

St. Xavier's College (Autonomous), Ahmedabad

FACULTY OF ARTS

DEPARTMENT OF ECONOMICS (SF)

BA. Hons. (Economics) SF

SEMESTER-7

Major Course – 1: Advanced Microeconomics

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		
Advanced Microeconomics (ECHMC771C)	4	0	0	10 + 2 from a recognized board in any stream	Intermediate Micro

Learning Objectives:

1. Develop an understanding of factor markets, particularly the demand and supply of inputs and the functioning of labour markets.
2. Explain consumer behaviour using utility maximisation, budget constraints, and the derivation of consumer demand functions.
3. Analyze consumer choice in greater depth, including income and substitution effects and decision-making under uncertainty and risk.
4. Introduce general equilibrium and welfare concepts, including Walrasian equilibrium, social choice theory, and Arrow's Impossibility Theorem.

Course Outcomes:

1. Analyze the determination of input prices and wage formation in labour markets.
2. Apply consumer theory to derive and interpret demand functions under budget constraints.
3. Evaluate the effects of price changes and risk on consumer decision-making.
4. Explain general equilibrium outcomes and assess the challenges of collective decision-making using social choice theory.

Unit 1: Factor markets and Labour Market

Demand for Inputs- Derived demand for factors of production, Marginal Revenue Product (MRP) and Value of Marginal Product (VMP), Profit maximization and optimal input choice, Input demand under perfect competition and imperfect competition, Substitution and output effects of wage changes

Supply of Inputs- Labour supply decision, Work–leisure trade-off, Backwards-bending labour supply curve, Intertemporal labour supply

The Labour Market- Competitive labour market equilibrium, Wage determination, monopsony in labour markets, Minimum wage and labour market policies, Wage differentials and human capital

Suggested Readings

- Ahuja: Factor Pricing and Labour Market chapters
- Lipsey & Chrystal: Factor Markets
- Pindyck & Rubinfeld: Chapters on Input Markets and Labour Markets

Unit 2: Consumer Theory – Utility Maximization and Duality

Utility Maximization under Constraints - Preferences and utility representation, Budget constraint and feasible consumption set, Consumer equilibrium ($MRS = \text{Price ratio}$), Marshallian (uncompensated) demand functions, Indirect utility function

Duality and Expenditure Minimization- Expenditure minimization problem, Hicksian (compensated) demand functions, Expenditure function, Relationship between Marshallian and Hicksian demand, Shephard's Lemma

Revealed Preference Theory- Weak Axiom of Revealed Preference (WARP), Strong Axiom of Revealed Preference (SARP), Revealed preference approach to demand analysis

Consumer Demand Functions- Properties of demand functions, Homogeneity and Walras' Law, Slutsky equation

Suggested Readings

- Pindyck & Rubinfeld: Consumer Behaviour chapters
- Ahuja: Utility analysis and revealed preference
- Lipsey & Chrystal: Consumer choice theory

Unit 3: Advanced Consumer Choice

Income and Substitution Effects- Slutsky decomposition, Hicksian decomposition, Normal vs inferior goods, Giffen goods, Price effect analysis

Consumer Choice under Uncertainty- Expected utility theory, Utility functions and risk attitudes, Risk aversion, risk neutrality, and risk-loving behaviour, Insurance and risk pooling, Risk premium

Choice under Risk- Expected value vs expected utility, Diversification, Utility functions and decision making under uncertainty

Suggested Readings

- Pindyck & Rubinfeld: Choice under uncertainty
- Ahuja: Uncertainty and risk
- Lipsey & Chrystal: Risk and uncertainty

Unit 4: General Equilibrium and Social Choice

General Competitive Equilibrium-Partial vs general equilibrium, Walrasian general equilibrium model, Excess demand functions, Walras' Law, Existence of equilibrium

Efficiency and Welfare-Pareto efficiency, Edgeworth box and exchange economy, Production efficiency, First and Second Welfare Theorems

Social Choice Theory-Collective decision-making, Voting rules and social welfare functions, Majority voting

Arrow's Impossibility Theorem- Arrow's conditions for social welfare function, Statement and intuition of the theorem, Implications for democratic decision-making

Suggested Readings

- Pindyck & Rubinfeld: General equilibrium and welfare
- Lipsey & Chrystal: Welfare economics and general equilibrium
- Ahuja: General equilibrium and welfare economics

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Major Course – 2: Behavioural and Experimental 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		
Behavioural and Experimental Economics (ECHMC772C)	4	0	0	10 + 2 from a recognized board in any stream	Basic Stats & Maths

Learning Objectives (LO)

1. Demonstrate an understanding of rational choice, bounded rationality, heuristics, biases, prospect theory, loss aversion, and other behavioural models of economic decision-making.
2. Apply behavioural economics concepts such as present bias, social preferences, nudges, and choice architecture to real-world economic and public-policy problems.
3. Design, conduct, and interpret basic economic experiments using appropriate research questions, hypotheses, treatment and control groups, randomisation, incentives, and elementary statistical analysis.
4. Critically interpret experimental evidence relating to games, markets, and policy interventions, and assess issues of external validity, ethics, reproducibility, and contemporary applications of experimental economics.

