

**REVISED SYLLABUS OF ECONOMETRICS
UNDER CBCS FRAMEWORK WITH EFFECT FROM 2020-2021
PROGRAMME: THREE-YEAR B.A/B.Sc. (BASIC APPLIED
STATISTICS)**

Semester	Course	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
Semester I	Course -I	Microeconomics	6	5	25	75	100
Semester II	Course -II	Macroeconomics	6	5	25	75	100
SECOND YEAR							
Semester III	Course -III	Quantitative Techniques	6	5	25	75	100
Semester IV	Course -IV	Mathematical Economics	6	5	25	75	100
	Course -V	Econometrics-I	5	5	25	75	100
THIRD YEAR							
Semester V	Course -VI	Econometrics-II	5	5	25	75	100
	Course -VII	Advanced Optimization Methods	5	5	25	75	100

**SRI KRISHNADEVARAYA UNIVERSITY:
ANANTAPURAMU**

**Commissionerate of Collegiate Education, A.P.,
Vijayawada
B.A./ B.Sc Econometrics Restructured Course Structure**

**Commissionerate of Collegiate Education, A.P.,
Vijayawada**
COURSE-I
CBCS/ SEMESTER SYSTEM
PROPOSED SYLLABUS - ECONOMETRICS
SEMESTER-I
MICROECONOMICS
SYLLABUS (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to:

- Understand that Economics is about the allocation of scarce resources, that scarcity forces choice, trade-offs exist and that every choice has an opportunity cost.
- Producers equilibrium with the help of isoquants, expansion path and elasticity of substitution
- Different types of markets and features
- Demonstrate marginal productivity theory of distribution, theory of wages, identify different types of rent and illustrate different types of interest and profit

Course Syllabus:

UNIT 1: (12 Hours)

Nature and scope of economics; Methodology in economics; Choice as an economic problem; basic postulates; Role of price mechanism; Demand and supply; Basic framework — applications; Market equilibrium.

UNIT 2: (12 Hours)

Utility — Cardinal and ordinal approaches; Indifference curve; Consumer's equilibrium (Hicks and Slutsky); Giffin goods; Compensated demand; Elasticity of demand — Price, income and cross; Consumer's surplus; Engel curve.

UNIT 3: (12 Hours)

Production decisions; Production function; Iso-quant; Factor substitution; law of variable proportions; returns to scale; economies of scale; Different concepts of cost and their interrelation; Equilibrium of the firm; Expansion path; Empirical evidence on costs.

UNIT 4: (12 Hours)

Market forms — Perfect and imperfect markets; Equilibrium of a firm — Perfect competition, monopoly and price discrimination; Measure of monopoly power; Monopolistic competition; Duopoly, Oligopoly; Taxation and equilibrium of a firm; Notion of controlled and administered prices.

UNIT 5: (12 Hours)

Marginal productivity theory of distribution; Theories of wage determination; Wages and collective bargaining; Wage differentials; Rent — Scarcity rent; Differential rent; Quasi rent; Interest — Classical and Keynesian theories; Profits — Innovation, risk and uncertainty theories. Concept of a social welfare function; Compensation principle — Kaldor, Hicks.

Co-Curricular Activities(15 Hours)

Seminars / Assignments /Quiz /Group Discussions /Open Text Book Test /Oral test /Brain Storming

Text Books:

- Koutsoyiannis, A. (1990), Modern Microeconomics, Macmillan.
- Henderson J. and R.E. Quandt (1980), Microeconomic Theory: A Mathematical Approach, McGraw Hill, New Delhi.
- Stonier, A.W. and D.C. Hague (1972), A Textbook of Economic Theory, ELBS & Longman Group, London.

