



Netaji Subhas Open University

POST GRADUATE DEGREE IN ECONOMICS (PGEC/ MA in Economics)

Duration- 2 Years

20 papers(4 credit each)

Full marks: 1000

Learning Objectives:

programme in Economics has been designed with the objective to develop in-depth knowledge of learners in frontier areas of economic theory and methods, so that they are able to use the knowledge to study real world economic problems. The programme has a strong focus on theoretical and quantitative skills and train learners in the collection and analysis of the data using their software skills and it also offers specialized optional courses, that allow learners to pursue their studies in their area of interest. The programme seeks to prepare learners to develop critical thinking to carry out investigation about various socio-economic issues objectively while bridging the gap between theory and practice. It also aims to equip the student with skills to analyze problems, formulate a hypothesis evaluate and validate results and draw reasonable conclusions thereof. The programme will help to prepare learners for pursuing research or careers that provide employment through entrepreneurship and innovative methods. Since today's unemployment problem can also be solved by developing the micro and small entrepreneurship, the programme prepares learners to develop own thinking /opinion regarding current national or international policies and issues and create awareness to become a rational and an enlightened citizen.

Expected Learning Outcomes:

At the end of the programme, the learners will have adequate competency in the frontier areas of economic theories and methods. The learners will acquire additional specialization through optional courses. They will be able to use common software for analysis of economic data. Besides, learners will be able to execute in-depth analysis of economic issues based on their understanding of economic theory, which will not only widen their opportunities for employment, but also help them to pursue their doctoral studies. Keeping the programme objectives in view, the specific learning outcomes of Masters in Economics are: Understanding the basic assumptions in various economic theories and enhance capabilities of developing ideas based on them; to prepare and motivate learners for research studies in Economics especially by developing questionnaire, collecting primary data through field surveys and to provide knowledge of a wide range of econometric techniques using excel or other statistical software. Also, the programme aims to motivate learners to extract or utilize different websites for secondary data collection, generating concepts for various facets of economic studies and gather latest information as required by them.

STRUCTURE

Semester 1 : 50x5=250	Semester 2 :50x5=250
Paper 1: History of Economic Thought	Paper 6: Microeconomic Theory
Paper 2: Statistics for Economics	Paper 7: Indian Economy- II (Reforms and Contemporary Issues)

Paper 3: Indian Economy-I (Problems & Policies)	Paper 8: Macroeconomic Theory
Paper 4: Mathematics for Economics	Paper 9: Basic Econometrics
Paper 5: Economics of the Social Sector	Paper 10: Development Economics
Semester 3: 50x5=250	Semester 4: 50x5=250
Paper 11: Public Economics	Paper 16: Project Work with Computer Applications
Paper 12: Financial Economics	Special Paper (Either A or B)
Paper 13: Environmental & Resource Economics	A. Agricultural Economics Paper 17A Agriculture and Economic Development
Paper 14: International Economics	Paper 18A: Agricultural Production and Farm Management
Paper 15: Growth Economics	Paper 19A: Contemporary Issues in Indian Agriculture
	Paper 20A Application of Statistics and Econometrics in Agricultural Economics
	Or
Xxx	B. Statistics & Econometrics
	Paper 17B Advanced Statistics
	Paper 18B Advanced Econometrics-I
	Paper 19B Advanced Econometrics-II
	Paper 20B Econometric Applications

Year-I

Paper 1: HISTORY OF ECONOMIC THOUGHT

Course objectives: After completion of this paper, learners will be able to critically think about the development of economic ideas, searching into their origins, interrelations, and, in some cases, their results.

Course Contents:

Unit 1: BEFORE ADAM SMITH

Mercantilism; Richard Cantillon (1680s-1734); David Hume (1711-76); Francois Quesnay and the Physiocrats; A.R. J. Turgot (1727-81)

Unit 2: ECONOMIC IDEAS OF ADAM SMITH (1723-90)

Wealth of Nations; Adam Smith's Value Theory; The Returns to the Factors of Production; The Invisible Hand; The Invisible Hands and the Market Economy; International Trade; The Market and the State; Economic Growth; Division of Labour & Technological Progress

Unit 3: THE CLASSICAL SCHOOL: THOMAS ROBERT MALTHUS AND DAVID RICARDO

Thomas Malthus (1776-1834); The Theory of Population; Malthus and the so-called Corn Law; Malthus' friendship with David Ricardo; David Ricardo (1772-1823); The Theory of Rent; The Theory of International Trade; The Theory of taxation.

Unit 4: KARL MARX AS AN ECONOMIC THEORIST

Life; The Communist Manifesto; Das Capital; Capitalism and Surplus Value; Marx's Labour Theory of Value; Economic Growth; The Falling Rate of Profit and the Breakdown of Capitalism; The Importance of Karl Marx

Unit 5: THE MARGINALIST REVOLUTION: THE DECADE OF 1870s AND BEYOND

William Stanley Jevons (1835-82); Marginal Utility Theory; Demand and Prices; The Sunspot Theory
Carl Menger (1840-1921); The Theory of Value; Ernest Engel (1821-96); The Austrian School: Eugen Von Bohm-Bawerk-Friedrich Von Wieser-Leon Walras (1834-1910) -Alfred Marshall and Partial-Equilibrium Theory-Marshall's Importance

Unit 6: THE MODERNIZATION OF ECONOMIC THEORY IN THE POST WAR PERIOD

Keynes and the Keynesian Revolution; John Hicks (1904-89) and General Equilibrium Theory; Paul Samuelson (1915-2009) and Foundations of Economic Theory

References:

1. Ahiakpor, J. C. (Ed.). (1998). *Keynes and the Classics reconsidered* (Vol. 63). Springer Science & Business Media.
2. Blaug, M. (1997). *Economic theory in retrospect*. Cambridge university press.
3. Cone, Carl (2017). *The Evolution of Modern Economic Theory And Other Papers on the History of Economic Thought*. Routledge.
4. Hunt, E. K., & Lautzenheiser, M. (2015). *History of economic thought: a critical perspective*. Routledge.
5. Marx, K. (1974): Works of Karl Marx.
6. Roll, Eric. (1947): *A History of Economic Thought*. New York: Prentice-Hall.
7. Sandelin, B., Trautwein, H. M., & Wundrak, R. (2014). *A short history of economic thought*. Routledge.
8. Sandmo, Agnar (2011): *Economics Evolving: A History of Economic Thought* Princeton University Press, Princeton & Oxford.
9. Schumpeter, J. A. (2006): *History of economic analysis*. Routledge.
10. Spiegel, H. W. (1991): *The growth of economic thought*. Duke University Press.
11. Staley, Charles E. (1991): *A History of Economic Thought: From Aristotle to Arrow*. Blackwell Publishers, USA.
12. Walker, Donald A. & Jan van Daal (2014): Leon Walras, *Elements of Theoretical Economics*, Cambridge University Press

Paper 2: STATISTICS FOR ECONOMICS

Course Objective: After completion of the course the learner will be able to know the basic statistical applications necessary for economic data analysis.