Course Outcomes

1. Explain the fundamental concepts, theories, and principles of behavioural economics and apply them to individual decision-making under risk, uncertainty, and intertemporal choice.
2. Analyse social preferences, behavioural biases, and choice architecture, and evaluate their applications in consumer behaviour, finance, and behavioural public policy.
3. Explain the foundations, principles, and methods of experimental economics and apply appropriate experimental designs, data-analysis techniques, and methods of evaluating experimental evidence.

4. Evaluate experimental evidence on strategic behaviour, markets, and public policy, and assess contemporary developments in behavioural and experimental economics, including digital experiments, RCTs, behavioural finance, environmental economics, ethics, and reproducibility.

Unit I: Foundations of Behavioural Economics

Introduction to Behavioural Economics: Meaning, nature and scope of behavioural economics, Evolution of behavioural economics, Standard economic model of rational choice, Bounded rationality and limits to optimisation, Role of psychology in economic decision-making

Individual Decision-Making: Preferences, beliefs and choices, Heuristics and biases, Availability, representativeness and anchoring, Framing effects, Overconfidence and hindsight bias, Status quo bias and default effects

Behavioural Models of Choice under Risk and Uncertainty: Expected utility theory: basic framework, Risk and uncertainty, Prospect Theory, Loss aversion, Reference dependence, Endowment effect

Applications: Consumer choice, savings decisions, insurance, financial decisions and public policy.

Unit II: Behavioural Economics: Social Preferences and Applications

Intertemporal Choice: Time preferences and discounting, Present bias, Exponential and hyperbolic discounting, Self-control problems, Commitment devices

Social Preferences: Self-interest versus other-regarding preferences, Altruism and reciprocity, fairness and inequality aversion, Trust and trustworthiness, Social norms and identity

Behavioural Economics and Public Policy: Behavioural insights and policy design, Nudges and choice architecture, Defaults and disclosure, Incentives and behavioural responses, Behavioural public policy, Ethics and limitations of nudging

(Applications of Behavioural Economics: Saving and retirement decisions, Health and education, Tax compliance, Environmental behaviour, Poverty and development, Consumer and financial behaviour)

Key concepts: Bounded rationality, heuristics, biases, prospect theory, loss aversion, present bias, social preferences and nudges.

Unit III: Foundations and Methods of Experimental Economics

Introduction to Experimental Economics: Meaning, nature and scope, Historical development of experimental economics, Role of experiments in economics, Laboratory, field and online experiments, Experimental economics versus behavioural economics

Designing an Economic Experiment: Research question and hypothesis, Treatment and control groups, Experimental variables, Randomisation, Incentive compatibility, Participant recruitment and sampling, Experimental instructions

Types of Economic Experiments: Individual decision-making experiments, Market experiments, Game-theoretic experiments, Field experiments, Laboratory experiments, Artefactual and framed field experiments

Experimental Data and Basic Analysis: Experimental observations and data, Mean, median and dispersion, Treatment effects, Comparing treatment and control groups, Basic statistical tests, Interpretation of experimental results, Replication and robustness

Practical component: Students may participate in simple classroom experiments involving individual choice, risk, time preferences or strategic interaction.

Unit IV: Experimental Economics: Games, Markets and Policy Applications

Experimental Analysis of Strategic Behaviour: Prisoner's Dilemma experiments, Public Goods Game, Ultimatum Game, Dictator Game, Trust Game, Coordination and bargaining experiments, Cooperation, punishment and reciprocity

Experimental Analysis of Markets: Experimental markets and price formation, Supply and demand experiments, Double-auction experiments, Competition and market power, Auctions and bidding behaviour, Information and market outcomes

Field Experiments and Policy Evaluation: Randomised Controlled Trials (RCTs), Natural and field experiments, Experimental evaluation of development programmes, Education, health and labour-market experiments, Behavioural interventions and policy experiments, External validity and scalability

Contemporary Developments: Online and digital experiments, Experiments using big data and digital platforms, Behavioural and experimental finance, Experimental environmental economics, Experiments on inequality and discrimination, Ethics in human-subject research, Reproducibility and transparency in experimental economics

Practical component: Students design a simple experiment, collect/interpret data and prepare a short experimental report.