Reference Books:

- Bach, G.L. (1977), Economics, Prentice Hall of India, New Delhi.
- Gauld, J.P. and Edward P. L. (1996), Microeconomic Theory, Richard. Irwin, Homewood.
- Heathfield and Wibe (1987), An Introduction to Cost and Production Functions, Macmillan, London.
- Lipsey, R.G. and K.A. Chrystal (1999), Principles of Economics (9th Edition), Oxford University Press, Oxford.
- Mansfield, E. (1997), Microeconomics (9th Edition), W.W. Norton and Company, New York.
- Ray, N.C. (1975), An Introduction to Microeconomics, Macmillan Company of India Ltd., Delhi.
- Ryan, W.J.L. (1962), Price Theory, Macmillan and CO. Limited, London.
- Samuelson, P.A. and W.D. Nordhaus (1998), Economics, Tata McGraw Hill, New Delhi.
- Varian, H.R. (2000), Intermediate Microeconomics: A Modern Approach (5th Edition), East-West Press, New Delhi.

**Commissionerate of Collegiate Education, A.P.,
Vijayawada
COURSE-II
CBCS/ SEMESTER SYSTEM
PROPOSED SYLLABUS - ECONOMETRICS
SEMESTER-II
MACROECONOMICS
SYLLABUS (75 Hours)**

Course Outcomes:

- Define and explain the process of calculating national income, identify its components, demonstrate circular flow of income, analyses the various identities with government and international trade
- Explain the meaning of consumption function, relationship between APC and MPC, consumption and income, concept of multiplier and accelerator, MEC and rate of interest.
- Analyses different phases of trade cycles, demonstrate various phases of trade cycles, understand the impact of cyclical fluctuations on the growth of business, and lay policies to control trade cycles.
- Explain economic growth and development, determinants of economic development and measurement of economic development.

Course Syllabus:

Unit 1:(12 Hours)

Concept and measurement of national income; National income identities with government and international trade; incorporation of environmental concerns in national accounts — green accounting.

Unit 2:(14 Hours)

Say's law of markets and the classical theory of employment; Keynes' objection to the classical theory; Aggregate demand and aggregate supply functions; The principle of effective demand; Consumption function — Average and marginal propensity to consume; Factors influencing consumption spending; The investment multiplier and its effectiveness in LDCs; Theory of investment — Autonomous and induced investment; Marginal efficiency of capital; Savings and investment — ex post and ex ante, Equality and equilibrium.

Unit 3: (10 Hours)

Classical, Neo-classical and Keynesian theories of interest.

Unit 4:(12Hours)

Nature and characteristics; Hawtrey's monetary theory; Hayek's over-investment theory; Keynes' view on trade cycle; The concept of accelerator; Samuelson and Hicks multiplier-accelerator interaction model; Control of trade cycles.

Unit 5: (12 Hours)

Sources of growth; Growth models — Harrod and Domar; Instability of equilibrium; Neo-classical growth models — Solow; Economic growth and technical progress.

Co-Curricular Activities(15 Hours)

Seminars / Assignments /Quiz /Group Discussions /Open Text Book Test /Oral test /Brain Storming

Text Books:

- Ackley, G. (1976), Macroeconomics: Theory and Policy, Macmillan Publishing Company, New York.
- Shapiro, E. (1996), Macroeconomic Analysis, Galgotia Publications, New Delhi.

Reference Books:

- Day, A.C.L. (1960), Outline of Monetary Economics, Oxford University Press, Oxford.
- Gupta, S.B. (1994), Monetary Economics, S. Chand and Co., Delhi.
- Heijdra, B.J. and F.V. Ploeg (2001), Foundations of Modern Macroeconomics, Oxford University Press, Oxford.
- Lewis, M.K. and P.D. Mizan (2000), Monetary Economics, Oxford University Press, New Delhi.

