

## COURSE CURRICULUM OF BS PROGRAMME IN ECONOMICS

### Semester I

Course No.	Course Title	Credit
Mandatory courses		
HSS101	English for Communication	2
MTH101	Calculus of One Variable	3
PT101	Physical Training	0
ECO101	Principles of Economics - I	3
Optional Courses (any four)		
BIO101	Biology I: Biomolecules	3
CHE101	Engineering Design and Drawing	3
CHM101	General Chemistry	3
PHY101	Mechanics	3
EES101	Earth Materials and Processes	3
Total Credits		20

### Semester II

Course No.	Course Title	Credit
Mandatory courses		
ECS102	Introduction to Programming	3
MTH102	Linear Algebra	3
ECO102	Principles of Economics - II	3
Optional Courses (Any three)		
BIO102	Biology II: Fundamentals of Cell Biology	3
CHM112	Basic Organic Chemistry	3
EES102	Introduction to Environmental Sciences	3
PHY102	Modern Physics	3
Total Credits		18

### Semester III

Course No.	Course Title	Credit
MTH201	Multivariable Calculus	3
ECO201	Econometrics I	4 (3+1)
	Minimum 12 credits from 2 <sup>nd</sup> year courses of other disciplines	12
Total Credits		19

### Semester IV

Course No.	Course Title	Credit
ECO202	Microeconomics I	4
ECO204	Macroeconomics I	4
	Minimum 12 credits from 2 <sup>nd</sup> year courses of other disciplines	12
Total Credits		20

**Semester V**

Course No.	Course Title	Credit
ECO301	Macroeconomics II	3
ECO303	Microeconomics II	4
ECO305	Econometrics II	4
ECO307	Game Theory	4
*****	Open Elective I	3/4
Total Credits		18/19

**Semester VI**

Course No.	Course Title	Credit
ECO302	India in the World Economy	4
ECO304	International Economics	4
ECO306	Development Economics	4
ECO***	Departmental Elective I	4
*****	Open Elective II	3/4
Total Credits		19/20

**Semester VII**

Course No.	Course Title	Credit
ECO***	Departmental Elective II	4
ECO***	Departmental Elective III	4
ECO***	Departmental Elective IV	4
*****	Open Elective III	3/4
*****	Open Elective IV	3/4
Total Credits		18/19/20

**Semester VIII**

Course No.	Course Title	Credit
ECO***	Departmental Elective V	4
ECO***	Departmental Elective VI	4
ECO***	Departmental Elective VII	4
*****	Open Elective V	3/4
*****	Open Elective VI	3/4
Total Credits		18/19/20

<b>Course Title</b>	<b>Principles of Economics I</b>	
<b>Course No</b>	<b>ECO101</b>	
<b>Units/Credits:</b>	<b>3 cr.</b>	
<b>Learning Objectives:</b>		
<ol style="list-style-type: none"> <li>1. Introduction to the definition and concepts of Economics</li> <li>2. Demand, supply and equilibrium, elasticity and its applications</li> <li>3. Consumer behavior and utility maximization/expenditure minimization, the production process and cost minimization/profit maximization, the costs of production</li> <li>4. Perfectly competitive markets, imperfect competition, markets and welfare, externalities and market inefficiency, public goods, the design of the tax system</li> <li>5. The labor market, and other factors of production, income inequality and poverty</li> </ol>		
<b>Course Contents:</b>		
<p><i>Introduction to the definition and concepts of Economics:</i> definitions of economics; scarcity and efficiency; microeconomics and macroeconomics; positive and normative economics; market, command and mixed economies, laissez-faire; opportunity costs; marginal concept; input-output and production possibility frontier; interdependence and gains from trade; post-hoc fallacy, ceteris paribus principle, fallacy of composition; economic growth, unemployment, inflation</p> <p><i>Demand, supply and equilibrium, elasticity and its applications:</i> demand schedule and the law of demand; determinants of household demand, income and prices; normal and inferior goods; substitutes and complements; shifts of demand curves; market demand; supply schedule and the law of supply; determinants of supply, factors of production, cost of production and technology; shifts of supply curves; market supply; excess demand, excess supply and market equilibrium; changes in equilibrium due to shifts in demand and supply curves; price elasticity of demand; elastic and inelastic demand; the midpoint formula for calculating elasticity; elasticity and total revenue; determinants of demand elasticity, substitutes and complements; income elasticity of demand; cross-price elasticity of demand; elasticity of supply; elasticity of labor supply; applications of elasticity with some examples like impact of tax on equilibrium price and quantity, minimum floors and maximum ceilings etc.</p> <p><i>Consumer behavior and utility maximization/expenditure minimization, the production process and cost minimization/profit maximization, the costs of production:</i> budget constraint/line, budget set; preferences or tastes; changes in budget line due to change in prices or income; utility function, marginal utility, law of diminishing marginal utility; utility maximization subject to budget constraint; diminishing marginal utility and downward-sloping demand; income and substitution effects; profit, total revenue, total cost; profit maximization, market prices of output, production technology (labor intensive or capital intensive production technology), prices of inputs; total product, marginal product and average product; law of diminishing returns; constant, increasing and decreasing returns to</p>		

scale; short run and long run production decisions; productivity and economies of scale; nature of the firm, individual proprietorship, partnership and limited liability partnership, corporation; ownership, control and executive compensation in firms; profit maximization/cost minimization; total and average fixed cost, total and average variable cost; total cost, average cost and marginal cost in the short-run and in the long-run; output decisions in the short-run and in the long-run.

