be able to determine the impact on various groups affected by those changes.
5. Production of masters in economics with good national and international level knowledge of higher studies in the field of agricultural economics
6. Makes the scholars responsible citizens and professionals which have the capability of critical thinking and independent analysis
7. Be able to present ideas effectively in oral and written forms to those in the agricultural and related fields
8. To upgrade students understanding about the function of agri markets for goods and services and income generation, its distribution and investment
9. To develop understanding of the production systems and allocation of scarce productive resources for optimization of profits under micro and macro conditions.
10. To impart in-depth knowledge into special fields of choice like agricultural economics, basic econometrics, growth and development, agricultural marketing, production economics, environmental economics, agricultural financial institutions and markets.

Programme Specific Outcomes (PSOs)

1. To provide in-depth knowledge of macroeconomics, microeconomics, econometrics, production economics, agricultural marketing for agricultural research and policy issues.
2. Advance the understanding of the students with economic theory, econometrics, production economics, linear programming and farm management with applications in a wide variety of allied fields.

3. To give in-depth knowledge to students about economic theory regarding utilization and allocation of resources including labour, natural resources and capital.

Course Structure of the M.Sc. Agricultural Economics

Sr. No.	Course Code	Course Name	Type of Course	L	T	P	Credits
		Semester: Flexible Study Scheme					
1	MAE101	Micro Economic Theory And Applications	T	2	0	0	2
2	MAE102	Macro Economics And Policy	T	2	0	0	2
3	MAE103	Evolution of Economic Thought	T	2	0	0	2
4	MAE104	Lab-Evolution of Economic Thought	P	0	0	2	1
5	MAE105	Agricultural Production Economics	T	2	0	0	2
6	MAE106	Lab-Agricultural Production Economics	P	0	0	2	1
7	MAE107	Agricultural Marketing & Price Analysis	T	2	0	0	2
8	MAE108	Lab-Agricultural Marketing & Price Analysis	P	0	0	2	1

9	MAE109	Research Methodology For Social Sciences	T	2	0	0	2
10	MAE110	Lab-Research Methodology For Social Sciences	P	0	0	2	1
11	MAE111	Econometrics	T	2	0	0	2
12	MAE112	Lab-Econometrics	P	0	0	2	1
13	MAE113	Linear Programming	T	2	0	0	2
14	MAE114	Lab-Linear Programming	P	0	0	2	1
15	MAE115	Agricultural Finance And Project Management	T	2	0	0	2
16	MAE116	Lab-Agricultural Finance And Project Management	P	0	0	2	1
17	MAE117	International Economics	T	2	0	0	2
18	MAE118	Lab-International Economics	P	0	0	2	1
19	MAE119	Institutional Economics	T	2	0	0	2
20	MAE120	Natural Resource And Environmental Economics	T	2	0	0	2
21	MAE121	Intellectual Property Management	T	1	0	0	1
22	MAE122	Seminar-I	P	NA	NA	NA	1
23	MAE123	Seminar-II	P	NA	NA	NA	1

24	MAE124	Master Research	P	NA	NA	NA	24(NC)
25	MAE125	Agriculture Statistics	T	3	0	0	3
26	MAE126	Agriculture Statistics Lab	P	0	0	2	1
27	MAE127	Fundamentals of Computer Applications Lab	P	-	-	2	1(NC)
28	MAE128	Library and Information Services Lab	P	-	-	2	1(NC)
29	MAE129	Technical Writing And Communication Skills Lab	P	-	-	2	1(NC)
Discipline Elective							
30	MAE130	Agricultural Development Policy Analysis	T	2	0	0	2
31	MAE131	Rural Marketing					
Total							41+27(NC)

Evaluation Criteria for Theory Courses

A. Continuous Assessment: [25 Marks]

Continuous Assessment 1: [10 Marks]
Continuous Assessment 2: [10 Marks]
Continuous Assessment 3: [05 Marks]

B. Mid Semester Test-1: [30 Marks]
C. Mid Semester Test-2: [20Marks]
D. End-Term Exam: [20 Marks]
E. Attendance: [5 Marks]

For the CAs the teacher shall take surprised test/term, paper/quiz/assignments etc.

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.

Course Title: MICRO ECONOMIC THEORY AND APPLICATIONS Course Code: MAE101	L	T	P	Credits
	2	0	0	2

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. Identify and appraise various models of how markets are organized, and the price and output decisions for maximizing profit.

5. Know how markets attain equilibrium and achieve optimality.

Course Contents

UNIT I   **8 hours**

Theory of Consumer Behavior - 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   **8 hours**

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   **7 hours**

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   **7 hours**
General Equilibrium Theory - Welfare Economics - Pareto Optimality – Social welfare criteria - Social Welfare functions.