**Commissionerate of Collegiate Education, A.P.,
Vijayawada
COURSE-III
CBCS/ SEMESTER SYSTEM
PROPOSED SYLLABUS - ECONOMETRICS
SEMESTER-III
QUANTITATIVE TECHNIQUES
SYLLABUS (75 Hours)**

Course Outcomes:

After successful completion of this course, the student will be able to:

- The use of mathematical symbols to formalize ordinary language statements about economics
- Apply mathematical and statistical techniques to problem solving.
- Plan and schedule work in an effective
- Demonstrate understanding of and ability to explain the economic applications of differentiation, and use it to formulate economic problems, including elasticities, marginal cost, marginal revenue.
- Find constrained optima using the Lagrange multiplier and substitution methods
- Understand and use these techniques to solve problems in economics, such as profit maximization, cost minimization or utility optimization
- Apply descriptive statistics to summarize data and explain basic concepts of probability theory
- Calculate and interpret statistical values by using statistical tools(Correlation and Regression

Course Syllabus:

Unit 1: (12 Hours)

Differentiation of a Function; Maxima and Minima, Elasticities; Inter-relationships among total, marginal and average cost and revenues; Constrained optimization problem; Integration of a function, producer's surplus.

Unit 2: (10 Hours)

Various types of matrices, Determinants, Solution of simultaneous equations; Inverse of a matrix, Cramer's rule,

Unit 3:(12 Hours)

Correlation; Simple, Coefficient of correlation — Karl Pearson and Rank Correlation, Partial and Multiple correlation Analysis, Regression analysis — Estimation of regression line in a bivariate distribution— Least squares method, interpretation of regression coefficients.

Unit 4: (14 Hours)

Time series analysis — Concept and components — Determination of regular, trend and seasonal indices; Index numbers — Concept, price relative, quantity relative, value relative; Laspeyres's, Paasche's and Fisher, Family budget method; Problems in the construction and limitations of index numbers, Tests for ideal index number.

Unit 5: (12 Hours)

Probability: Concept, Rules of probability (Addition and Multiplication); Random variables, Mathematical expectations, Theoretical distribution — Binomial, Poisson and Normal: their properties and uses.

Co-Curricular Activities(15 Hours)

Problem Solving/ Seminars / Assignments /Quiz /Group Discussions /Open Text Book Test /Oral test /Brain Storming

Text Books:

- Allen, R.G.D. (1974), Mathematical Analysis for Economists, Macmillan Press, London.
- Black, J. and J.F. Bradley (1973), Essential Mathematics for Economists, John Wiley and Sons.
- Gupta, S.C. and V.K. Kapoor (1993), Fundamentals of Applied Statistics, S. Chand and Sons, New Delhi.

Reference Books

- Chiang, A.C. (1986), Fundamental Methods of Mathematical Economics (3rd Edition), McGraw Hill, New Delhi.
- Croxton, F.E., D.J. Cowden and S. Klein (1973), Applied General Statistics, Prentice Hall, New Delhi.
- Gupta, S.C. and V.K. Kapoor (1993), Fundamentals of Applied Statistics, S. Chand and Sons, New Delhi.
- Speigal, M.R. (1992), Theory and Problems of Statistics, McGraw Hill Book, London.

**Commissionerate of Collegiate Education, A.P.,
Vijayawada
COURSE-IV
CBCS/ SEMESTER SYSTEM
PROPOSED SYLLABUS - ECONOMETRICS
SEMESTER-IV
MATHEMATICAL ECONOMICS
SYLLABUS (75 Hours)**

Course Outcomes:

After successful completion of this course, the student will be able to:

- Build models by expressing words in symbols, numbers and equations
- Know new techniques to solve complex problems
- Measure the effect of change and discover techniques to improve your decision-making process
- Learnt economic dynamics and solve problems through adjustment with time
- Learnt a new dimension of scientific, logical and critical thinking, that will assist your mind to solve personal, professional and social problems and guide you to take wise decisions

Course Syllabus:

Unit 1 : (12 Hours)

Variable, constants and parameters; Simple functional relationship and their graphs; Elementary ideas of differential and integral calculus; Quadratic equations; Difference and differential equations.

Unit 2 : (10 Hours)

Utility function; budget line; Constrained optimization; Consumer's equilibrium; Income effect; substitution effect and price effect; Slutsky equation; Derivation of demand curve; Elasticity of demand; Consumer's surplus.