*Perfectly competitive markets, markets and welfare, externalities and market inefficiency, public goods, the design of the tax system, imperfect competition:* competitive market, perfect competition; supply behavior of the competitive firm, total cost and the shutdown condition; short-run and long-run competitive equilibrium; efficiency (Pareto) of competitive equilibrium, welfare of market participants, consumer surplus, producer surplus, the deadweight loss of taxation, the Laffer curve; international trade, the winners and losers from trade, the effects of tariffs, the arguments for restricting trade; externalities, positive and negative externalities, public policies towards externalities like market based policies of corrective taxes and subsidies, tradable pollution permits, private solutions to externalities, the Coase theorem; public (social) goods and private goods, common resources, the free rider problem, the tragedy of the Commons; taxes and inefficiency, taxes and equity, the benefits principle, the ability to pay principle, vertical equity, horizontal equity, the tradeoff between equity and efficiency, tax incidences and optimal taxation; monopoly, the welfare costs of monopolies, price discrimination, public policy towards monopolies, monopolistic competition, product differentiation, advertising, oligopoly, the economics of cooperation, public policy towards oligopolies, antitrust policy.

*The labor market, and other factors of production, income inequality and poverty:* factor incomes, personal income, the nature of factor demands, the demand and supply of factors of production, real wage, demand and supply of labor, determinants of supply, wage differentials, labor quality, the economics of labor unions, economic analysis of labor discrimination; the capital market, physical or tangible capital, social capital or infrastructure, intangible capital, human capital, investment and depreciation, interest rate, bonds and stocks, mortgages and the mortgage market, the demand for new capital and investment decision; land markets, rent and value of output produced on land; utilities possibilities frontier, sources of household income, minimum wage, unemployment, the distribution of income, income inequality, Lorenz curve and the Gini coefficient, causes of increased inequality, poverty and poverty line, the redistribution debate, redistribution programs and policies.

**Selected Readings:**

1. *Economics* by Paul A Samuelson and William D Nordhaus (Mcgraw Hill)
2. *Principles of Economics* by Karl E. Case, Ray C. Fair and Sharon E Oster (Pearson)
3. *Principles of Economics* by N. Gregory Mankiw (Cengage)
4. *Economics* by D. Acemoglu, D. Laibson and J. List (Pearson)

<b>Course Title</b>	<b>Principles of Economics II</b>	
<b>Course No</b>	<b>ECO102</b>	
<b>Units/Credits:</b>	<b>3 cr.</b>	
<b>Learning Objectives:</b>		
<ol style="list-style-type: none"> <li>1. Introduction to macroeconomics, measuring national output, national income, unemployment, inflation and long-run growth</li> <li>2. Aggregate expenditure and equilibrium output, the government and fiscal policy, saving, investment, money demand, money supply and equilibrium interest rate</li> <li>3. Aggregate demand in the goods and money markets, aggregate supply and the equilibrium price level, the labor market in the macro economy</li> <li>4. International trade, comparative advantage, and protectionism, open economy macroeconomics, exchange rate, balance of payments, foreign trade and economic activity, equilibrium in the open economy</li> </ol>		
<b>Course Contents:</b>		
<p><i>Introduction to macroeconomics, measuring national output, national income, unemployment, inflation and long-run growth:</i> aggregate output, expansion or boom, contraction, recession or slump, depression, business cycle, output growth; unemployment, inflation, hyperinflation, deflation, transfer payments, goods-and-services market, labor market, money market, fiscal policy, monetary policy, a brief history of the world economy like the great depression and the subprime crisis; national income and product accounts, gross domestic product (GDP), final goods and services, intermediate goods, value added, the three methods of calculating GDP: the sum of final goods and services (the expenditure approach), the sum of value added, the sum of incomes in a given period within an economy, personal consumption expenditures (durable and nondurable goods, services), gross private domestic investment (nonresidential, residential investment, change in business inventories), depreciation, gross investment, net investment, government consumption and government gross investment, net exports, national income, personal income, compensation of employees, proprietors' income, rental income, corporate profits, net interest, indirect taxes minus subsidies, net business transfer payments, surplus of government enterprises, disposable personal income or after-tax income, personal saving, personal saving rate, current dollars, gross national product (GNP), net national product (NNP), nominal and real GDP, calculating real GDP, the GDP deflator, gross national income, limitations of the GDP concept; employed, unemployed, not in the labor force, labor force, unemployment rate, labor force participation rate, discouraged worker effect on unemployment, frictional, structural, and cyclical unemployment, the costs of unemployment; consumer price index (CPI), inflation rate, producer price index (PPI), nominal and real interest rate, the costs of inflation, long-run output growth, productivity growth.</p> <p><i>Aggregate expenditure and equilibrium output, the government and fiscal policy, saving, investment, money demand, money supply and equilibrium interest rate:</i> aggregate output and aggregate income, the Keynesian theory of consumption, consumption function, marginal propensity to consume (MPC), aggregate saving, marginal propensity to save (MPS), planned investment, actual investment, the determination of equilibrium output (income), planned</p>		

aggregate expenditure, equilibrium aggregate output, the saving/investment approach to equilibrium, exogenous variable, the multiplier; fiscal policy, monetary policy, discretionary fiscal policy, net taxes, disposable or after-tax income, budget deficit, adding taxes to the consumption function, the determination of equilibrium output (income) with taxes, savings/investment approach to equilibrium with taxes, government spending multiplier, tax multiplier, balanced-budget multiplier; the federal budget, federal surplus and federal deficit, federal debt, economy's influence on the government budget, automatic stabilizers, fiscal drag, full employment budget, structural deficit, cyclical deficit; the demand for money, transaction motive, non-synchronization of income and spending, speculation motive, the total demand for money, the effect of income and the price level on the demand for money, the supply of money, equilibrium interest rate, changing money supply to affect the interest rate, tight monetary policy, easy monetary policy.