Course Contents:

Unit 1: MEASURES OF CENTRAL TENDENCY

Averages and Measures of Central Tendency; The Arithmetic Mean; Weighted mean; Properties of the Arithmetic Mean; Arithmetic mean computed from grouped data; The Median- Median for ungrouped data; Median for grouped data; The Mode-Mode for ungrouped data; Mode for Grouped data; Empirical Relation Mean Median and Mode; The Geometric Mean ;The Harmonic Mean ;Relation between Arithmetic, Geometric and Harmonic Means; Quartiles, Deciles and Percentiles

Unit 2: MEASURES OF DISPERSION

Dispersion or variation; The Range; The Mean Deviation; The Quartile Deviation; Standard Deviation; The coefficient of variation

Unit3: MOMENTS, SKEWNESS AND KURTOSIS

Moments- Definition; Moments for Grouped Data relation between Moments; Computation of Moments for Grouped Data; Charlier's Check and Sheppard's Correction; Moments in Dimensionless form; Skewness-

Definition-Different measures of Skewness; Kurtosis-Different Measures of Kurtosis; Population Moments, Skewness and Kurtosis

Unit 4: CORRELATION & REGRESSION

Correlation; Linear correlation; Measures of correlation; Product moment Formula for the linear correlation coefficient; Rank Correlation; Regression-Scatter Diagrams and Regression lines; Standard error of Estimate; Explained and Unexplained Variation

Units 5: INDEX NUMBERS AND THEIR APPLICATIONS

Price and Quantity Index Numbers: Various Formulae; Tests for an index number, Cost of living Index Number; Uses of index number

Unit 6: INTRODUCTION TO THE THEORY OF PROBABILITY AND DISTRIBUTION

Concept of probability; Probability Theorems, assuming two events only; Applications to the Theorems Random Variables and related elementary concepts; Discrete and Continuous and Related concepts; Expectation and Variance of Random Variables; Probability Distributions; Discrete: Mean and Variance of Binomial and Poisson distribution; Continuous: properties of normal distribution; Concept of Moment Generating Function

References:

1. Larsen, R. J., & Marx, M. L.: *An introduction to mathematical statistics and its applications* (Vol. 2). Englewood Cliffs, NJ: Prentice-Hall, 1986.
2. Goon, Gupta and Dasgupta: *Fundamentals of Statistics*, Vol I and Vol II, The World Press Pvt. Ltd. Calcutta. 1983.

3. Goon, Gupta and Dasgupta: *Fundamentals of Statistics*, Vol I and Vol II, The World Press Pvt. Ltd. Calcutta.1983.
4. Das, N. G: *Statistical Methods (Part-I & II) M.*" Das & Co., Calcutta .1977.
- 5.A. L. Nagar, & Das, R. K. *Basic statistics*. Oxford University Press.1983.
- 6.Kenney, J. F., & Keeping, E. S.: *Mathematics of statistics: Part One & two*. D. Van Nostrand Company.1953.
7. Bowen and Starr: *Basic Statistics for Business and Economics*: McGraw-Hill Companies,1982.
8. Michael Barrow: *Statistics for Economics, Accounting and Business Studies*, Pearson Education,2009
- 9.John Mounsey : *Introduction to statistical calculations*. English Universities Press, 1964.
- 10.Murray Spiegel, R.: *Theory and Problems of Statistics in SI Units*, IBC.Singapore1972

Paper 3: INDIAN ECONOMY-I (PROBLEMS AND POLICIES)

Course Objectives: After completion of the course the learner will be able to: Know the current issues and problems facing Indian economy with additional knowledge on paradigm shifts and turning points.

Course Contents:

Unit 1: INDUSTRIAL POLICY

Policies Before 1990s

Industrial Policy Resolution 1948; Industrial Policy Resolution, 1956; Industrial Policy Statement, 1977;

Industrial Policy of 1980: Industrial Policy, 1985:A Move Towards Liberalization Measure

New Industrial Policy 1991 and After

A Note on Competition Commission of India

Unit 2: LABOUR LAWS AND REGULATIONS

Labour Policy Prior to Independence in India

Constitution and Labour Policy

Labour Policy after Independence

The Labour Laws and Regulations Relating to Working Conditions

The Labour Laws Regulating Employee Relations

Labour Laws and Regulations relating to Wages and Monetary Benefits

Labour Laws and Regulations relating to Social Security

Labour Reform Measures Recently Initiated

Labour Laws: What must be done?

Unit 3: POVERTY AND INEQUALITY

Poverty line; Poverty Measures in India; Government Policy to Combat Poverty; Economic Reforms and Poverty

Concept of Inequality

Inequality Measures

Nature of Inequality in India

Reasons for the rise in Inequality in India and Government Measures

Role of inclusive growth

Unit 4: EMPLOYMENT AND SOCIAL SECURITY

Employment trends
Different Types of Unemployment
Nature of Unemployment Problem
Causes of Unemployment
Extent and Magnitude of Unemployment
Issues of Measurement of Employment and Unemployment
Employment Policy of Government of India:
The Role of MGNREGS for gainful Employment in Rural Areas
Reforms and Employment
Informal Sector and Informalisation of Labour
Social Security Measures in India

Unit 5: FISCAL POLICY

Objectives of Fiscal Policy
Fiscal Policy Reforms since 1991
Fiscal Responsibility in India: FRBM Act
Principles of Fiscal Federalism
Impact of Fiscal Reforms on Fiscal Consolidation
The Finance Commission

Unit 6: TRADE AND INVESTMENT POLICY

Trade Policy
Import Substitution-based Industrialization; Export-led Growth; Current and Capital Account
Convertibility; Trade Policy prior to 1991; Trade Policy since 1991
FDI Policy
First Phase (1950-1980)
Second Phase (1980-91)
Third Phase (Post -1991)
FII Policy

References

1. Bhagwati, J and Desai, P (1970): *India: Industrialisation*. Oxford University Press, Delhi.
2. Bhat T. P. (2013): *Growth and Structural Change in Indian Industries*, Institute for Studies in Industrial Development (ISID), 2013/2.
3. Rangarajan, C (2009): “Paradigm Shifts in Industrial Policy,” in C. Rangarajan: *India: Monetary Policy, Financial Stability and Other Essays*, Academic Foundation, New Delhi
4. Shetty, S. L. (1978), Structural Retrogression in the Indian Economy since the Mid-Sixties, *Economic and Political Weekly*.
5. Thakur, B, Gupta, R. & Singh, R. (2012), Changing Face of India's Industrial Policies: A Look, *International Journal of Scientific and Research Publications*, Volume 2, Issue 12.

6. Uppal, J. S. (1975)*India's economic problems*. Tata McGraw Hill

Paper 4: MATHEMATICS FOR ECONOMICS

Course objectives: After completion of the course the learner will be able to know the preliminary mathematical techniques required for economic analysis.

Course Contents:

Unit 1: FUNCTIONS AND ITS DERIVATIVE OR DIFFERENTIATION

Definition & Types of functions
Concept of derivative or differentiation
Rules of differentiation
Higher order derivatives
Slope and curvature
Multivariate functions and their derivatives
Higher Order partial derivatives
Total differential and its rules
Total derivative
Homogeneous function
Euler's theorem
Homothetic function

Unit 2: APPLICATIONS OF FUNCTIONS AND DERIVATIVES IN ECONOMICS

Average and marginal functions
Elasticity of demand
Marginal revenue, marginal Products and marginal cost
Profit maximization
Cost minimization
Slope and curvature of indifference curve and iso-quant
Relation between price elasticity and total expenditure
Unit elastic demand curve
Relation among AR, MR, and price elasticity of demand
Relation among TR, MR, and elasticity of demand –
Elasticity of factor substitution and shape of iso-quant
Properties of Homogenous production function
Homogeneous production functions and returns to scale
Cobb-Douglas production function
Product exhaustion (or Addingup) theorem
Properties of CES production function.

Unit 3: MAXIMA AND MINIMA (EXTREMA) OF FUNCTIONS

Concepts of Maxima and Minima –
Identification of Maxima and Minima –
Points of inflexion
Optimization of Multivariate function
Unconstrained and constrained optimization
Constrained optimization with Lagrange Multipliers
Sufficient condition for constrained optimization
Application of Maxima and Minima in Economics
Relation between AP and MP
Relation between AC and MC
Profit maximization
Utility maximization with budget constraint
Output maximization with cost constraint
Cost minimization with output constraint
Sign of co-efficients of a cubic cost function

Unit 4: INTEGRATION AND ITS APPLICATION

Definite integral: Properties
Definite integral as an area under a curve
Indefinite integral
Rules of integration
Application of integration in Economics:
Finding out total function from marginal functions
Demand function from elasticity of demand
Indifference curve from MRS function
Iso-quant from MRTS function
Measurement of consumer's surplus and producer's surplus

Unit 5: MATRICES AND DETERMINANTS

Definition
Matrix operations
Different types of matrices
Determinant of a matrix
Properties of determinants
Inverse matrix
Solution of a system of linear equations by matrix inversion method
Hessian determinant and Hessian- bordered determinant
Application of matrix and determinant operations in Economics:
Derivation of Slutsky equation
Leontief static open model-
Cramer's rule for solving IS– LM model