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

https://www.lse.ac.uk/study-at-lse/summer-schools/summer-school/courses/economics/ec101

Course Title: MACRO ECONOMICS AND POLICY Course Code: MAE102	L	T	P	Credits
	2	0	0	2

Learning Outcomes:

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

1. Defines concepts related to national income and calculation methods of national income.
2. Interprets macroeconomic issues such as money, foreign exchange, inflation, unemployment, economic growth and foreign trade.
3. Gain in depth knowledge about Keynesian vs Monetarist policy formulations as well as the theoretical justifications of such policies, together with the effectiveness of alternative policies with respect to the policy goals
4. Develop an understanding of the interrelationships among the various macroeconomic variables and the way they impact upon the working of the economy as a whole,
5. thereby determining the course of the economy.
6. Get acquainted with disequilibrium transactions and quasi equilibrium situations in general disequilibrium macro models

Course Contents

UNIT I   **8 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   **7 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/macroeconomics

Course Title: EVOLUTION OF ECONOMIC THOUGHT	L	T	P	Credits
Course Code: MAE103	2	0	0	2

Learning Outcomes:

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

2. Familiarity with the theoretical and empirical analysis of economic growth process and policy implications.

3. Gaining awareness of problems of economic growth in the phase of globalization exploring major growth strategies and development.

4. Understanding of the growth trajectory of the Indian economy in the post-reform period with critical review of poverty, inequality and unemployment issues

5. Understanding of the various aspects of development strategies of governments of developing countries involving both the public and private sectors. Understanding the basics of infrastructure and economic development.

6. Learning the Experiences of the Structural adjustment programmes of the post liberalization era.

Course Contents

UNIT I   **8 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   7 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: Lab- EVOLUTION OF ECONOMIC THOUGHT	L	T	P	Credits
Course Code: MAE104	0	0	2	1

Learning Outcomes:

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

1. Familiarity with the theoretical and empirical analysis of economic growth process and policy implications.
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. Understanding of the various aspects of development strategies of governments of developing countries involving both the public and private sectors. Understanding the basics of infrastructure and economic development.
5. Learning the Experiences of the Structural adjustment programmes of the post liberalization era.

Course Contents

Measurement of economic growth, Measurement of sectorial composition, HDI and PQLI, Calculation of structural change. Gini Coefficient for income inequality. Markov chain analysis.

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.

Course Title: **AGRICULTURAL PRODUCTION ECONOMICS**	L	T	P	Credits
Course Code: **MAE105**	2	0	0	2

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

UNIT I   **8 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   **7 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   **7 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   **8 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 Hill.

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: LAB-AGRICULTURAL PRODUCTION ECONOMICS	L	T	P	Credits
Course Code: MAE106	0	0	2	1

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.

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

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. Classify the importance of regulated markets and their structure.

3. An useful 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

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 - 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 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 **15 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

ourse Title: LAB-AGRICULTURAL MARKETING AND PRICE ANALYSIS Course Code: MAE108	L	T	P	Credits
	0	0	2	1

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. Classify the importance of regulated markets and their structure.
3. An useful 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.

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
	2	0	0	2

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

UNIT I   **8 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   **7 hours**

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

UNIT III   **7 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   **8 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: LAB-RESEARCH METHODOLOGY FOR SOCIAL SCIENCES	L	T	P	Credits
Course Code: MAE110	0	0	2	1

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.

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: ECONOMETRICS	L	T	P	Credits
Course Code: MAE111	2	0	0	2

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.

5. Investigate knowledge about the concept of identification and application of various estimation techniques in a simultaneous equation system.

Course 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, hetero scedasticity, 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

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: LAB- ECONOMETRICS	L	T	P	Credits
Course Code: MAE112	0	0	2	1

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.

5. Investigate knowledge about the concept of identification and application of various estimation techniques in a simultaneous equation system.

Course Contents

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.

Course Title: LINEAR PROGRAMMING	**L**	**T**	**P**	**Credits**
Course Code: MAE113	2	0	0	2

Learning Outcomes:

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

1. Knowledge about quantitative tools and introduction to linear programming.

2. Classify the 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

UNIT I   **7 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   **8 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   **7 hours**
Extension of Linear Programming models: Variable resource and price programming, transportation problems, recursive programming, dynamic programming.

UNIT IV   **8 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

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

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

Course Title: LAB-LINEAR PROGRAMMING	L	T	P	Credits
Course Code: MAE114	0	0	2	1

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

1. Knowledge about quantitative tools and introduction to linear programming.
2. Classify the 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.