*Aggregate demand in the goods and money markets, aggregate supply and the equilibrium price level, the labor market in the macro economy:* money market, planned investment schedule, planned aggregate expenditure and the interest rate, effect of interest rate on equilibrium investment, aggregate expenditure and output, equilibrium in both the goods and money markets, policy effects in the goods and money markets, expansionary fiscal policy and expansionary monetary policy effects, crowding-out effect, interest sensitivity or insensitivity of planned investment, contractionary fiscal policy and contractionary monetary policy effects, macroeconomic policy mix; the aggregate demand (AD) curve, reasons for downward sloping aggregate demand curve, aggregate expenditure and aggregate demand, shifts of the aggregate demand curve; the aggregate supply (AS) curve, aggregate supply in the short-run, shifts of the short-run aggregate supply curve, cost shock or supply shock, the equilibrium price level, the long-run aggregate supply curve, potential output or potential GDP, short-run equilibrium below potential output, monetary and fiscal policy effects on AD-AS equilibrium, causes of inflation, demand-pull inflation, cost-push or supply-side inflation, stagflation, expectations and inflation, money and inflation, the behavior of the central bank, controlling the interest rate, inflation targeting; unemployment rate, frictional, structural, and cyclical unemployment, labor demand curve, labor supply curve, the equilibrium wage, the classical view of the labor market, explaining the existence of unemployment, sticky wages, social, or implicit contracts, relative-wage explanation of unemployment, explicit contracts, efficiency wage theory, minimum wage laws, the short-run relationship between the unemployment rate and inflation, the Phillips curve, AD-AS analysis and the Phillips curve, expectations and the Phillips curve, the long-run AS curve, potential output, and the natural rate of unemployment, the nonaccelerating inflation rate of unemployment (NAIRU).

*International trade, comparative advantage, and protectionism, open economy macroeconomics:* balance of payments and exchange rates, equilibrium in the open economy: trade surplus, trade deficit, the economic basis for trade, Corn Laws, Ricardo's theory of comparative advantage, absolute advantage vs. comparative advantage, gains from mutual absolute advantage, gains from comparative advantage, why does Ricardo's plan work, terms of trade, exchange rate, trade and exchange rates in a two-country/two goods world: an

example, Heckscher-Ohlin theorem, trade barriers: tariffs, export subsidies and quotas, free trade or protection; foreign exchange, balance of payments, the current account and the capital account, balance of trade, trade deficit, balance on current account, balance on capital account, equilibrium output (income) in an open economy, planned aggregate expenditure in an open economy, net exports of goods and services, determining the level of imports, marginal propensity to import (MPM), equilibrium output (income) in an open economy, the open-economy multiplier, imports, exports, and the trade feedback effect, import and export prices and the price feedback effect, the open economy with flexible exchange rates, floating, or market –determined exchange rates, the market for foreign exchange, appreciation of a currency, depreciation of a currency, the equilibrium exchange rate, factors that affect exchange rates, law of one price and the purchasing-power-parity theory, relative interest rates, exchange rate effects on imports, exports, and real GDP, exchange rates and the balance of trade: the J curve, exchange rates and prices, monetary policy with flexible exchange rates, fiscal policy with flexible exchange rates

**Selected Readings:**

1. *Economics* by Paul A Samuelson and William D Nordhaus (Mcgraw Hill)
2. *Principles of Economics* by Karl E. Case, Ray C. Fair and Sharon E Oster (Pearson)
3. *Principles of Economics* by N. Gregory Mankiw (Cengage)
4. *Economics* by D. Acemoglu, D. Laibson and J. List (Pearson)

<b>Course Title</b>	<b>Econometrics I</b>	
<b>Course No</b>	<b>ECO201</b>	
<b>Department:</b>	<b>Economic Sciences</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	

**Learning Objectives:**

What is the effect of reducing class size on test scores of students? Is a tax on alcohol effective in tackling drunk driving? What is the effect of a job-training program on wages of the trainees? After taking this course a student will be able to answer such questions. So the objective of this introductory course on Econometrics is to be able to find quantitative answers to sound important quantitative questions. This would require that students learn statistical methods for evaluating economic relationships, testing economic theories and evaluating government and business policy. This course will be supplemented by lab sessions where students will learn to explore data and analyze relationships (by running regressions) using statistical software. Hence this course will provide both theoretical and practical training to students.

**Course Contents:**

*Economic Questions and Data:* Economic Questions, Causal effects and Idealized

## Experiments, Data Sources and Type

*Probability Theory:* Random Variables (Discrete and Continuous) and Probability Distributions, Moments and Moment Generating Function (MGF), The Normal, Chi-Squared, Student T and F distribution, Joint distributions, Random Sampling, Large Sample Properties and Limit Theorems.

*Statistical Inference:* Estimation of the Population Mean, Hypothesis Testing, Confidence Intervals, Comparing Means of Different Populations, Scatterplots and Sample Covariance and Sample Correlation.

*Linear Regression with One Regressor:* Linear Regression Model and its Estimation by OLS, OLS Assumptions, Measures of Fit, Sampling Distribution of the OLS estimator, Asymptotic Distribution of the OLS estimator, Hypothesis Testing and Confidence Interval of the Regression Coefficient, Gauss Markov Theorem.

*Linear Regression with Multiple Regressors:* The Multiple Regression Model and its estimation, Omitted Variable Bias, the OLS Assumptions in Multiple Regression Model, Measures of Fit, Distribution of the OLS Estimators in Multiple Regression Model, Multicollinearity. Hypothesis testing and Confidence Interval for a Single Coefficient, Tests of Joint Hypothesis, Model Specification in Multiple Regressions. Consistency. OLS Asymptotics and Large Sample Inference, Asymptotic Efficiency of OLS.

*Weighted Least Squares (WLS):* Heteroskedasticity, WLS with known Heteroskedasticity, WLS with Heteroskedasticity of known Functional Form (Feasible Generalized Least Squares (FGLS)), Heteroskedasticity Robust Standard Errors.