Unit 6: DYNAMIC ANALYSIS

Difference Equation

Solutions of first order and second order difference equation

Differential equation – Solution of a first order differential equation

Application of difference equation (First Order) in Economics

Keynesian dynamic multiplier

Cobweb model

Multiplier and accelerator model of trade

Application of differential equation in Economics

Domar Model of Economic growth

Dynamic Optimization and its Application

References:

1. Blume, L. and Simon, C.: *Mathematics for Economists*, Norton, 1994.
2. Bradeley, Teresa: *Essential Mathematics for Economics and Business*. John Wiley & Sons, 2013
3. Chiang, A.C.: *Fundamental Methods of Mathematical Economics*, Third Edition, McGraw- Hill 2005.
4. Chiang, A.C. and Wainwright, K.: *Fundamental Methods of Mathematical Economics*, Fourth Edition, McGraw- Hill, 2005.
5. Chiang, A.C., *Elements of Dynamic Optimization*, McGraw- Hill, 1993.
6. Dixit, A: *Optimization in Economic Theory*, Oxford University Press, 1976.
7. Henderson, J.M. and Quandt, R.E.: *Microeconomic Theory: A Mathematical Approach*, 3rd Edition, McGraw- Hill Book Company, 1980.
8. Hoy, Michael, John Livernois, Chris McKenna, Ray Rees, and Thanasis
9. Stengos. *Mathematics for economics*. MIT press, 2011. Intrilligator: *Mathematical Optimization and Economic Theory*, Prentice Hall, 1971.
10. Sarkhel, Jaydeb and Anindya Bhukta: *An Introduction to Mathematical Techniques for Economic Analysis*. Book Syndicate, Calcutta, 2000
11. Shone, Ronald, *Economic Dynamics*, Cambridge University Press, 1997.
12. Sydsaeter, K. and Hammond, P.: *Mathematics for economic analysis*, Pearson Education, 2002.
13. Turkington, D. A. (2006): *Mathematical tools for economics*. Wiley-Blackwell.

Paper 5: ECONOMICS OF THE SOCIAL SECTOR

Course objectives: After studying this paper learners will be able to understand that the ongoing process of economic reform in India is the emerging keen interest in social development and also will realize its mutuality with economic growth.

Course Contents:

Unit 1: IMPORTANCE OF SOCIAL SECTOR

Why Study the Economics of Social Sector?

Social Sector and Welfare

Unit 2: SOCIAL DEVELOPMENT AND DEPRIVATION

Development Indices
Human Development Index (HDI)
Inequality Adjusted HDI
Gender Development Index (GDI)
Gender Empowerment Measure (GEM)
Deprivation Indices
Uni-Dimensional Measure:
Sen's Index
FGT Index
Multidimensional Deprivation:
Human Poverty Index (HPI),
Multidimensional Poverty Index (MPI)
Human Development in an Unequal World

Unit 3: ECONOMICS OF EDUCATION

Education as an instrument for economic growth
Demand for education — private demand and social demand
Benefits of education — Direct and indirect benefits,
Effects of education on poverty and income distribution
Effects of education on employment
Policy on Education in India since Independence

Unit 4: ECONOMICS OF HEALTH

Health dimensions of development
Health Inequality and Socio-Economic Status
Determinants of health — poverty, malnutrition and environmental issues
Major Initiatives of the Government

Unit 5: DEMOGRAPHY AND DEVELOPMENT

Fertility decline
Theory of demographic transition
Demographic dividend
India's demographic dividend

Unit 6: ECONOMICS OF SOCIAL INFRASTRUCTURE

Infrastructure as a public good
Social and physical infrastructure
Role of infrastructure Understanding
India's Progress in Social Infrastructure

References:

1. Alkire, S. and Foster, J. (2009). Counting and Multidimensional Poverty Measurement. *OPHI Working Paper 32*. University of Oxford, UK.
2. Alkire, S. (2002): *Valuing Freedoms — Sen's Capability Approach and Poverty Reduction*, Indian Edition, Oxford University Press, New Delhi, 2002.
3. Banerjee, A. and E. Duflo (2011): *Poor Economics, Public Affairs*, 2011.
4. Bardhan., P. and C.Udry .(1999) Population Chapter (Section IV), *Development Microeconomics*, OUP
5. Birdsall, N. (1988): Economic Approaches to Population Growth in H. Chenery and T.N.Srinivasan (eds.) *Handbook of Development Economics*, Volume-I, Elsevier Science Pubs. B. V.
6. Canning, D., and Pedroni, P. (2004): The Effect of Infrastructure on Long Run Economic Growth, *Working Paper*, Harvard University. web.williams.edu/Economics/wp/pedroniinfrastructure.pdf
7. Cowell, F. (1995). *Measuring inequality* (2nd ed.). Prentice Hall.
8. Dinniwydy, C.L. and F. J. Teal. (1996): *Principles of Cost-Benefit Analysis for Developing Countries*, CUP.
- 9, Drèze, Jean, and Amartya Sen (2015). *An uncertain glory: India and its contradictions*. Princeton University Press, 2013.
10. Mehrotra, S. K., & Delamonica, E. (2007). *Eliminating human poverty: macroeconomic and social policies for equitable growth* (Vol. 1, No. 84277-84774), Zed Books.
11. Sitaprabhu, Kand Sandhya S Iyre(2018): *Human Development in an Unequal World*. OUP.
12. Human Development Reports, Technical Notes: UNDP-various issues
13. India Development Report, IGIDR
14. India Infrastructure Report, OUP
15. India Social Development Report, Council for Social Development, OUP-Variou Issues.

Paper6: MICROECONOMIC THEORY

Course Objectives: After completion of the course the learners will be able to: Learn the basic idea of Microeconomics in particular and Economics in general.

Course Contents:

Unit 1: INTRODUCTION TO BASICS OF CONSUMPTION

Budget Line
Ordinal vs Cardinal Utility
Indifference Curves
Revealed Preference Theory
Duality approach:
Indirect Utility Function and its properties
Expenditure Function
Consumer surplus
Equivalent and compensating variation
Revealed preference Theory

Unit 2: THEORIES OF PRODUCTION, COST AND PROFIT MAXIMISATION

Production Function:

Various types of Production Function

Leontief Production function

General Concept of Homogeneous production Function and its properties

Cobb-Douglas as representative of Homogenous production function

CES Production Function

Homothetic production function

Isoquants

Properties of Isoquants

Returns to Scale

Finding the optimal Employment of inputs by isoquant and iso-cost lines

Cost function:

Various Types of cost function

Relation between short run cost and long run cost curves

Derivation of LRAC curve from SRAC curve

Economies of scale and Diseconomies of Scale

The learning Curve

Application of duality Approach

Market Structure:

Perfect Competition

Assumptions,

The perfectly competitive firm as a price taker

Short-run equilibrium under perfect competition

Break-even point and Shut down point

Supply curve of the firm under perfect competition

Long run Equilibrium under industry in perfect competition

Monopoly: Basic Theory

Sources of monopoly power

Lerner's Degree of monopoly power

Profit Maximization in the short- run

Social Cost of monopoly

Price Discrimination under Monopoly: different degrees

Peak Load Pricing

Unit 3: ALTERNATIVE THEORIES OF THE FIRM

Baumol's sales Maximisation model

Williamson's model of managerial discretion

Marris model of managerial enterprise

Full cost pricing rule

Behavioural theory of the firm

Unit 4: GAME THEORY

Static Games of Complete Information –

Solution Concepts-Pure and mixed strategy, Nash applications

Dynamic Games of Complete Information and Solution Concepts

Sub-game perfect Nash
Backward induction
Applications

Unit 5: GENERAL EQUILIBRIUM AND WELFARE

Concept of General Equilibrium
Walras Law: Existence, Uniqueness and Stability of General Equilibrium
Two-sector General Equilibrium Models
Compensation Principle:
Kaldor -Hicks -Scitovsky tests
Kaldor- Hicks criterion in terms of utility possibility curve
Scitovsky double criterion
Samuelson's criterion
Little's criterion
A.K. Sen's Approach
Social Welfare Function
Bergson frontier
Arrow's social choice and individual values

