

St. Xavier's College (Autonomous), Ahmedabad

FACULTY OF ARTS

DEPARTMENT OF ECONOMICS (SF)

BA. Hons. (Economics) SF

SEMESTER-6

Major Course – 1: Mathematical Economics

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-requisite(s) of the Course (if any)
	Lectures	Tutorial	Practical / Practice		
Mathematical Economics (ECHMC661C)	4	0	0	10 + 2 from a recognized board in any stream	Reading Graphs and Data in Economics

Learning Objectives:

- 1 Understand mathematical tools such as optimisation, linear programming, integration, and dynamic equations used in economic analysis
- 2 Explain how these mathematical techniques model economic behaviour, constraints, and dynamic adjustment processes

Course Outcomes:

- 1 Apply optimisation methods, linear programming techniques, integration, and difference–differential equations to solve economic problems
- 2 Analyse static and dynamic economic models by interpreting solutions, stability conditions, and economic implications

Unit–1: Optimization without Equality Constraints and Multiple Constraints:

Unconstrained optimization with one and several variables, first-order and second-order conditions, local versus global maxima and minima, concavity and convexity, optimization with inequality constraints, Kuhn–Tucker conditions, complementary slackness, corner solutions, multiple inequality constraints, constraint qualification,

economic interpretation of Kuhn–Tucker multipliers, comparison with Lagrange multiplier method, applications in consumer and producer theory

UNIT 2: Linear Programming

Linear programming, introduction to linear programming, terminology, formulation of linear programming problems, objective function, constraints, decision variables, feasible region, graphical method, corner-point method, unbounded solution, infeasible solution, redundant constraints, standard form, slack variables, basic and non-basic variables, simplex method, simplex tableau, pivot operations, optimality conditions

UNIT 3: Integration and Economic Applications

Introduction to integration, definite integral, indefinite integral, rules for finding indefinite integrals, finding definite integrals, total cost from marginal cost, total revenue from marginal revenue, consumer surplus, producer surplus, present value of continuous income stream

Unit–4: Difference and Differential Equations in Economic Dynamics:

Introduction to dynamic analysis, difference equations and their solutions, first-order difference equations, qualitative analysis of difference equations, cobweb model of supply and demand, stability and instability in the cobweb model, differential equations and their solutions, qualitative analysis of differential equations, dynamic stability of markets, equilibrium adjustment and market stability, economic interpretation of dynamic behaviour

Reference Books:

1. Geoff Renshaw – Maths for Economics, Oxford University Press.
2. Teresa Bradley – Essential Mathematics for Economics and Business, Wiley.
3. Sydsaeter, Knut & Hammond, Peter J. – Essential Mathematics for Economic Analysis, Pearson.
4. Simon, Carl P. & Blume, Lawrence – Mathematics for Economists, W. W. Norton & Company.
5. Chiang, Alpha C. & Wainwright, Kevin – Fundamental Methods of Mathematical Economics, McGraw-Hill.

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SEMESTER-6

Major Course – 2: Labour Economics

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-requisite(s) of the Course (if any)
	Lectures	Tutorial	Practical / Practice		
Labour Economics (ECHMC662C)	4	0	0	10 + 2 from a recognized board in any stream	Microeconomics

Learning Objectives:

1. Explain the fundamental concepts of labour economics and analyse the structure, characteristics and changing trends of the Indian labour market.
2. Analyse employment, unemployment, wages, labour mobility and migration, with particular reference to contemporary labour-market issues in India.
3. Examine major labour issues and policies in India relating to informal employment, women workers, child labour, vulnerable groups, employment generation and labour-market reforms.
4. Evaluate industrial relations, social security systems and emerging labour-market challenges, including the gig economy, automation, artificial intelligence, changing work arrangements and the future of employment.

Course Outcomes:

1. Explain the fundamental concepts, nature, scope and functioning of labour economics and analyse the major characteristics and structural changes in the Indian labour market.
2. Analyse major labour-market issues in India, including informalisation, vulnerable employment, gender disparities, child labour and the employment challenges faced by disadvantaged groups
3. Evaluate industrial relations, trade unions, collective bargaining, labour disputes and the major social-security policies and programmes in India.
4. Assess emerging labour-market issues such as the gig and platform economy, automation, artificial intelligence, remote work, globalisation, green jobs and changing skill requirements

Unit I: Introduction to Labour Economics and the Indian Labour Market

Meaning, Nature and Scope of Labour Economics: Labour as a factor of production, Labour market and its distinctive characteristics, Labour supply and labour demand, Elasticity of demand for Labour and its application, Determinants of labour-force participation, Human capital and labour productivity.

The Indian Labour Market: Characteristics and structure of India's labour market, Labour force, workforce and worker-population ratio, Organised and unorganised sectors, Formal and informal employment, Rural and urban labour markets, Trends in employment and labour-force participation in India

Indian focus: Changing structure of employment in India; formalisation versus informalisation; demographic changes and labour-market participation.