### **Selected Readings:**

1. *Statistical Inference* by Casella and Berger (Cengage)
2. *Statistical Methods* by Hogg and Craig (Pearson)
3. *Introduction to Econometrics* by James H. Stock and Mark W. Watson (Pearson)
4. *Introductory Econometrics: A Modern Approach* by Jeffrey M. Wooldridge (Cengage)
5. *Mostly Harmless Econometrics: An Empiricist's Companion* by Angrist and Pischke (Princeton University Press)

<b>Course Title</b>	<b>Microeconomics I</b>	
<b>Course No</b>	<b>ECO202</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	
<b>Learning Objectives:</b>		
This introductory course teaches the fundamentals of microeconomics. Students are introduced to consumer's decision-making process, market structure and equilibrium concepts and their properties. Topics include consumer theory, producer theory, market equilibrium, monopoly, and the role of the government in the economy. We aim to cover following topics in this course:		



1. The Firm and the Supply Function
2. Consumer Choice and Demand
3. Monopoly and Competitive Markets
4. General Equilibrium
5. Equilibrium, Taxes and Welfare

**Course Contents:**

*Consumer Choice and Demand:* Limits of consumer choice - the budget constraint. Reasons for choice – preferences, Representation of preferences - Utility Functions, The choice - The formal problem of maximization of preferences and derivation of the demand function, The Slutsky equation - Income and substitution effects, Income and substitution effects of Hicks, Revealed preference and Slutsky equation, Weak and Strong axioms of revealed preference, Price indices, Consumer surplus and market demand, Consumer surplus - Discrete goods and continuous goods, Market demand - Aggregation of individual demands

*The Firm and the Supply Function:* Technology, Technological constraint, Different types of technology, Marginal product and marginal rate of technical substitution, Returns to scale, Benefit maximization and cost minimization, The formal problem of profit maximization and cost minimization, Cost functions - marginal cost and average cost, Supply curve, Supply function of a competitive firm, The relation of the supply with marginal costs, The producer surplus, Supply curve of an industry.

*Monopoly and Competitive Markets:* Basic Game Theory, Welfare and output, Quality choice, Price discrimination, First-degree price discrimination, Second-degree price discrimination, The competitive firm, The profit maximization problem, The industry supply function, Welfare analysis, Pareto efficiency

*General Equilibrium:* Pure Exchange Economy. One-consumer-One-producer Economy, The 2×2 production model, General Versus Partial Equilibrium Theory

*Equilibrium, Taxes and Welfare:* Agents and goods, Walrasian equilibrium, The First Fundamental Theory of Welfare Economics, The Second Welfare theorem, Pareto Optimality and Social Welfare Optima, The compensation criterion, Optimal Taxation.

**Selected Readings:**

1. *Intermediate Microeconomics: A Modern Approach* by Hal R. Varian. (W W Norton)
2. *Microeconomic Analysis* by Hal R. Varian. (W W Norton)
3. *A Course in Microeconomic Theory* by David Kreps. (Princeton University Press)
4. *Microeconomic Theory: Basic Principles and Extensions* by Walter Nicholson & Christopher Snyder (Pearson)
5. *Microeconomics* by Satya Ranjan Chakravarty (Allied Pub.)

<b>Course Title</b>	<b>Macroeconomics I</b>	
<b>Course No</b>	<b>ECO204</b>	For: UG/PG
<b>Units/Credits:</b>	<b>4 cr.</b>	
<b>Prerequisite: Desirable</b>		
<b>Learning Objectives:</b>		
<p>This course aims to provide a formal treatment of the macroeconomic concepts. The students were introduced to preliminary concepts and definitions in understanding the aggregate economy in their first year course, Principle of Economics II. This course introduces the students to formal modeling of a macro-economy in terms of analytical tools. It discusses the various alternative theories of output, employment and interest rate determination in a closed economy in the short run, medium run as well as the long run. It also introduces students to various micro-foundations of macroeconomic theories.</p>		
<b>Course Contents:</b>		
<p><i>Economy in the very Long run – Economic Growth:</i> Harrod-Domar model, Solow Growth Model, Golden rule of Capital Accumulation, Solow growth models with growth in population and technical progress, Growth Accounting, Cross-country growth and convergence</p> <p><i>Economy in the Long run – Classical Model:</i> Production and Output, Labor Market, Money Market (Quantity Theory of Money), Classical Dichotomy - Money neutrality</p> <p><i>Economy in the short run – Business Cycles:</i> Building the IS-LM model, Aggregate Demand, Aggregate Supply and the Philips curve, Aggregate demand-Supply (AD-AS) models, Fiscal and Monetary Policies</p> <p><i>Micro-foundations:</i> Theories of Consumption – Inter-temporal Choice and Consumption, Keynesian Consumption theory, Life Cycle Hypothesis, Permanent Income Hypothesis, Random Walk Hypothesis, Behavioral Consumption theories. Theories of Investment, Theories of Money Demand</p>		
<b>Selected Readings:</b>		
<ol style="list-style-type: none"> <li>1. <i>Macroeconomics: Policy and Practice</i> by F. S. Mishkin (Pearson)</li> <li>2. <i>Macroeconomics</i> by N. G. Mankiw (Macmillan)</li> <li>3. <i>Macroeconomics</i> by A. B. Abel and B. Bernanke (Pearson)</li> <li>4. <i>Macroeconomics</i> by R. Dornbush, S. Fisher &amp; R. Startz (McGraw Hill)</li> <li>5. <i>Macroeconomics</i> by O. Blanchard (Pearson)</li> <li>6. <i>Economic Growth</i> by R. J. Barro and X. Sala-i-Martin (MIT Press)</li> <li>7. <i>Advanced Macroeconomics</i> by D. Romer (McGraw Hill)</li> </ol>		