Unit6: ECONOMICS OF RISK AND UNCERTAINTY

Von Neumann- Morgenstern Utility Function
Preferences over Lotteries
Expected utility theorem— Applications and its critique
Attitude towards Risk
Measures of absolute and relative risk aversion
Moral Hazard and Adverse selection

References:

1. Hal R. Varian. *Microeconomic Analysis*, W.W. Norton and Company, 3 rd Edition, 1992.
2. Hal R. Varian : *Intermediate Microeconomics: A Modern Approach* (Eighth International Student Edition). 2014.
3. H. Gravelle and R. Rees. *Microeconomics*, Pearson Education, 3 rd Edition, 2004.
4. F. Cowell. *Microeconomics*, Oxford University Press, 2006.
5. James M. Henderson and Richard E. Quandt. *Microeconomic Theory: A Mathematical Approach*. 3rd Edition, McGraw Hill Book Company 1980
6. C. Snyder and W. Nicholson, *Fundamentals of Microeconomics*, Cengage Learning (India), 2010.
7. W. Nicholson, *Microeconomic Theory*, The Dryden Press, Japan, 1985.
8. Gibbons Robert: *Game Theory for applied economists*, 1992, Princeton University Press
9. E. Silberberg, *The Structure of Economics: A Mathematical Analysis*, 1990, McGrawHill, Second Edition.
10. Baumol, W.J. *Economic Theory and Operations Analysis*, PHI, 1977.

11. J. Gans, King S, Stonecash R, Mankiw NG. *Principles of economics*, Cengage Learning; 2011
12. VonNeuman,J. and O. Morgenstern: *Theory of Games and Economic Behaviour*. Princeton University Press:1944.

Paper 7:INDIAN ECONOMY-II (REFORMS AND CONTEMPORARY ISSUES)

Course Objectives: Building on the more aggregative analysis of trends in the Indian Economy, this course examines sector-specific trends in key indicators and their implications in the post-Independence period

Course Contents:

Unit 1: INDIAN ECONOMY ON THE PATH OF REFORMS

Rationale of economic reforms in India
Political economy aspects of reforms
Typology of reforms

Unit 2: FINANCIAL SECTOR REFORMS IN INDIA

Reforms in Money Market
Reforms in Capital Market
Progress after Reforms

Unit 3: MONETARY POLICY

Objectives of Monetary Policy
The Evolution of Monetary Policy Operating Framework
Globalization of Monetary Policy
Changing Contours of Monetary Policy in India

Unit 4: INDIA'S EXTERNAL SECTOR

General overview
Contours of external sector reforms
Joining hands with WTO and its impact on India
Impact assessment of balance of trade and balance of payments position
Impact of capital inflows
Issues related to accumulation of foreign exchange reserves

Unit 5: INDIA'S SERVICES REVOLUTION

Increasing Importance of the Services (or Tertiary)Sector
Trend and Composition within the Tertiary Sector

Growth in the Service sector
Performance of India's services sub-sectors
Factors Responsible for the Spurt in Services Growth
Impact of Service Sector –driven growth on employment and poverty

Unit 6: INDIA'S GROWTH EXPERIENCE

Seven Decades of India's Growth Experience
Reforms as Catalyst to the Growth Process

References:

1. Kapila, U. (ed.) *Indian economy since Independence*. 2015-16, Academic Foundation, 27th Rev.Ed.
2. Joshi, V. *India's long road, the search for prosperity*. 2017, Oxford University Press.
3. Bhagwati, J and A.Panagariya: *India's tryst with destiny*. 2014, Harper-Collins Publishers,2014
4. Dreze, J. and A. Sen *An Uncertain Glory: India and its contradictions*. 2014, Penguin,UK.
5. Reddy, Y.V., N. Valluri and P. Ray *Financial and fiscal policies: Crises and newrealities*. 2014 Oxford University Press, New Delhi.
6. Nayak, P.B. (ed) *Economic Development of India*. Series: Critical Concepts inEconomics, USA: Taylor and Francis, Routledge.2014.
7. Mohan, R. (ed): *India Transformed: 25 years of economic reforms*. 2017, PenguinRandom House India pvt.ltd.
8. De,Supriyo, *India's fiscal policy: Prescriptions, pragmatics and practice*. 2017,Cambridge University Press.
9. Tendulkar, S. and T.A. Bhavani: *Understanding reforms*. New Delhi: Oxford UniversityPress (latest available edition).
10. Joshi, V. and I.M.D. Little: *India: Macroeconomics and political economy 1964-1991*.1994, Oxford University Press (latest available edition).
11. Malhotra, R. 2014, *Tackling Poverty, Hunger and Malnutrition*. India Public Policy ReportOxford University Press.
12. Balakrishnan, P. *Economic growth in India*. 2010, Oxford University Press (latestavailable edition).

Paper 8: MACROECONOMIC THEORY

Course objectives: After the completion of the course the learner will be able to be equipped with the knowledge of basic functioning of a market economy at the macro level including understanding of national income accounting in both close and open economy

Course Contents:

Unit 1: KEYNESIAN AND POST-KEYNESIAN MACRO ECONOMIC MODELS

Keynes vs. Classics

Neo-classical Synthesis of Keynes' General Theory: Hicks, Patinkin
Keynes in Walrasian framework

Transition to Disequilibrium Macroeconomics: Clower, Leijonhufvud, Barro-Grossman, Malinvaud, Benassy

Unit 2: RATIONAL EXPECTATIONS AND NEW CLASSICAL MACROECONOMICS

Imperfect Information Model:
Role of Expectations in Macroeconomics
Adaptive Expectation Hypothesis
Rational Expectation Hypothesis
Rational Expectation and Policy Ineffectiveness Proposition
Workers' Misperception Model
Phillips Curve Analysis

Short-run and long run Phillips curve; Samuelson and Solow— the natural rate of unemployment hypothesis; Lucas 'surprise' supply equation: Application to financial crisis of recent past

Unit 3: NEW KEYNESIAN MACROECONOMICS

Sticky Price (Menu Cost Model); Efficiency Wage Model (A very simple formulation of Romer, 2005); Insider-Outsider Model of Lindbeck and Snower (1986)

Unit 4: REAL BUSINESS CYCLE (RBC) THEORY

Main Features of RBCs
Simple Real Business Cycle Model
Technology shocks
How a technology shock will influence on aggregate output and employment
Policy Implications of Real Business Cycle Theory
Criticisms of Real Business Cycle Theory

Unit 5: BASICS OF INFINITE HORIZON MODEL & OVERLAPPING GENERATION MODEL (OLG)

Ramsey Model — Command vs. Control Economy
Governments' role in a decentralized economy
OLG basic model — two period & dynamic inefficiency

Unit 6: STRUCTURALIST MACRO MODELS

Seminal ideas of Lewis and Kaldor
Kaldor's agriculture- industry model & inter- sectoral Terms of Trade

Kaleckian Development Model

References:

1. Akerlof, G.A. and Yellen, J.L. (eds.) (1986) *Efficiency Wage Models of the Labour Market*, Cambridge; Cambridge University Press.
2. Barro, R.J. and Grossman, H.I. (1971), "A General Disequilibrium Model of Income and Employment", *American Economic Review*, 61, 82-93.
3. Clower, R. W. (1969): "The Keynesian Counter Revolution: A Theoretical Appraisal", In Clower (ed.), *Monetary Economics*, London Penguin Books.
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Paper 9: BASIC ECONOMETRICS

Course Objectives: After completion of the course the learner will be able to know the basics of econometrics

Course Contents:

Unit 1: DEFINITION, SCOPE AND GOALS OF ECONOMETRICS

What is Econometrics?

