**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., VijayawadaCOURSE-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. Under
* 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

and that Economics is about the allocation of scarce resources, that scarcity forces choice, **Course Syllabus:**

trade-offs exist and that every choice has an opportunity cost.

**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.

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**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 thevarious 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, NewDelhi.

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**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, Crammer’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; Laspeyer’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.

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**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; Marketequilibrium; 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.

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**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 ꭓ2 (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; Gomertz 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.

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**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 tworegressions;Regression with dummy dependent variables - The Linear Probability Model and Linear Discriminant Function, The Probit and Logitmodels.

**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.
* Grifith, 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.

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**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, notes, 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 sadle points, mixed strategies, graphical solution of 2 x N and M x 2 Games. Dominance property, the modified dominance property, reducing game property to LPP.

**Unit 4:(12 Hours)**

Queuing theory – Basic characteristics of queuing 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