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: AGRICULTURAL FINANCE AND PROJECT MANAGEMENT	L	T	P	Credits
Course Code: MAE115	2	0	0	2

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

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, and SHG's.

UNIT II   **8 hours**

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   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.
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: LAB-AGRICULTURAL FINANCE AND PROJECT MANAGEMENT Course Code: MAE116	L	T	P	Credits
	0	0	2	1

Learning Outcomes:

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

Acquire basic information regarding the role and importance of agriculture finanace.

Classify the importance of economic feasibility test of crdit.

Learn the different types of financial statements.

Understand the concept of project evaluation.

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 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.

Course Title: INTERNATIONAL ECONOMICS
Course Code: MAE117

L	T	P	Credits
2	0	0	2

Learning Outcomes:

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

1. Learn about the classical trade models in money terms, classical trade model for multiple goods and multiple countries and understand the role of transportation cost in trade.

2. Gaining the basic knowledge to understand the movement of exchange rate with respect to various national and international economic policies

3. Learn basic knowledge about how domestic inflation is related with the movement f exchange rate

4. Understand about various instruments of trade policies and about the costs and benefits of imposition of tariff, and about the advantages and disadvantages of free trade

5. Gaining the basic knowledge to understand the movement of balance of payment with the changes of money supply

Course Contents

UNIT I   **8 hours**

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.

UNIT I   **7 hours**

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

UNIT I   **8 hours**

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 I   **7 hours**

Official Exchange Rate and Shadow Exchange Rate - Walra's Law and Terms of Trade – Trade Blocks. IMF, World Bank, IDA, IFC, ADB – International Trade agreements – Uruguay Round – GATT – WTO.

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

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.

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: LAB- INTERNATIONAL ECONOMICS	L	T	P	Credits
Course Code: MAE118	0	0	2	1

Learning Outcomes:

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

1. Learn about the classical trade models in money terms, classical trade model for multiple goods and multiple countries and understand the role of transportation cost in trade.

2. Gaining the basic knowledge to understand the movement of exchange rate with respect to various national and international economic policies

3. Learn basic knowledge about how domestic inflation is related with the movement f exchange rate

4. Understand about various instruments of trade policies and about the costs and benefits of imposition of tariff, and about the advantages and disadvantages of free trade

5. Gaining the basic knowledge to understand the movement of balance of payment with the changes of money supply

<div align="center">Course Contents</div>

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.

Course Title: INSTITUTIONAL ECONOMICS
Course Code: MAE119

L	T	P	Credits
2	0	0	2

Learning Outcomes:

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

1. Acquire basic information regarding Old and New Institutional Economics.
2. Classify the importance 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.
5. Investigate about the economic analysis of property rights.

Course Contents

UNIT I **8 hours**

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

UNIT II **7 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: NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS

Course Code: MAE120

L	T	P	Credits
2	0	0	2

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.
5. Investigate about factors that determine international cooperation to mitigate global environmental problems

Course Contents

UNIT I   **8 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   **7 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   **7 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   **8 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.
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 MANAGEMENT** Course Code: **MAE121**	**L**	**T**	**P**	**Credits**
	1	0	0	1

Learning Outcomes:

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

1. Acquire basic information regarding Intellectual Property Rights.
2. Classify the importance of Patentability of Biological Inventions.
3. Learn the different procedure for patent protection.
4. Understand the concept of Geographical Indications of Goods and Commodities.
5. Investigate about the importance of Valuation, Costs and Pricing of Technology.

<div align="center">

Course Contents

</div>

UNIT I   **5 hours**

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   **3 hours**

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 **2 hours**

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 **3 hours**
Trademark- Geographical Indications of Goods and Commodities – Copy rights-Designs – Biodiversity Protection. 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 .

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

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.
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: Seminar-I

Course Code: MAE122

L	T	P	Credits
NA	NA	NA	01

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
5. To ask appropriate questions, use evidence to support claims, respond to a range of questions

Course Content
Seminar topic will be suggested by faculty

Course Title: Seminar-II

Course Code: MAE123

L	T	P	Credits
N	N	N	
A	A	A	1

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, ask appropriate questions, use evidence to support claims, respond to a range of questions

Course Content
Seminar topic will be suggested by faculty

Course Title: Master's Research

Course Code: MAE124

L	T	P	Credits
NA	NA	NA	24

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. Analyse 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 plant pathology experiments

5. Familiarize with indexing databases, citation databases: web of science, scopus, etc.

Course Title: Agriculture statistics

Course Code: MAE125

L	T	P	Credits
3	0	0	3

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
5. Acquire knowledge about land utilization and irrigation including the net area sown gross cultivated area, current follow, cultivable waste