Relationship between Econometrics and Economic Theory

Econometrics and statistics

Branches of econometrics

Goals of econometrics

Methodology of Econometrics Research

Unit 2: THE CLASSICAL LINEAR REGRESSION MODEL (CLRM)--I

Introduction to Regression: the CLRM

The OLS method of Estimation

The assumptions of the CLRM

Properties of the OLS estimators -

- i. Linearity
- ii. Unbiasedness
- iii. Efficiency and BLUEness

iv. Consistency

The overall goodness of fit

Problems associated with R^2

Unit 3 THE CLASSICAL LINEAR REGRESSION MODEL (CLRM)--II

Multiple Regression

Unit 4: VIOLATING THE ASSUMPTIONS OF THE CLRM-I

Multicollinearity

Causes

Consequences

Types of Multicollinearity

Enhancement synergism

Change in sign

Tests and Remedies

Unit 5: VIOLATING THE ASSUMPTIONS OF THE CLRM -II

Heteroskedasticity

Causes

Consequences

Tests and Remedies

Unit 6: VIOLATING THE ASSUMPTIONS OF THE CLRM-III

Autocorrelation

Causes,

Consequences

Tests and Remedies

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Paper10: DEVELOPMENT ECONOMICS

Course Objectives: After completion of the course the learner will be able to know the current theoretical and empirical issues and problems concerning economic development.

Course Contents:

Unit 1: MACRO PERSPECTIVE OF DEVELOPMENT

The idea of Vicious Circle of Poverty
Industrialization and Balanced Growth
The Problem of Coordination failures

Unit 2: RURAL ECONOMY

Rural Employment
Rural Credit: Credit Labour Interlinkage
Agriculture and Rural Industrialization
Non-farm Sector Growth
Rural Credit and Microfinance
Why Doesn't Microfinance Work?
Factors to Future Success of Micro finance

Unit 3: OPEN ECONOMY DEVELOPMENT ISSUES

Terms of Trade and Dependence
Unequal Exchange
FDI
Transfer of Technology
Role of World Bank
Globalization and Development

Unit 4: INSTITUTION AND DEVELOPMENT

A Framework for the Study of Institution:
Vertical hierarchies and Horizontal/ circular networks
Examination of Vertical Hierarchies
Government and Corporation
Role of State in Growth and Development

Unit 5: CAPABILITY APPROACH TO DEVELOPMENT

The Capability Approach and its Potential
What are capabilities?
Equality of What?
Capabilities and Functionings

Freedom and agency
Education in the capability approach

Unit 6: POVERTY AND INEQUALITY

Trends in World Inequality
Poverty and Inequality
Multidimensional Poverty
Implications for India

References:

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Year 2

Paper 11: PUBLIC ECONOMICS

Course Objectives: The course deals with the nature of government intervention and its implications for allocation, distribution and stabilization. Inherently, this study involves a formal analysis of government taxation and expenditures. The subject encompasses a host of topics including public goods, market failures and externalities. The learners will be able to know the theory of public economics and its application in the Indian economy.

Course Contents:

Unit 1: PRINCIPLES OF PUBLIC FINANCE

Principles of maximum Social Advantage

Role of public finance in the developing economies

Public Economics - Of allocation, distribution and stabilization — Functions.

Market failure - Public goods and externalities

Coase Theorem

Public goods and free-rider problem

Unit 2: PRINCIPLES OF TAXATION

Meaning and type of taxes

Requirements of a good tax structure

Approaches to taxation

Micro analysis of direct and indirect taxes

Individual income tax

Corporation income tax

Sales tax including value-added tax and expenditure tax

Incidence of taxes
Nature of tax burden and principles of tax incidence
Theories and measures of tax incidence
Trade-off between equity and efficiency
Optimal taxation

Unit 3: PUBLIC EXPENDITURE

Wagner's law of increasing state activities
Wiseman- Peacock hypothesis
Pure theory of public expenditure
Structure and growth of Public expenditure

Unit 4: ECONOMICS OF PUBLIC DEBT

Sources of public debt
Classical view of public debt
Compensatory aspect of debt policy
Burden of public debt
Management of public debt

Unit 5: INDIAN PUBLIC FINANCES

Indian tax system
Revenue of the Union and States
Major taxes in India
Direct tax
Indirect tax
Goods and Services Tax (GST)
Taxation on agriculture
Expenditure tax
Reforms in direct taxes
Reforms in Indirect taxes
Taxes on services
Non-tax Revenue of the Centre and the States
Trends in public expenditure in India
Trends in Public debt in India
Finance Commission in India—A note

Unit 6: FISCAL FEDERALISM

Federalism—As a Form of Government
Fiscal Federalism

Vertical and Horizontal Imbalance
Fiscal Transfers
Competitive and Cooperative Federalism
Devolution of resources and grants
Resource transfer from Union to States
Criteria for transfer of resources
Centre – State Financial Relations in India

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Paper 12: FINANCIAL ECONOMICS

Course objectives: After completion of this course, learners will be able to know about fair value, risk and returns, and the financing of securities and assets. Numerous monetary factors are taken into account, too, including interest rates and inflation.

Course Contents:

Unit 1: TIME VALUE OF MONEY

Time value of money and opportunity cost of capital
Future Value of a cash flow: concepts of compounding
Present value of a cash flow: concepts of discounting
Valuing different types of cash flows
Valuing level cash flows: different types of annuities & perpetuities
Real versus nominal interest rate: Fisher's equation

Unit 2: ALTERNATIVE DECISION-MAKING RULES FOR INVESTMENT DECISION

Payback method
Accounting rate of return
Net present value method
Internal rate of return method
Terminal value method

Unit 3: PORTFOLIO THEORY

Mean Variance Criterion
Systemic & Un-systemic risk
Portfolio Diversification-
Risk and Return_ Markowitz analysis
Capital Asset Pricing Model
Arbitrage Pricing Theory

Unit 4: FINANCIAL MARKETS

Analysis of Financial Markets
Fundamental analysis,
Technical analysis,
Efficient Market Hypothesis
Functioning of different Financial Markets:
Money Market
Capital markets and its components:
Stock market
Bond market
Forwards Market,
Futures & Options Market,
Currency Futures & Currency Options Market
Concept of Derivatives and its Classification

Unit 5: FACTORING AND FORFAITING

Meaning and Concept
Contract of Factoring

Types of Factoring Services
Modus operandi of Factoring
Forfaiting

Unit 6: FINANCIAL RISK

The Growth of Modern Financial Markets
Market theory
How options work
Risk vs reward
Derivative and Leverage
Credit Risk in an interest-rate swap
Credit Risk in a currency swap
Operational risk
Insurance as a Risk management Technique

References:

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Paper 13: ENVIRONMENTAL AND RESOURCE ECONOMICS

Course Objectives: This course focuses on economic causes of environmental problems. Selected topics on international environmental problems are also discussed.

Course Content:

Unit 1: ECONOMY AND THE ENVIRONMENT

Economy- Environment Interaction,
The economics of the linkages between trade and the environment
Environmental Externalities

Unit 2: POLLUTION CONTROL

Market instruments for pollution control,
Non- market instruments for pollution control,
Relative effectiveness of Market and Non –Market instruments in developing countries

Unit 3: VALUATION OF ENVIRONMENTAL GOODS

Contingent valuation
Hedonic valuation
Travel cost methods
Is There a Role for Benefit-Cost analysis in Environmental Valuation?

Unit 4: ECONOMIC GROWTH AND SUSTAINABLE DEVELOPMENT

Economic Growth and Environmental Sustainability: The Prospects for Green Growth
The Growth Illusion: How Economic Growth Enriched the Few, Impoverished the Many and Endangered the planet
The Rise and Fall of Sustainable Development, 1992-2012.
Ensuring a Sustainable and Inclusive Globalization
National Income and Green Accounting

Unit 5: RENEWABLE RESOURCE AND EXHAUSTIBLE RESOURCES MANAGEMENT

Common Property Resources
Management of resources in a globalized world
Implications for ‘sustainability’ of current resource use and management

Unit 6: ECONOMICS OF CLIMATE CHANGE

The Stern Review
Major Conclusion of the Stern Review
The Brave New World of Carbon Trading
Carbon Trading: Theory and Consequent policies
Managing “the Climate Change Problem through Emission Control, Sequestration, geo-Engineering, Mitigation and Adaptation

To what extent Climate Change will impact on Development?