<b>Course Title</b>	<b>India in the World Economy</b>	
<b>Course No</b>	<b>ECO301/ECO601</b>	
<b>Units/Credits:</b>	<b>3 cr.</b>	
<b>Learning Objectives:</b>		
<p>This course will cover the history of Indian economic development and the current progress, challenges and strategy going forward. This course will help in developing an in-depth understanding of the Indian economy- its history, recent developments, and impending challenges. The participants will become proficient in understanding and analyzing macroeconomic developments and policy. They will also become familiar with the current dominant thoughts and tools used for economic policy making and research.</p>		
<b>Course Contents:</b>		
<p><i>Colonial Legacy:</i> The Economic History of India, The Impact of Colonial Rule on the Indian Economy</p> <p><i>Evolution of Economic Planning in India:</i> The five year plans, 2<sup>nd</sup> plans and industrialization, Nehru-Mahalanobis Plan Model, Choice of Industrialization Strategies, Economic Growth in the Nehru Era, Selective Import Liberalization (under the 7<sup>th</sup> five year plan)</p> <p><i>Indian Agriculture:</i> Agricultural Policy: Issues, Concepts and Instruments, Land reform, Green revolution, Agricultural pricing and policies, Indian Public Distribution System, Agricultural Crisis and Farmer Suicides</p> <p><i>Structural Change:</i> Manufacturing, Services &amp; Urbanization, Manufacturing vs. Services in India, Framework for comparing sectors, Low Skill Manufacturing, Deindustrialization</p> <p><i>Emerging Economies of the East, fall of Soviet Union, and Initiation of Globalization:</i> Changing economic and political climate in India</p> <p><i>Indian Economic Crisis:</i> Reforms of 1990 and the Economic Transformation in India, Financial-Economic Crises and Indian Experience, Effects of the Twin Balance Sheet Crisis, Successful and Unsuccessful Central Banking Experiences.</p> <p><i>India versus China in the 21st Century:</i> Sources of India's Export Growth in Pre-and Post-Reform Periods. India and China - Changing Patterns of Comparative Advantage</p> <p>Intensive and extensive margins of exports</p> <p><i>Global Financial Crisis:</i> Capital account management in India, Contagion, decoupling and the spillover effects of the US financial crisis</p> <p><i>Emergence of Inward looking policies:</i> Brexit and other international political changes</p> <p><i>Demonetization:</i> Objective and Background, Costs and Benefits, and Markers of Success.</p>		

**Selected Readings:**

1. *Economic Surveys of India*, Department of Economic Affairs, Ministry of Finance, Govt. of India
2. *The Economic History of India 1857-1947* by Tirthankar Roy (Oxford University Press, 3rd edition, 2011)
3. *The emerging giant* by A. Panagariya (Oxford University Press, 2008)
4. *The Concise Oxford Companion to Economics in India* by K. Basu and A. Maertens (eds.) (Oxford University Press, 2011)
5. *The Oxford Companion to Politics in India* by Niraja Gopal Jayal and Pratap Bhanu Mehta (eds.) (Oxford University Press, 2011)
6. *Reforms and Economic Transformation in India* by J. Bhagwati and A. Panagariya (Oxford University Press, 2013)
7. *In Defense of Globalization*, J. Bhagwati (Oxford University Press, U.K. 10. ILO 2004)
8. *Agricultural Crisis and Farmer Suicides* by R S Deshpande and Saroj Arora (eds.) (Sage, New Delhi, 2010)
9. *India's Economic Development Since 1947* by Uma Kapila (eds.) (Academic Publishers, 3rd Ed. or latest version)
10. *Development Planning: The Indian Experience*, S Chakraborty. 1987. Clarendon Press.
11. *Agrarian Question* by Kaushik Basu (eds.) (Oxford University Press, 2000)
12. *The Indian Economy: Problems and Prospects*, Bimal Jalan (ed.) (Penguin, 2004)
13. *India: Development and Participation* by Jean Dreze and Amartya Sen (Oxford University Press, 2nd edition, 2002)
14. *India Planning for Industrialization*, by J. Bhagwati and Desai: OUP.

<b>Course Title</b>	<b>Macroeconomics II</b>	
<b>Course No</b>	<b>ECO302/ECO602</b>	For: UG/PG
<b>Units/Credits:</b>	<b>4 cr.</b>	
<b>Learning Objectives:</b>		
<p>This course aims to familiarize students to the quantitative tools used in modern macroeconomics. The course is quantitative in nature, and significant amount to time will be spend on teaching students dynamical systems and dynamic optimization. In doing so, appropriate examples from various macroeconomic models will be covered. The examples in the course introduce students to long-term micro founded theories of growth and introduction to Business Cycles using the Dynamic Stochastic General Equilibrium (DSGE) model. Students may also be introduced to some computational methods in macroeconomics using some standard software.</p>		

**Course Contents:**

*Dynamical Systems:* Differential equations, First Order Ordinary Differential Equations (ODE), Systems of Linear ODE, Deterministic and Stochastic Difference equations, Markov Processes

*Dynamic Optimization:* Dynamic Optimization in Continuous time – Finite and Infinite horizon, Markov Decision Processes model, Dynamic Programming - Finite and Infinite horizon

*Exogenous Growth Model:* Review Solow Growth Model with Golden rule of capital accumulation and dynamic inefficiency, Neo-Classical Growth Model, Overlapping Generations Model

*Endogenous Growth Models:* One sector models of Endogenous Growth – AK Model, One sector Human and Physical capital model, Learning by Doing and Knowledge Spillovers, Public services and Endogenous growth

*Dynamic Stochastic General Equilibrium (DSGE) Model:* Real Business Cycle, New Keynesian models

**Selected Readings:**

1. *Economic Dynamics in Discrete Time* by J. Miao (MIT Press)
2. *Economic Growth* by R. J. Barro and X. Sala-i-Martin (MIT Press)
3. *Intertemporal Macroeconomics* by C. Azariadis (Wiley-Blackwell Publishers)
4. *Advanced Macroeconomics* by D. Romer (McGraw Hill)
5. *Lectures on Macroeconomics* by O. J. Blanchard and S. Fisher (MIT Press)
6. *Introduction to Modern Economic Growth* by D. Acemoglu (Princeton University Press)
7. *Recursive Macroeconomic Theory* by L. Ljungqvist and T. J. Sargeant (MIT Press)
8. *Recursive Method in Economic Dynamics* by N. Stokey, R.E. Lucas and E. Prescott (Harvard University Press)
9. *Applied Computational Economics and Finance* by M. J. Miranda and P. L. Fackler (MIT Press)

<b>Course Title</b>	<b>Microeconomics II</b>	
<b>Course No</b>	<b>ECO303/ECO603</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	

**Learning Objectives:**

1. Classical Demand Theory
2. Choice Under Uncertainty
3. Adverse Selection, Signaling, and Screening
4. The Principle-Agent Problem
5. Externalities and Public Goods
6. General Equilibrium Under Uncertainty

**Course Contents:**

*Classical Demand Theory:* Preference Relations - Basic Properties, Preference and utility. The Utility Maximization Problem. Duality. Relationship between Demand, Indirect Utility, and Expenditure Functions. Integrability. Welfare Evaluation and Economic Changes. The Strong Axiom of Revealed Preference.