Course Content

UNIT I   **15 hours**

Frequency distribution, standard error and deviation, correlation and regression analyses, co-efficient of variation;

UNIT II   **14 hours**

Hypothesis testing. Concept of p-value. Tests of significance-t, F and chi-square (X^2); Data transformation and missing plot techniques;

UNIT III   **15 hours**

Design of experiments and their basic principles, completely randomized, randomized block, split plot, strip-plot, factorial and simple confounding designs;

UNIT IV   **16 hours**

Efficiency of designs; Methods of statistical analysis for cropping systems including intercropping; Pooled analysis.

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

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

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

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

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 Statistics Lab	L	T	P	Credits
Course Code: MAE126	0	0	1	2

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. Hepls 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
5. Acquire knowledge about land utilization and irrigation including the net area sown gross cultivated area, current follow, cultivable waste

Course Content

Correlation analysis. Regression analysis (exponential, power function, quadratic, multi-variate, selection of variables, validation of models, ANOVA and testing of hypothesis). Tests of significance (Z-test, t-test, F-test and Chi-square test). Analysis of variance. Completely randomized design. Randomized block and latin square designs. Missing plot and analysis of covariance. 23, 24 and 33 simple and confounded experiments. Split plot designs. Factorial in split plot designs.

Suggested readings:

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

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

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

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

Course Title: Fundamental of Computer Application Lab Course Code: MAE127	L	T	P	Credits
	1	0	0	01(NC)

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.
5. Students will be able to synthesize and integrate material from primary and secondary sources with their own ideas in research papers.

Course Content

Ms-word: creating a document, saving and editing, use of options from tool bars, format, insert and tools(spelling and grammar), alignment of text, creating a table, merging cells, column and row width. Ms-excel: entering expressions through the formula tool bar and use of inbuilt functions, sum, average, max, min. Creating graphs and saving with and without data in Ms-excel.Ms-access: creating database, structuring with different types of fields. Ms-power point: preparation of slides on power point. Internet Browsing: browsing a web page and creating of E-Mail ID. Agri. net (ARIS).

Suggested Readings:

1. Salaria, R.S. 2017. *Computer Fundamentals.*Daryaganj, New Delhi. pp. 486.
2. Manish, S. and Bhatt, A. 2016. *Computers in Agriculture: Fundamentals and Applications.* New India Publishing Agency.New Delhi. pp. 190.
3. Manjunath, B.E. 2010.*Computer Basics.*Vasan Publications, Bengaluru, Karnataka. pp. 356.

Course Title: Library and Information Services Lab	L	T	P	Credits
Course Code: MAE128	1	0	0	01(NC)

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
5. Effectively search information resources

Course Content

Introduction to Library and its services; five laws of library science; type of documents; classification and cataloguing; organization of documents; sources of information primary, secondary and tertiary; current awareness and SDI services; tracing information from reference sources; library survey; preparation of bibliography; 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 self study 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: Technical Writing and Communication Skills Lab	L	T	P	Credits
				01(N
Course Code: MAE129	1	0	0	C)

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
5. Familiarise with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation

Course Content

Various forms of scientific writings: theses, technical papers, review, 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, precis, citations etc. commonly used abbreviations in the theses and research communications; illustrations, photographs and drawings with suitable captions; paginations, numbering of tables and illustrations; writing of numbers and dates in scientific write-ups; editing and proof reading; writing a review article, access methods.

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: AGRICULTURAL DEVELOPMENT AND POLICIES Course Code: MAE130	L	T	P	Credits
	2	0	0	2

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 globalisation 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.

5. Investigate about the importance of Globalization and the relevance of development policy analysis.

<div align="center">**Course Contents**</div>

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.

UNIT II   **8 hours**

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   **8 hours**

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   **7 hours**

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

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.

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: **RURAL MARKETING**	**L**	**T**	**P**	**Credits**
Course Code: **MAE131**	2	0	0	2

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 globalisation exploring major growth strategies and development.
3. Understanding of the growth tr
4. ajectory of the Indian economy in the post-reform period with critical review of poverty, inequality and unemployment issues
5. Understand the Role of agriculture in economic / rural development.
6. Investigate about the importance of Globalization and the relevance of development policy analysis.

UNIT I   **8 hours**
Concept and scope of rural marketing: nature, characteristics and potential. Environmental factors: sociocultural, economic and other environmental factors affecting rural marketing.

UNIT II   **7 hours**

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

UNIT III   **8 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   **7 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.

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