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Paper 14: INTERNATIONAL ECONOMICS

Course objectives: Learners of International Economics can make use of the skills and tools learned in a wide range of career paths, such as journalism, consultancy, government agencies and international institutions, while at the same time enjoying the ability to make sense of some of the most important and complex issues of our times.

Course Contents:

Unit 1: INTERNATIONAL TRADE AND DEVELOPMENT PARADIGMS

Mercantilist Theory of Trade and Development
Classical Political Economists on Trade and Growth
The Post-World War II Debate on Free Trade vs. Trade Protection
Export Pessimism and Legacy of Inward-Looking Development Strategy
Recent development crises

Unit 2: PROBLEMS OF TRADE IN PRIMARY COMMODITIES

Prebisch-Singer Hypothesis of Unequal Distribution of Gains
Critique of Secular Deterioration of TOT
Unequal Exchange: Frank, Kay and Emmanuel

Unit 3: UNEVEN DEVELOPMENT AND TRADE

Structuralist Theories: Foreign Exchange, Savings, and Growth
Lewis-Nurkse Growth Process and Economic Dependence
North-South Trade

Unit 4: TRADES, POVERTY AND INEQUALITY

International trade and Globalization
Convergence debate and inequality among nations

Unit 5: CAPITAL MOBILITY AND LABOUR MIGRATION

International capital mobility and economic growth

FDI, Growth and Welfare

Outsourcing

Role of MNCs

Labour mobility /Migration and its impact on economic development.

International trade in services

Unit 6: WTO AND THE MULTILATERAL TRADE AGREEMENTS

Evolution, Structure and Functions of WTO

WTO Rules and Principles of Trade policy

Dispute Settlement Mechanism

The WTO Agreements on Services

Trade Rounds and the WTO

WTO and India

References:

1. Debraj Ray. *Development Economics*, Princeton University Press, 1998
2. Prabirjit Sarkar: "Terms of Trade of the South vis-à-vis the North: A macroeconomic Framework", 1994
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Paper 15: GROWTH ECONOMICS

Course objectives: The study of economic growth provides learners with both a theoretical and empirical understanding of how all these factors ('ingredients') combine together to provide the right recipe for a country's long-run growth.

Course Contents:

Unit 1: EQUILIBRIUM GROWTH MODELS WITHOUT MONEY

Concept of economic growth, the rate of growth and the equilibrium rate of growth
Harrod- Domar model

Unit 2: THE NEOCLASSICAL GROWTH MODEL WITHOUT MONEY

Solow Model: Basic Assumptions
Dynamics and Equilibrium in Solow model (existence, uniqueness and stability of steady state): INADA Conditions
Implication of Solow Model: Golden rule of capital accumulation
Convergence

Unit 3: THE CAMBRIDGE MODEL OF ECONOMIC GROWTH

Kaldor's model and its implications
Pasinetti model

Unit 4: GROWTH AND TECHNICAL PROGRESS: DISEMBODIED TECHNICAL PROGRESS

Harrod –neutral
Solow- neutral
Hicks- neutral

Unit 5: CONVERGENCE OF GROWTH

Absolute vs Conditional Convergence
 β Convergence
 σ convergence
Implications

Unit 6: MODERN THEORY OF GROWTH

Dissatisfaction with neoclassical theory
One sector models of endogenous growth: the AK model-

Endogenous growth and human capital formation: the Lucas model-
Endogenous growth and R& D- Romer model

References:

1. Barro, R. and Sala- I- Martin, (2004), *Economic Growth*(2nd Ed), McGraw- Hill.
2. Dasgupta, D. (2010). *Modern growth theory*. Oxford University Press.
3. Jones, Charles. I (2002), *Introduction to Economic Growth*, W.W. Norton.
4. Robert J. Barro and Xavier Sala- i- Martin (1992), 'Convergence', *Journal of Political Economy*, Vol. 100, No. 2, pp. 223- 251.
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Paper 16: PROJECT WORK WITH COMPUTER APPLICATIONS

Course objectives: One main reason for the use of computers in economic analysis and forecasting is the widespread availability of in expense, convenient microcomputers. For a small investment of time and effort one can now, perform various financial analyses more easily and quickly. The end result is increased productivity.

Project Report 40

Viva 10

This course will be different from other courses as it visualises a fully computer lab-based teaching course. This course also provides a basic idea of how problem can be formulated, how to take up a research project and also the steps that need to follow in any primary data-based research study. The learners are expected to acquire enough competence in handling application of computer packages so that they can use that knowledge in the preparation of the research Project Work.

Course Contents:

Unit 1: Essential Steps in Primary Data Collection:

Problem selection,
Testing of hypothesis and Inference
Sample design
Designing of questionnaire
Pre-testing of questionnaire for collection of primary data,
Introduction to secondary data sources.

Unit 2: Estimation of descriptive statistics

Mean
Median
Mode
Measures of dispersion
Skewness and kurtosis
Simple correlation
Rank correlation
Graphical representation of data sets
Pie chart
Bar chart
Linear and nonlinear curve fitting
Introduction to probability theory
Random sampling using random number table
Chi-Square
ANOVA based Tests.
(The Software to be used will be STATA.)

Unit 3:Regression Model

Linear regression model
Test for linear restriction on parameters test of heteroscedasticity
Test for linear restriction on parameters test of autocorrelation
Test for linear restriction on parameters test of multicollinearity
Application of dummy variable models
Simple models with limited dependent variable –
Logit and Probit
Examples from economic behaviours.
(The Software to be used will be STATA.)

Unit 4a: Basics of Time series

Univariate Time Series Modelling - ARMA and ARIMA Process;
Test of Stationarity –
Unit Root Test,
Augmented Dickey-Fuller Test;
Non-Stationary Series:
Co-integration and Granger causality.
(The software to be used will be E-Views.)

Unit 4b: Basics of Panel Data Analysis

Introduction to Panel Data
The Random Effects
Estimator vs. The Fixed Effects Estimator — The Hausman Test;
(The Software to be used will be STATA.)

Unit 5:Multivariate Analysis

Multiple Regression
Factor Analysis

Discriminant Analysis
Cluster Analysis.
(The Software to be used will be SPSS.)

Unit 6: Preparation of the Project Report:

The learners are supposed to come up with a conclusive answer to a particular proposed research question. Finally, a report will have to be submitted by the student. Essential components are: they must apply computer packages

SPECIAL PAPER (EITHER A or B)

A. AGRICULTURALECONOMICS

Paper 17A: AGRICULTURE AND ECONOMIC DEVELOPMENT

Course objectives: Agricultural economics plays a role in the economics of development, for a continuous level of farm surplus is one of the wellsprings of technological and commercial growth. In general, one can say that when a large fraction of a country's population depends on agriculture for its livelihood, average incomes are low.

Course Contents:

Unit1: AGRICULTURE AND ECONOMICDEVELOPMENT IN HISTORICAL PERSPECTIVE

Interrelationships between Agriculture and Industry
The problem of Balance
Agriculture in Europe and Russia
Agriculture's role in Asian Economic Development–
The Japanese Experience
The Chinese Experience
The Case of India

Unit 2: CONTRIBUTION OF AGRICULTURE INECONOMIC DEVELOPMENT

Measurement Problems in the Agricultural Sector
The Product Contribution
The Factor Contribution
The Market Contribution
Their Measurements

Unit 3: THEORY OF AGRICULTURE IN ECONOMIC DEVELOPMENT

Disguised Unemployment in Agriculture
Economic Theory and Agrarian Economics
Balanced Growth between Agriculture and Industry

Unit 4: LANDS REFORMS AND ECONOMIC DEVELOPMENT

The Historical Aspect
The Economic Aspect
The Demographic Aspect
The Case of India

Unit 5: INTERNATIONAL COMMODITY AGREEMENTS

Objectives of International Commodity Agreements
Scope and Limitations of International Commodity Agreements
A Brief History of Some Major International Commodity Agreements
The Case of India

Unit6: PEASANT ECONOMY

Chayanov's Theory of Peasant Economy
Different types of Peasants and their Adoption of suitable technology
Intra-Household Relationship
Role of women in agriculture

References:

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Paper 18A: AGRICULTURAL PRODUCTION AND FARM MANAGEMENT

Course objectives: Farm management is one of the most important resources in operating farms. Farm management determines how the farm-life will be organized, resources allocated and activities performed. It deals with various strategies and methods to keep a farm productive, sustainable, resistant and profitable.