Suggested Readings

1. Cartwright, Edward (2018). *Behavioral Economics*. 3rd ed., Routledge.
2. Dhami, Sanjit (2016). *The Foundations of Behavioral Economic Analysis*. Oxford University Press.
3. Kahneman, Daniel (2011). *Thinking, Fast and Slow*. Farrar, Straus and Giroux.
4. Thaler, Richard H. (2015). *Misbehaving: The Making of Behavioral Economics*. W. W. Norton.
5. Thaler, Richard H. and Cass R. Sunstein (2021). *Nudge: The Final Edition*. Yale University Press.
6. **Friedman, Daniel and Shyam Sunder (1994). *Experimental Methods: A Primer for Economists*. Cambridge University Press.**
7. Gupta, G. (2015) *An Introduction to Experimental Economics*. Orient Blackswan.

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Major Course – 3: AI Tools for Research

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)
	Lectur es	Tutori al	Practical / Practice		
AI Tools for Research (ECHMC773C)	4	0	0	10 + 2 from a recognized board in any stream	NA

Learning Objectives

1. Explain the fundamental concepts, evolution, major subfields, and applications of Artificial Intelligence, including the role of Large Language Models (LLMs) and AI-powered research tools.
2. Differentiate the major machine-learning paradigms—supervised, unsupervised, and reinforcement learning—and identify suitable algorithms for classification and regression problems.
3. Demonstrate basic programming in R and effectively use AI assistants to generate, execute, and troubleshoot R code.
4. Apply AI-assisted techniques for data preprocessing and implement supervised machine-learning models in R using domain-specific datasets.
5. Interpret machine-learning model outputs and communicate evidence-based conclusions for solving discipline-specific problems.

Course Outcomes

1. Explain the fundamentals of Artificial Intelligence, its evolution, major subfields, and the role of AI tools and Large Language Models in academic research.
2. Describe the core concepts of machine learning and distinguish among different learning paradigms and commonly used supervised-learning algorithms based on their applications.
3. Develop and execute basic R programs using AI-assisted coding tools for data analysis and problem-solving.
4. Apply AI-assisted data-preprocessing and supervised machine-learning techniques in R to analyse domain-specific datasets and interpret the results for evidence-based decision-making.

Unit 1: Introduction to AI, Evolution, and Subfields: What is AI? Human intelligence vs. machine intelligence; core goals of Artificial Intelligence. • Subfields of AI in Research: Computer Vision (medical imaging, satellite data); NLP (literature mining, summarisation, citation analysis); Robotics (lab automation, sample handling). • AI Research Tools: NotebookLM (AI-powered research notebook & source synthesis), Scite (smart citation analysis & credibility assessment), Consensus (evidence-based paper search), Elicit (automated literature review), Research Rabbit (citation network mapping). • Modern AI Landscapes: Mono-modal AI vs. Multi-modal AI systems in research contexts. • Introduction to Large Language Models (LLMs): How they process language; showcase of state-of-the-art AI tools for academic work.

Unit 2: Intuitive Machine Learning: • The shift from rule-writing to learning from data. Supervised, Unsupervised, and Reinforcement Learning approached intuitively — with classification vs. regression, and visual algorithms such as Linear Regression, Logistic Regression, Decision Trees, and K-Nearest Neighbours — all without mathematics, emphasizing conceptual understanding.

Unit 3: Introduction to R Programming and AI-Assisted Coding: • Getting started in with R; foundations of R syntax; using LLMs to generate and translate R code; running AI-generated scripts; and basic troubleshooting with AI assistance.

Unit 4: Machine Learning & Economics: • The essence of Machine Learning (ML), ML vs traditional econometric approach, Key objective of ML, Supervised ML, Unsupervised ML, Causality.

(Note: The ML application is covered only for Cross-Sectional data)

III. Course Delivery:

Units 1 – 3: Online Recorded Course (on Moodle)

- Each unit contains 15 hours of content uploaded on Moodle.
- Every recorded hour is structured as: 20 minutes of video recording + 20 minutes of reading notes + 1 quiz of 20 questions covering the session and reading material.
- Students progress through units at their own pace within the scheduled semester window with scheduled quizzes.

Unit 4: Offline: — Department-Assigned Faculty

- Conducted by a faculty member assigned by the respective department.
- Faculty present real, field-specific problems drawn from their discipline.
- One offline session per week over the duration

IV. Reference Books:

- The Master Algorithm — Pedro Domingos (Basic Books)
- Artificial Intelligence: A Guide for Thinking Humans — Melanie Mitchell (Farrar, Straus and Giroux)
- Data Smart: Using Data Science to Transform Information into Insight — John W. Foreman (Wiley)
- R for Data Science (R4DS) — Hadley Wickham & Garrett Grolemund (O'Reilly Media)
- Intuitive Biostatistics: A Nonmathematical Guide to Statistical Thinking — Harvey Motulsky (Oxford University Press)
- An Introduction to Statistical Learning (ISL) — Gareth James et al. (Springer)