Unit 3 :(12 Hours)

Properties of production function — Homogeneous and non-homogeneous; Cobb-Douglas, Returns to scale; Choice of optimal combination of factors of production; Cost and revenue functions; Derivation of cost curves; Relation between total, average and marginal cost and revenue; Producer's surplus; Production possibility curve.

Unit 4 :(12 Hours)

Concept of equilibrium; Equilibrium of the firm under perfect competition, monopoly, price discrimination, monopolistic competition; Economies of scale; Market equilibrium; Economic interpretation of time lag in function; Cobweb model.

Unit 5 :(14 Hours)

Input-output analysis; The simple closed and open model; Linkages, concepts and measurement; Dynamic input-output model; Linear programming — Basic concepts, primal and dual; Basic theorem of linear programming; Graphic and simplex method.

Co-Curricular Activities(15 Hours)

Problem Solving/ Seminars / Assignments /Quiz /Group Discussions /Open Text Book Test
/Oral test /Brain Storming

Text Books:

- Allen, R.G.D. (1974), Mathematical Analysis for Economists, Macmillan Press, London.
- Chiang, A.C. (1986), Fundamental Methods of Mathematical Economics (3rd Edition), McGraw Hill, New Delhi.
- Hands, D.W. (1991), Introductory Mathematical Economics, D.C. Heath
- Henderson, J. and R.E. Quandt (1980), Microeconomic Theory: A Mathematical Approach, McGraw Hill, New Delhi.

Reference Books:

- Colell, A. Mas et. al. (1991), Microeconomic Theory, Harvard University Press, Cambridge, Mass.
- Handy, S.T. (1997), Operations Research, Prentice-Hall of India, New Delhi.
- Mukherji, B. and V. Pandit (1982), Mathematical Method of Economic Analysis, Allied Publishers, New Delhi.

Commissionerate of Collegiate Education, A.P.,
Vijayawada
COURSE-V
CBCS/ SEMESTER SYSTEM
PROPOSED SYLLABUS - ECONOMETRICS
SEMESTER-IV
ECONOMETRICS-I
SYLLABUS (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to:

- Distinguish the results of violating the assumptions of classical regression model
- Explain the problems that arise when the assumptions are not valid
- explain the nature and the results of heteroscedasticity
- Use appropriate tests to detect heteroscedasticity
- Express consequences of using OLS in the presence of autocorrelation
- Apply remedial measures to correct autocorrelation

Course Syllabus:

Unit 1: (12 Hours)

Statistical Methods for Econometrics

Statistical vs. deterministic relationships; Correlation and regression; Theoretical frequency distribution and application of Binomial, Poisson and Normal; Testing of hypothesis; Type-I and Type-II errors; Standard errors, Tests based on Z, t and χ^2 (Chi-square) statistics.

Unit 2: (12 Hours)

Two Variable Regression Model

Concept of Regression – Causation – Correlation; Nature, meaning and scope of econometrics; Specification of an econometric model-Reasons for inclusion of Stochastic term – Assumptions; Two Variable Linear Regression Model - OLS Method of estimation - Principle of Least Squares – Properties of estimators (BLUE) - Gauss-Markov theorem; Significance tests of parameter estimates – ANOVA Concept and application - Goodness of fit.

Unit 3:(12 Hours)

Multiple Regression Analysis

Three Variable Linear Regression Model – Estimation and Tests of significance; Concept and derivation of coefficient of multiple determination and adjusted coefficient of multiple determination; ANOVA application; Test of overall significance of the regression – F test; Partial correlation coefficients and multiple correlation coefficient. General linear regression model –Matrix Approach.

Unit 4: (12 Hours)
Non-linear Regression

Estimation of non-linear equations — parabolic, exponential, geometric, hyperbolic, modified exponential; Gompertz and logistic functions; Meaning of Homoscedasticity and Heteroskedasticity - detection of Heteroskedasticity – consequences of Heteroskedasticity – Solution to the problem.