Course Contents:

Unit 1: DEMAND FOR AND SUPPLY OF AGRICULTURAL PRODUCTS

Price Response of Marketable Surplus
Elasticity of demand for Farm Products

Unit 2: PRICING OF AGRICULTURAL PRODUCTS

Function of Prices
Instability in Agricultural Price
Types of Agricultural Instability

Unit 3: AGRICULTURAL MARKETING AND ITS PROCESS

Agricultural Marketing
Meaning, Role, Definitions and Significance of Agricultural Marketing
Problems of Agricultural Marketing
Marketing of Agricultural Produce in India
How to improve agricultural Marketing?
Process of Agricultural Marketing: Three Processes
Marketing Functions
Marketing Efficiency
Efficient Marketing
Approaches to Marketing Efficiency Estimation
Technical and Pricing Efficiency
Most Common approaches to the Study of Marketing

Unit 4: FARM MANAGEMENT

Meaning
Scope
Definitions
Objectives
Farm Management Decisions
Organizational Management Decisions
Administrative Management Decisions
Marketing Management Decisions

Economic Principles Applied to Farm Management

Unit 5: FARM PLANNING AND MANAGING FARM RISK

Farm Planning

Why Farm Planning is Necessary?

Characteristics of Good Farm Plan

Limitations of Farm Planning

Firm Budgeting

Sources of Farm Risk

Production Risk

Price Risk or Marketing Risk

Financial Risk

Measures to Manage Farm Risk

Diversification

Insurance

Agronomic Practices

Market Risk Management

Financial Risk Management

Unit 6: FARM EFFICIENCY MEASURES

Physical Efficiency Measures

Financial Efficiency Measure

Cost Concepts and Income Measures

Management of Firm resources

References:

1. Barefield, Alan (1996): *Introduction to agricultural economics*. Prentice Hall, 1996.
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Paper 19A: CONTEMPORARY ISSUES IN INDIAN AGRICULTURE

Course objectives: With the completion of the course, learners learn how our current economy embraces less energy intensive tools of agricultural production but also adopts smart farming systems. By eliminating the use of fossil fuels and reducing energy use, sustainable farming helps in reducing greenhouse gas emissions, thereby playing a significant role in combating climate change.

Course contents:

Unit 1: EFFICIENCY, FARM SIZE AND PRODUCTIVITY IN INDIAN AGRICULTURE

Trends in Agricultural productivity of India
International Comparison
Findings of Farm Management Survey on Farm Size and Productivity
Probable Explanations

Unit 2: GROWTH AND EQUITY IN INDIAN AGRICULTURE

Growth Rate in Indian Agriculture
Gap between growth Rates in Agriculture and Non-Agriculture Sectors
Issues of equity in Indian Agriculture
Growth of Agricultural Labourers

Unit 3: ISSUES AND PRIORITIES IN INDIAN AGRICULTURE

Debate on Institutional Reforms
Debate on New Technology
Issues on Agricultural Marketing
Terms of Trade between Agriculture and Industry
Policy on Agriculture
Agricultural Price Policy
Agi- Marketing Policy
Procurement Policy

Unit 4: FOOD AND NUTRITION SECURITY IN INDIA

Concepts of Food and Nutrition Security
Prerequisites
Globalization and Food Security
Climate Change and Food Security
Impact of Climate Change on the Poor
WTO and Food Security
Food Security in India
Public Distribution System
Cases for Targeted Public Distribution System
National Food Security Act, 2013
Role of ICDS and Mid-Day Meal Scheme
Nutrition Security in India
Is nutrition security in India at stake?
What should be done to realize food and nutrition security for all the citizens of India?

Unit 5: CROP INSURANCE, CONTRACT FARMING AND FDI IN AGRICULTURE

Crop Insurance:

Meaning and Need for Crop Insurance
Implementation of Crop Insurance Schemes in India
Problems and Prospects of crop Insurance in India
Contract Farming
Meaning of Contract Farming
Cases for and Against Contract Farming
Role of Government Agencies in the Context of Contract Farming
FDI in Indian Agriculture: Issues and Prospect
Role of FDI in the Growth of Indian Agricultural Sector since
Liberalization
Foreign Direct Investment in Agriculture: Land Grab or Food Security
Improvement?
Entry of Corporates in Agricultural sector of India
FDI and Its Impact on Employment in Agriculture Sector of Indian Economy

Unit6: WTO AND INDIAN AGRICULTURE

Agreement on Agriculture (AoA) under WTO System
Developing countries and WTO
Globalization and Priority Issues for Indian Agriculture
Issues related to Market Access – Debate on Green Box and Blue Box
subsidies
Impact of WTO on Indian agriculture
Will Indian Agriculture prosper under WTO Rules and Regulations?

References:

1. Aswal, N. (2015): Foreign Direct Investment and Its Impact on Employment in Agriculture Sector of Indian Economy. *HCTL Open International Journal of Technology Innovations and Research (IJTIR)*, 14.
2. Bhukta, Anindya (2001): "Indian Agriculture under WTO Regime", In G.K. Chadha. (Ed.). (2001): *WTO and the Indian Economy*. Deep and Deep Publications.
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- Agriculture,” In Ambar Nath Ghosh and Asim K. Karmakar (eds.), *Agriculture, Sustainable Development and Microfinance*, Regal Publications, New Delhi
8. Glover, D., & Kusterer, K. (2016): *Small farmers, big business: contract farming and rural development*. Springer.
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 11. Hoda, A., & Gulati, A. (2008): *WTO negotiations on agriculture and developing countries* (Vol. 48). International Food Policy Research Institution.
 12. Hueth, D. L., & Furtan, W. H. (Eds.). (2012). *Economics of agricultural crop insurance: theory and evidence* (Vol. 4). Springer Science & Business Media.
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 16. Raju, K. N. (1997). Land Reforms in India: Achievements and Failures. *Kurukshetra-New Delhi*-, 45, 98-103.
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 20. Wohlmeyer, H., & Quendler, T. (Eds.) (2017): *The WTO, agriculture and sustainable development*. Routledge.
 21. Ghosh, A N and Karmakar , A .K. (eds) (2014): *Analytical Issues in Trade ,development and Finance*, Springer.
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Course objectives: Econometrics allows economists to convert economic theories into quantifiable metrics. Econometrics is also crucial for establishing trends between datasets. Based on these trends, economists can also forecast future financial or economic trends. It also helps them get a specific pattern or result from cluttered data.

Course contents:

Unit1: DIFFERENT FORMS OF PRODUCTION FUNCTIONS AND ECONOMETRIC TECHNIQUES FOR ESTIMATING AGRICULTURAL PRODUCTION FUNCTION

Different forms of Production Functions
Linear Production Function
Quadratic Production Function
Cobb-Douglas Production Function
CES Production Function
Estimating Agricultural Production Function

Unit 2: ESTIMATION OF SUPPLY RESPONSE AND MARKETED SURPLUS FUNCTION

Estimation of supply response function
Nerlovian Supply response Model
Estimation of marketed surplus function:
Rajkrishna Model
T.N.Krishnan Model
Behrman Model

Unit 3: FORECASTING DEMAND

Trend analysis for Demand Forecast
Elasticities of demand

Unit 4: ESTIMATION OF DEMAND AND SUPPLY THROUGH SIMULTANEOUS EQUATIONS MODEL

Exactly Identified demand function
Exactly Identified supply function

Unit 5: MEASUREMENT OF INSTABILITY IN AGRICULTURAL PRICES

Graphical Analysis
Quantitative Approach
Cobweb model
Corn-Hogg Cycle

Unit 6: MEASURING IMPACT OF CLIMATE CHANGE ON AGRICULTURE

Strategies to adapt to an uncertain climate change

The impact of climate change on agriculture in developing countries

Will Indian agriculture survive climate change?