*Choice Under Uncertainty:* Expected Utility Theory, Money Lotteries and Risk Aversion, Comparison of Payoff Distributions in Terms of Return and Risk, State-dependent Utility.

*Adverse Selection, Signalling, and Screening:* Information Asymmetries and Adverse Selection, Signalling, Screening.

*The Principle-Agent Problem:* Hidden Action, Hidden Information, Hidden Actions and Hidden Information - Hybrid Models.

*Externalities and Public Goods:* Bilateral Externalities, Public Goods, Multilateral Externalities, Private Information and Second-Best Solutions, Efficient Provision of a Discrete Public Goods, Private Provision of a Discrete Public Good, voting for a Discrete Public Good, Demand Revealing Mechanisms, Demand Revealing Mechanism with a Continuous good.

*General Equilibrium Under Uncertainty:* Equilibrium with certainty, Equilibrium with Uncertainty, A Market Economy with Contingent Commodities, Arrow-Debreu Equilibrium, The Capital Asset Pricing Model, The Arbitrage Pricing Theory. Incomplete market.

*Welfare Economics:* Utility possibility set. Social Welfare Functions and Social Optima. Invariance Property of Social Welfare Functions. Coalition Bargaining - The Shapley Value.

**Selected Readings:**

1. *Microeconomic Analysis* by Hal R. Varian (W W Norton)
2. *Microeconomic Theory* by Andrew Mas-collel, Michael D. Whinston & Jerry R. Green (Oxford University Press)
3. *Advanced Microeconomic Theory* by Geoffrey A. Jehle and Philip J. Reny (Pearson)
4. *A Course in Microeconomic Theory* by David Kreps (Princeton University Press)
5. *Microeconomics Behavior, Institutions, and Evolution* by Samuel Bowels (Princeton University Press)
6. *Microeconomics* by Satya Ranjan Chakravarty (Allied Publishers)

<b>Course Title</b>	<b>International Economics</b>	
<b>Course No</b>	<b>ECO304/ECO604</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	

**Learning Objectives:**

The core objective of this course is to explain the reasons for trade and explanation of trade patterns and the gains accruing from trade or from restricting trade. Considerable attention is also given to understand the impact of trade on market structure, factor movement, income distribution, taxation and growth. The European Union (EU), World Trade Organization (WTO), the United Nations Conference on Trade and Development (UNCTAD) and The Organization for Economic Co-operation and Development (OECD) are institutionally involved in trade policy and taxation issues and their major concerns are included in the syllabus. The main topics covered in this course are:

1. The Theory of International Trade
2. Welfare and Trade Policy
3. Money and Balance of Payments
4. Scale Economies and Imperfect Competition

**Course Contents:**

*Theory of International Trade:* Gains from Trade and the Law of Comparative Advantage. The Ricardian Model. Factor Proportion Theory. The Heckcher-Ohlin Model. Trade Theory with Firm-Level Heterogeneity. Gravity Models and the Gains from Trade. Trade Costs. Offshoring and Fragmentation of Production. Economic Geography.

*Welfare and Trade Policy:* Trade Policy and Trade Agreements. Political Economy of Trade Policy and the WTO. Optimal Tariff and Domestic Taxes. Coordination of tax policies. Policy Responses to Distortions and Constraints. Partial Reforms and Policies. Free Trade Agreements. Preferential Trade Agreements. Custom Unions. Intellectual Property Rights. Compulsory License. International Protection of Intellectual Property. Regional and National Exhaustion of Intellectual Property. Intellectual Property Rights and Foreign Direct Investments. Trade Policies Coherence and Access to Essential Products.

*Money and Balance of Payments:* The small Country Case. General Equilibrium and Comparative Statistics. Stability of the Long-Run Equilibrium. Small Country with Sticky Wages. International Equilibria.

*Scale Economies and Imperfect Competition:* Trade and Competition. Product Selection. Product Differentiation and Intra-Industry Trade. Trade Protection and Domestic Market Power. Foreign Market Power. Strategic Export and Import Policies. Intra-Industry Trade.

**Selected Readings:**

1. *Theory of International Trade* by Avinash Dixit and Victor Norman. (Cambridge University Press, 1980)
2. *Trade Policy and Market Structure* by Helpman, Elhanan, and Paul Krugman (MIT Press, 1989)
3. *The Economics of the World Trading System* by Bagwell, Kyle, and Robert W. Staiger (MIT Press, 2004)
4. *International Trade Theory and Policy* by Paul Krugman, Maurice Obstfeld, Marc

Melitz (Pearson)

5. *Foundations of International Macroeconomics* by M. Obstfeld and K. Rogoff (MIT Press)
6. *Integration with the Global Economy: The case of Turkish Automobile and Consumer Electronic Industries* by E. Taymaz and K. Yilmaz, Commission on Growth and Development Working Papers No. 37, 2008

<b>Course Title</b>	<b>Econometrics II</b>	
<b>Course No</b>	<b>ECO305/ECO605</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	

**Learning Objectives:**

This course builds on the material taught in Econometrics - I. Hence after taking this course students will have an in depth understanding of the regression models used by economists to answer quantitative questions. This course will also be supplemented by lab sessions where students will learn to explore data and analyze relationships (by running regressions) in statistical software used by economists. Hence this course will provide both theoretical and practical training to students.

**Course Contents:**

*Review of Ordinary Least Squares and Weighted Least Squares:* The Multiple Regression Model and its Estimation, Omitted Variable Bias, Measures of Fit, OLS Assumptions in Multiple Regression Model, Distribution of the OLS Estimators in Multiple Regression Model, Multicollinearity. Hypothesis Testing and Confidence Interval for a Single Coefficient, Tests of Joint Hypothesis, Model Specification in Multiple Regressions. OLS Asymptotics and Large Sample Inference, Asymptotic Efficiency of OLS. Heteroskedasticity, Weighted Least Squares with known Heteroskedasticity, Weighted Least Squares with Heteroskedasticity of known Functional Form (Feasible GLS), Weighted Least Squares or Heteroskedasticity Robust Standard Errors.