Unit II: Some Theories: Gravity models of migration, Becker's theory of discrimination, the efficient bargaining model, efficiency wage theory, and principal-agent theory, Hedonic Wage Function

Unit III: Labour Issues and Labour Policies in India

Informalisation and Vulnerable Employment: Nature and characteristics of informal employment, Informal workers and the unorganised sector, Casualisation and contractualization of labour, Precarious employment and working conditions, Problems of informal workers in India

Women and Labour Markets: Female labour-force participation, Gender wage gap, Occupational segregation, Unpaid care and domestic work, Women workers in the informal sector, Maternity protection and workplace safety

Child Labour and Vulnerable Groups: Causes and consequences of child labour, Constitutional and legislative provisions, Rehabilitation and elimination of child labour, Labour issues concerning persons with disabilities and other vulnerable workers

India Focus: Major Labour Policies and Programmes: Employment policy in India, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Skill development and employment programmes, Labour-market interventions for women and youth, Labour reforms and the changing regulatory framework, Child labour acts

Unit IV: Industrial Relations, Social Security and Emerging Labour Issues

Industrial Relations and Trade Unions: Meaning and importance of industrial relations, Trade unions: objectives, functions and problems, Collective bargaining, Industrial disputes and their causes, Strikes, lockouts and dispute settlement, Changing nature of trade unionism in India

Social Security in India: Concept and importance of social security, Social insurance and social assistance, Provident fund, pension and health insurance, Social security for unorganised workers, Major social-security schemes in India, The Social Security Code and its implications

Contemporary Labour-Market Issues: Gig and platform economy, Automation, artificial intelligence and the future of work, Remote and hybrid work, Platform workers and social protection, Labour-market implications of globalisation, Green jobs and just transition, Skills, employability and lifelong learning

Emerging Labour Policy Challenges: Balancing labour-market flexibility and worker protection, Formalisation of employment, Decent work and social protection, Inclusive employment growth, Future directions of labour policy in India

Indian focus: Gig workers, platform economy, labour codes, social security, automation, changing nature of work and the future of employment

(Major Sources of Labour Market Data)

- Population Census
- Periodic Labour Force Survey (PLFS)
- Employment-Unemployment Surveys
- Administrative and other sources of labour statistics
- Basic issues in measuring employment and unemployment)

Suggested Readings

- Venkata Ratnam, C. S. — *Industrial Relations*
- Papola, T. S. and Sharma, Alakh N. — works on labour and employment in India
- Datt, Gaurav and Mahajan, Ashwani — *Indian Economy*
- Government of India — *Economic Survey*
- Ministry of Statistics and Programme Implementation — **PLFS reports**
- Ministry of Labour & Employment — labour legislation, employment and social-security reports
- ILO — reports on employment, decent work and labour markets
- Labour Economics by Chakraborty
- Labour Economics by M. V. Joshi

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Major Course – 3: Econometric Analysis-2

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-requisite(s) of the Course (if any)
	Lectures	Tutorial	Practical / Practice		
Econometric Analysis-2 (ECHMC663C)	4	0	0	10 + 2 from a recognized board in any stream	Basic Stats & Maths

Learning Objectives:

- **LO-1:** Develop an understanding of advanced multiple regression models involving alternative functional forms, qualitative variables, interaction effects, prediction, and model-selection techniques.
- **LO-2:** Understand heteroskedasticity, model misspecification, measurement errors, missing data, nonrandom sampling, outliers, and appropriate remedial estimation methods.

Course Outcomes

- **CO-1:** Apply multiple regression techniques to quantitative and qualitative data, interpret model coefficients, assess goodness of fit, and generate predictions for economic and policy analysis.
- **CO-2:** Diagnose heteroskedasticity and specification or data problems and apply robust inference, weighted least squares, feasible GLS, proxy variables, and least absolute deviations methods.

Unit-1: Multiple Regression Analysis: Issues

Multiple Regression Analysis, Effects of Data Scaling on OLS Statistics, Beta Coefficients, Functional Forms, Logarithmic Functional Forms, Quadratic Models, Interaction Terms, Average Partial Effects, Goodness of Fit, Selection of Regressors, Adjusted R-Squared, Nonnested Models, Controlling for Multiple Factors, Reducing Error Variance, Prediction, Residual Analysis, Confidence Intervals for Predictions, Prediction with Logarithmic Dependent Variables

Unit-2: Regression with Qualitative Variables

Qualitative Information, Dummy Independent Variables, Dummy Explanatory Variables with Logarithmic Dependent Variables, Dummy Variables for Multiple Categories, Ordinal Information, Interactions Involving Dummy Variables, Interactions Among Dummy Variables, Different Slopes, Differences in Regression Functions Across Groups, Binary Dependent Variables, Linear Probability Model, Policy Analysis, Program Evaluation, Unrestricted Regression Adjustment, Discrete Dependent Variables

Unit-3: Heteroskedasticity

Heteroskedasticity, Consequences of Heteroskedasticity for OLS, Heteroskedasticity-Robust Inference, Heteroskedasticity-Robust LM Tests, Testing for Heteroskedasticity, White Test, Weighted Least Squares Estimation, Known Heteroskedasticity, Feasible GLS, Misspecified Heteroskedasticity Functions, Prediction with Heteroskedasticity, Prediction Intervals with Heteroskedasticity

Unit-4: Specification & Data Problems

Functional Form Misspecification, RESET Test, Nonnested Alternatives, Proxy Variables, Unobserved Explanatory Variables, Lagged Dependent Variables, Multiple Regression, Potential Outcomes, Random Slope Models, Measurement Error, Missing Data, Nonrandom Samples, Outliers, Influential Observations, Least Absolute Deviations Estimation

Practical sessions for the above topics will be conducted on STATA or R software.

Reference Books:

Wooldridge, J. M. – Introductory Econometrics: A Modern Approach

Gujarati, D. N. & Porter, D. C. – Basic Econometrics

Stock, J. H. & Watson, M. W. – Econometrics

Hill, R. C., Griffiths, W. E., & Lim, G. C. – Principles of Econometrics

Studenmund, A. H. – Using Econometrics: A Practical Guide