Unit 5:(12 Hours)
Violation of Assumptions of the Model

Meaning of Autocorrelation and Multicollinearity - detection of Autocorrelation – consequences of Heteroskedasticity – Solution to the problem.

Co-Curricular Activities(15 Hours)

Problem Solving/ Seminars / Assignments /Quiz /Group Discussions /Open Text Book Test /Oral test /Brain Storming

Text Books:

- Gujarati, D.N. (1995), Basic Econometrics (2nd Edition), McGraw Hill, New Delhi.
- Maddala, G.S. (Ed.) (1993), Econometrics Methods and Application (2 Vols.), Aldershot U.K.
- Johnston, J and DiNARDO, J, Econometric Methods (4th Edition), McGraw-Hill Education - Europe
- Koutsoyiannis, A. (1977), Theory of Econometrics (2nd ed.), The Macmillan Press Ltd., London.

Reference Books:

- Amemiya, T. (1985), Advanced Econometrics, Harvard University Press, Cambridge, Mass.
- Baltagi, B.H. (1998), Econometrics, Springer, New York.
- Dongherty, C. (1992), Introduction to Econometrics, Oxford University Press, New York.
- Goldberger, A.S. (1998), Introductory Econometrics, Harvard University Press, Cambridge, Mass.
- Hill R. C., E.G. William and G.G. Judge (1997), Undergraduate Econometrics, Wiley, New York.
- Kennedy. P. (1998), A Guide to Econometrics (4th Edition), MIT Press, New York.
- Kmenta, J. (1997), Elements of Econometrics (Reprint Edition), University of Michigan Press, New York.
- Krishna, K.L. (Ed.) (1997), Econometric Applications in India, Oxford University Press, New Delhi.
- Theil, H. (1981), Introduction to Econometrics, Prentice Hall of India, New Delhi.

Commissionerate of Collegiate Education, A.P.,
Vijayawada
COURSE-VI
CBCS/ SEMESTER SYSTEM
PROPOSED SYLLABUS - ECONOMETRICS
SEMESTER-V
ECONOMETRIC-II
SYLLABUS (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to:

- Explain model specification errors
- Recognize types and results of model specification errors
- Apply tests of specification errors
- Express the role of lags in economics
- Use distributed lag models
- Define basic concepts in time series econometrics
- Explain proxy variables

Course Syllabus:

Unit 1: (12 Hours)

Autoregressive and Distributed lag models

Distinction between Autoregressive and Distributed lag models— Role of lags in Economic analysis – Reasons for lags; Estimation of Distributed lag model – Koyck model, Adaptive Expectation and Partial adjustment models, Estimation of Auto regressive Model – Almon approach to distributed-lag models; Error correlation mechanism, Causality test.

Unit 2: (12 Hours)

Regression on Dummy Variables

Need for Dummy variables; Regression on one qualitative with two categories; Regression on one quantitative variable and one qualitative variable with two categories; Regression on one quantitative variable and one qualitative variable with more than two categories; Regression on one quantitative variable and two qualitative variables; Testing structural stability of regression models comparing two regressions; Regression with dummy dependent variables - The Linear Probability Model and Linear Discriminant Function, The Probit and Logit models.

Unit 3:(12 Hours)

Simultaneous Equations Models

Nature of Simultaneous Equations Models - Simultaneous Equation bias – Inconsistency of OLS estimators; The Identification problem – Under indemnification – exact identification and over identification; Rules for Identification – Order and Rank conditions; Estimation of Simultaneous Equation models – Recursive models and OLS; Methods of ILS and 2SLS.

Unit 4: (12 Hours)
Errors in Variables

The concept of Errors in variables – The classical solution for a single equation model with one explanatory variable; The single equation model with two explanatory variable – one measured with error and both measured with error; Reverse Regression – Instrumental Variable Method; Proxy Variables.