*Regressions with Dummy Variables:* A Single Dummy Variable, Dummy Variable for Multiple Categories, Interactions Involving Dummy Variables, Linear Probability Model, Introduction to Program Evaluation.

*Specification and Data Issues:* Functional Form Misspecification, Measurement Error, Logarithmic Functional Form, Models with Quadratics, Models with Interactions, Adjusted R squared, Controlling for too many Regressors, Prediction and Residual Analysis.

*Limited Dependent Variable Models:* Logit and Probit Models for Binary Response, Maximum Likelihood Estimation of Logit and Probit models, Tobit Model, The Poisson Regression Model.

*Instrumental Variable Estimation and Two Stage Least Squares:* Omitted Variable in a Simple Regression Model, Statistical Inference with IV, Properties of IV with a Poor



Instrumental Variable, IV estimation in the Multiple Regression Model, Two Stage Least Squares. Testing for Endogeneity and Testing Over identifying Restrictions.

*Panel Data Methods:* Two Period Panel Data Analysis, Policy Analysis with Two Period Panel Data, Differencing with More than Two Time Periods, Fixed Effect Estimation, Fixed Effect or First Differencing, Random Effect Models.

*Time Series Regression and Forecasting:* Time Series Data and Serial Correlation, Autoregressions, Autoregressive Distributed Lag Model, Lag Length Selection Using Information Criteria, Non-stationarity

**Selected Readings:**

1. *Introduction to Econometrics* by James H. Stock and Mark W. Watson (Pearson)
2. *Introductory Econometrics: A Modern Approach* by Jeffrey M. Wooldridge (Cengage)
3. *Econometric Analysis* by William H. Greene (Pearson)
4. *Econometric Analysis of Cross Section and Panel Data* by Jeffrey M. Wooldridge (MIT Press)
5. *Mostly Harmless Econometrics- An empiricist's companion* by Joshua Angrist and Jorn-steffen Pischke (Princeton University Press)
6. *Mastering Metrics* by Joshua Angrist and Jorn-steffen Pischke (Princeton University Press)

<b>Course Title</b>	<b>Development Economics</b>	
<b>Course No</b>	<b>ECO306/ECO606</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	
<b>Learning Objectives:</b>		
<p>In this course we investigate the microeconomics and macroeconomics of development that enables us to dig below and deeper the "big questions" of economic development. While we explore the very rich economics that emerges from understanding, at the micro level, at the same time it tries to understand the economy-wide perspectives on the nature of the development problem. The course is designed as a mix of development microeconomic and development macroeconomics. This course aims at developing the building blocks: household behavior (nutrition, health, education, gender, family), markets (land, credit, savings, insurance), and institutions. A proper understanding of the "big questions" of economic development should incorporate these building blocks into appropriate frameworks of the developing countries. It also answers the "big questions" of economic development in a different way assuming no fundamental differences between two societies, but still they can evolve along very different paths depending on past expectations, aspirations or actual history.</p>		
<b>Course Contents:</b>		
<p><i>The Big Picture:</i> Introduction to Development Economics, World Inequality, Convergence debate, Poverty and measurement of poverty, Globalization and poverty</p>		

*Agriculture:* Agricultural Organization and Productivity in Developing countries, Agrarian Organization, Land Rental Contracts, Land Reform, Property Rights, Land Acquisition, Interlinked transactions, Agricultural Technology Adoption

*Savings, Credit and Insurance:* Credit and investment, Microfinance, Savings and Insurance, Insurance Failures

*Health:* Health and Nutrition- Poverty Traps, Providing health services and medicines in developing countries, Health externalities and randomized experiments, HIV & the economics of risky behaviors

*Education and Human capital:* Education, Educational Interventions, Private and Public Education Choice, Public versus Private Investment in Education, Fertility, Child Labour

*Labour and Migration:* Labour markets, Migration

*Institutions:* Political and Legal institutions and development, Financial institutions and development

*Political economy:* Economic theory of conflict, Ethnicity and Conflict, Corruption, Aid, Public goods and Development, Policy debate

*History, Growth and Development:* History, Expectations and Development, Aspirations and Development, Inequality and Markets

**Selected Readings:**

1. *Understanding Poverty* by, A. Banerjee, R. Benabou, and D. Mookherjee, editors, (Oxford University Press)
2. *Development Economics* by D. Ray (Princeton University Press)
3. *Analytical Development Economics* by K. Basu, (MIT Press)
4. *Development Microeconomics* by P. Bardhan and C. Udry (Oxford University Press)
5. *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty* by A.V.Banerjee and E. Duflo
6. *Introduction to Readings in the Theory of Economic Development* by D. Mookherjee and D. Ray, (London: Blackwell)
7. *Development Economics* by D. Ray in *The New Palgrave Dictionary of Economics*, edited by L. Blume and S. Durlauf (Palgrave)

<b>Course Title</b>	<b>Game Theory</b>	
<b>Course No</b>	<b>ECO307/ECO607</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	

**Learning Objectives:**

1. Rational decision making, utility function and the case of uncertainty.
2. The definition of a game, complete information, static games.
3. Nash equilibrium in pure and mixed strategies.
4. Extensive-form games, game trees, sub-game perfect Nash equilibrium.
5. Incomplete information, Bayesian games.

**Course Contents:**

*Rational decision making, utility function and the case of uncertainty:* preference relations, rationality, existence of utility functions, rational choice paradigm, uncertainty, lotteries, von Neumann-Morgenstern expected utility function, decision making under uncertainty, value of information.

*The definition of a game, complete information, static games:* normal-form games, pure strategies, mixed strategies, examples of games like prisoner's dilemma, rock-paper-scissors, Cournot duopoly, dominated strategies, beliefs, best responses, solutions concepts like iterated elimination of strictly dominated pure strategies, rationalizability.