References:

1. Balcombe, K. (2011). The nature and determinants of volatility in agricultural prices: an empirical study. *Safeguarding food security in volatile global markets*, 85-106.
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OR

B. STATISTICS & ECONOMETRICS

Paper 17B: ADVANCED STATISTICS

Course objectives: Statistical knowledge helps the learners to use the proper methods to collect the data, employ the correct analyses, and effectively present the results. Statistics is a crucial process behind how we make discoveries in science, make decisions based on data, and make predictions.

Course Contents:

Unit 1: THEORY OF PROBABILITY-I

Various concepts and the Elementary ideas of Set Theory
The definition of probability
Probability Theorems, assuming two events only
Applications to the Theorems

Unit 2: THEORY OF PROBABILITY-II

Random Variables and related elementary concepts
Discrete and Continuous and Related concepts.
Expectation and Variance of Random Variables
Moment Generation Functions and Various Moments of a
Random variable (both discrete and continuous)

Unit 3: PROBABILITY DISTRIBUTIONS

Discrete: Binomial and Poisson
Continuous: Uniform or Rectangular and normal

Unit 4: STATISTICAL INFERENCE OR SAMPLE STATISTICS

Various types of sampling
Concepts
Applications,
Merits
Demerits
The Concept of a Statistic
Statistic and Parameter
Sampling distribution of a statistic
Mean and proportion (Formulae only)

Unit 5: THEORY OF ESTIMATION

Point Estimation and interval Estimation:
Concepts,
Properties
Applications

Unit 6: HYPOTHESIS TESTING

The Concepts of Hypothesis Testing: Various Concepts
Type 1 error
Type II error
z test
t test
Chi- square test

F test

Test for goodness of fit

Tests for independence of attributes

References:

1. V. K. Rohatgi and A. K. M. E. Saleh, (2000): *An Introduction to Probability and Statistics*, 2nd Edition, Wiley
2. Jay L. Devore. (2010): *Probability and Statistics for Engineers*, Cengage Learning.
3. Kenny and Keeping (1947): *Mathematical Statistics, Part I & Part II*. Publisher, Van Nostrand, 1947.
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6. P.K. Giri and J. Banerjee (2014) *Statistical Tools and Techniques*. Academic Publishers, Kolkata

PAPER 18B: ADVANCED ECONOMETRICS-I

Course objectives: Econometrics is a very significant branch of Economics. For future researchers Econometrics provides a strong analytical background and prepare them for more advanced research activity, for future finance specialists a module in Econometrics provide specific and common skills useful in finance area.

Course Contents:

Unit 1: DUMMY VARIABLES

Use of dummy variable
Estimation and Interpretation
Dummy Variable Trap
Interaction Effect
Application of Dummy Variable

Unit 2: DYNAMIC ECONOMETRIC MODELS

Distributed lag model
Autoregressive models

Unit 3: SIMULTANEOUS EQUATION MODELS

Basic definitions
Consequences of ignoring simultaneity
Identification Problem
Estimation of simultaneous equation models
Example

Unit 4: LIMITED DEPENDENT VARIABLE REGRESSION MODELS-I

The linear probability model
The problems with linear probability model

Unit 5: LIMITED DEPENDENT VARIABLE REGRESSION MODELS-II

The logit model

Unit 6: LIMITED DEPENDENT VARIABLE REGRESSION MODELS-III

The Probit model

Paper 19B ADVANCED ECONOMETRICS-II

Course objectives: Econometrics is a very significant branch of Economics. For future researchers Econometrics provides a strong analytical background and prepare them for more advanced research activity, for future finance specialists a module in Econometrics provide specific and common skills useful in finance area.

Course Contents:

Unit 1: TIME SERIES ECONOMETRICS-I

Arima models and the box-Jenkins methodology
An introduction to time series econometrics
ARIMA Models
Examples of ARIMA model
Stationarity
Autoregressive time series models
The AR (1) model
The AR(ρ) model
Properties of the AR models
Moving average models
The MA (1) model
The MA(q) model
Properties of the MA models
ARMA models
Box-Jenkins model selection

Unit 2: TIME SERIES ECONOMETRICS-II

Modeling the variance: arch-garch models
The Arch-model

The Garchmodel
Vector autoregressive models and causality tests
Learning objectives
Vector Autoregressive (VAR) models
The VAR model
Pros and cons of VAR models
The Granger causality test

Unit 3: TIME SERIES ECONOMETRICS-III

Non-stationarity and unit-root tests
Unit roots and spurious regressions
What is a Unit root?
Spurious Regression
Explanation of spurious regression problem
Testing for Unit roots
Testing for the order of integration
The simple Dickey-Fuller (DF) tests for unit roots
The augmented Dickey-Fuller (ADF) tests for unit roots
The Phillips-Perron (PP) test
Cointegration and Error-correction Models
What is cointegration?
Cointegration and error-correction mechanism (ECM)
Testing for cointegration
Cointegration in single equations: Engle-Granger (EG) approach
Drawbacks of the EG approach

Unit 4: TIME SERIES ECONOMETRICS--IV

Identification in Standard and Co integrated Systems
Identification in Standard case
The order condition
The rank condition

Unit 5: PANEL DATA ECONOMETRICS-I

Traditional Panel Data Models
The advantages of Panel data
The linear panel data model
Different methods of estimation
Dynamic Heterogeneous Models
Bias in dynamic Panels
Solutions to the bias problem
Solutions to heterogeneity bias

Unit 6: PANEL DATA ECONOMETRICS-II

Non-Stationary Panels
Panel unit-root tests
Panel co-integration Tests

References (for Advanced Econometrics-1 &II):

1. Dimitrios, Asteriou & Stephen G. Hall (2011): *Applied Econometrics*, palgravemacmillan , New York.
2. Enders, W. *Applied econometric time series*. John Wiley & Sons.2014.
3. Gujarati, D.: *Basic Econometrics*, Mc Grawhill Higher Education, 2003
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6. Johnston, J.: *Econometric Methods*, 3rd Edition, McGraw- Hill/Irwin; 4th edition, 1996.
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11. Maddala, G.S.: *Introduction to Econometrics*, 3rd edition, John Wiley & Sons Ltd, 2005.
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Paper 20B: ECONOMETRIC APPLICATIONS

Course objectives: Econometrics allows economists to convert economic theories into quantifiable metrics. Econometrics is also crucial for establishing trends between datasets. Based on these trends, economists can also forecast future financial or economic trends. It also helps them get a specific pattern or result from cluttered data

Course Contents:

Unit 1: CROSS SECTIONAL REGRESSION ANALYSIS

Two variable linear models
The linear specification;
Basic assumptions

Least square estimators and their properties
Tests of goodness of fit
Inference in the least square model
General linear model:
OLS Estimators and their properties
Tests of goodness of fit;

Unit 2: SOME ECONOMETRIC PROBLEMS

Multicollinearity, heteroscedasticity, and auto- correlation (basic concepts, problems and remedial measures only)
Endogeneity problem and Instrumental Variable Techniques

Unit 3: MULTIVARIATE ANALYSIS

Multiple Regression
Factor Analysis
Discriminant Analysis
Cluster Analysis.

Unit 4: LIMITED DEPENDENT VARIABLE

Introduction to LOGIT and PROBIT Models.

Unit 5: TIME SERIES ANALYSIS

Univariate Time Series Modelling - AR, MA and ARIMA Process
Test of Stationarity
Unit Root Test,
Augmented Dickey Fuller Test
Non-Stationary Series:
Integrated Series
Co-integration and Error Correction
Granger causality

Unit 6: PANEL DATA ANALYSIS

Introduction to Panel Data
The Pooled OLS Estimator
The Random Effects Estimator
The Fixed Effects Estimator
GMM estimation of panel models

This course will follow Statistical Packages like STATA and Eviews mostly. While some portions require the applications of SPSS.

References:

1. Dimitrios, Asteriou & Stephen G. Hall (2011): *Applied Econometrics*, palgravemacmillan, New York.
2. Enders, W. (2014): *Applied econometric time series*. John Wiley & Sons.
3. Smith, A. D., & Taylor, J. E. (2016): *Essentials of applied econometrics*. University of California Press.