Unit 5:(12 Hours)
Introduction to Time Series: (12 Hours)

Concept of Time series – Stationary and Nonstationary Time Series: Models of Time Series – Purely Random Process; Random Walk; Moving Average (MA) Process; Autoregressive (AR) Process; Autoregressive Moving Average Process (ARMA); Autoregressive integrated moving Average (ARIMA) Process; Estimation of AR, MA and ARMA Models; The Box-Jenkins Approach.

Co-Curricular Activities(15 Hours)

Problem Solving/ Seminars / Assignments /Quiz /Group Discussions /Open Text Book Test /Oral test /Brain Storming

Text Books

- Greene, W. (1997), *Econometric Analysis*, Prentice Hall, New York.
- Griffith, W.F., R.H. Hill and G.G. Judge (1993), *Learning and Practicing Econometrics*, John Wiley, New York.
- Gujrati, D. (1995), *Basic Econometrics*, (3rd Edition), McGraw Hill, New Delhi.
- Johnston, J. (1985), *Econometric Methods*, McGraw Hill, New York.

Reference Books

- Johnston J. and J. D. Nardo (1997), *Econometric Methods*, McGraw Hill, New York.
- Kmenta, J. (1997), *Elements of Econometrics*, Michigan Press, New York.
- Koutsoyiannis. A. (1977), *Theory of Econometrics*, (2nd Edition), The Macmillan Press Ltd., Hampshire.
- Maddala, G.S. (1993), *Econometrics — An Introduction*, McGraw-Hill, New York.

Commissionerate of Collegiate Education, A.P.,
Vijayawada
COURSE-VII
CBCS/ SEMESTER SYSTEM
PROPOSED SYLLABUS - ECONOMETRICS
SEMESTER-V
ADVANCED OPTIMIZATION METHODS
SYLLABUS (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to:

- Find solutions to sequencing problems using optimal sequence algorithms
- Find solutions to network flow problems using standard algorithms
- Analyze a project with deterministic as well as probabilistic activity items
- Demonstrate solution methods including graphs and linear programming to analyze and solve the two-person zero sum game
- Have deep understanding of the theoretical background of queueing systems
- Apply and extend queueing models to analyze the real-world systems
- Generate random numbers and random variates using different techniques

Course Syllabus:

Unit 1:(12 Hours)

Sequencing Problems: Introduction, sequencing problem, terminology, notation and assumption, problems with n jobs and two machines, optimal sequence algorithm, problems with n jobs and three machines, problems with n jobs and m machines.

Unit 2:(12 Hours)

Network scheduling by PERT/CPM, basic concepts, activities, nodes, network, critical path, constraints and networks, construction of the network, time calculations and networks, critical path calculations, critical path method.

Unit 3:(12 Hours)

Introduction, two-person zero sum games, the maximin minimax principles, games without saddle points, mixed strategies, graphical solution of $2 \times N$ and $M \times 2$ Games. Dominance property, the modified dominance property, reducing game property to LPP.

Unit 4:(12 Hours)

Queueing theory – Basic characteristics of queueing models – Arrival and service distribution – steady state solution of M/M/1 and M/M/C models with associated distribution of queue length and waiting time

Unit 5:(12 Hours)

Simulation – Introduction, elements of simulation model, event type simulation, generation of random phenomena, Monte Carlo technique, generation of uniform (0, 1) random observations.

Co-Curricular Activities(15 Hours)

Problem Solving/ Seminars / Assignments /Quiz /Group Discussions /Open Text Book Test /Oral test /Brain Storming

Text Books:

- Kanti Swarup, P.K. Gupta and Man Mohan (2004): Operations Research, Sultan Chandand Sons, NewDelhi.
- Operations Research, S. Kalavathi, Vikas publishing house PvtLtd.
- Hamdy A. Taha (1987): Operations Research – An Introduction, 4/e, Prentice HallofIndia,Private Ltd, NewDelhi.

Reference Books:

- Hillier F S and Libermann G J (2002): Introduction to Operations Research, 7th Edition, McGraw Hill
- Gross D, Shortle J.F. , Thompson J.M. and Harris C.M. (2011): Fundamentals of Queuing Theory, John Wiley & Sons