*Nash equilibrium in pure and mixed strategies:* definition of Nash equilibrium in pure and mixed strategies, existence of Nash equilibrium, Cournot duopoly, Bertrand duopoly, median voter theorem.

*Extensive-form games, game trees, subgame perfect Nash equilibrium:* perfect and imperfect information, mixed and behavioral strategies, game trees, sequential rationality, backward induction, subgame perfect Nash equilibrium, centipede game, Stackelberg competition, finitely and infinitely repeated games, the folk theorem, strategic bargaining, contracts

*Incomplete information, Bayesian games:* Player's preference type, common prior, static and dynamic games of incomplete information, Bayesian Nash equilibrium, perfect Bayesian equilibrium, sequential equilibrium, adverse selection and signaling, auctions.

**Selected Readings:**

1. *Game Theory: An Introduction* by Steven Tadelis (Princeton University Press)
2. *An Introduction to Game Theory* by Martin J. Osborne (Oxford University Press)
3. *A Course in Game Theory* by Osborne and Rubinstein (MIT Press)
4. *Game Theory* by Fudenberg and Tirole (MIT Press)
5. *Microeconomic Theory* by Mas-Collel, Whinston and Green (Oxford University Press)
6. *A Primer in game Theory* by Robert Gibbons (Princeton University Press)
7. *Games of Strategy* by Avinash Dixit, David H. Reiley, and Susan Skeath (W W Norton)

<b>Course Title</b>	<b>Behavioral Economics</b>	
<b>Course No</b>	<b>ECO308 / ECO 608</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	

**Learning Objectives:**

This course provides an overview of behavioral economics. Behavioral economics incorporates descriptively accurate assumptions about cognitive ability, social interaction, moral motivation, and emotional responses into economic modeling and explores the implications of this for human behavior and economic outcomes. Empirical findings in psychology, sociology and related disciplines, as well as the field of experimental economics often motivate these assumptions. Behavioral economics seeks to generate theoretical insights, make more accurate predictions of field phenomena, and suggest welfare improving policies.

**Course Contents:**

*Review of Decision-making:* Economic decision-making of consumers and producers, Economics and Psychology in the decision-making perspective

*Prospect Theory:* Value and Weighting Function, Cumulative Prospect Theory, Economic Applications

*Bounded Rationality:* Mental Accounting, Limited Information and importance of feedback, Irrational decision-making and the psychology of price

*Dual System Theory:* Availability and Affect, Saliency, Status quo bias and inertia

*Temporal dimensions:* Time discounting and present bias, Diversification bias and empathy gap, Forecasting and memory

*Social dimensions:* Trust and Dishonesty, Fairness and Reciprocity, Social Norms, Consistency and Commitment

*Subjective Expectations:* Role of subjective expectations in decision-making, Measurement and analysis of subjective expectations

**Selected Readings:**

1. *The Behavioral Economics Guide* (latest)
2. *The Foundations of Behavioral Economic Analysis* by Sanjit Dhami (Oxford University Press, 2016)
3. *Advances in Behavioral Economics* Colin F. Camerer, George Loewenstein & Matthew Rabin (Princeton University Press, 2000)
4. *Judgment Under Uncertainty: Heuristics and Biases* by Daniel Kahneman, Paul Slovic & Amos Tversky (Cambridge University Press, 1982)
5. *Choices, Values, and Frames* by Daniel Kahneman & Amos Tversky (Cambridge University Press, 2000)
6. *Misbehaving: The Making of Behavioral Economics* by Richard Thaler (W W Norton, 2016)
7. *Thinking, Fast and Slow* by Daniel Kahneman (Penguin, 2013)
8. *Nudge: Improving Decisions About Health, Wealth, and Happiness* by Richard H. Thaler & Cass R. Sunstein (Penguin, 2009)
9. *Predictably Irrational: The Hidden Forces That Shape Our Decisions* by Dan Ariely (Harper Collins, 2011)

<b>Course Title</b>	<b>Industrial Organization</b>	
<b>Course No</b>	<b>ECO309 / ECO 609</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	
<b>Learning Objectives:</b>		
<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Monopoly</li> <li>3. Product Selection, Quality and Advertising</li> <li>4. Vertical Control</li> <li>5. Short-Run Price Competition</li> <li>6. Pricing Tactics</li> <li>7. Dynamic Price Competition, Collusion, Entry and Exit</li> <li>8. Product Differentiation: Vertical Differentiation and Monopolistic Competition</li> <li>9. Research and Development</li> </ol>		
<b>Course Contents:</b>		

*Introduction:* Theory of Firm, Profit-Maximization, Principle-Agent Relationship, Law and Economics, Industrial Organization and International Trade.

*Monopoly:* Pricing Behavior, Cost Distortions, Rent-Seeking Behavior, Durable Goods and Limit on Monopoly Power, Welfare Effects.

*Product Selection, Quality and Advertising:* Product Selection, Quality and Information, Experience Goods, Advertising, Repeat Purchase

*Vertical Control:* Linear Prices versus Vertical Restraints, Externalities and Vertical Control, Intra-brand Competition, Inter-brand Competition, Competition-Reducing Restraints.

*Short-Run Price Competition:* The Bertrand Paradox, Capacity Constraints, Cournot Analysis, Concentration Indices and Industry Profitability, Quantity Competition. Limit pricing, Predation

*Pricing Tactics:* Perfect Price Discrimination, Multimarket (third-degree) Price Discrimination, Personal Arbitrage and Screening (Second-Degree Price Discrimination), Non-linear Pricing, Pricing in Two-Sided Markets, Pricing of Products with Network Effects, Price Dispersion, Search Theory

*Dynamic Price Competition, Collusion, Entry and Exit:* Static Approaches to Dynamic Price Competition, Supergames, Reputation for Friendly Behavior, Dynamic Games and Tacit Collusion, Mergers, Entry Barriers, Merger and Antitrust Law, Entry Deterrence and Antitrust Law

*Product Differentiation - Vertical Differentiation and Monopolistic Competition:* Spatial Competition, Monopolistic Competition, Advertising and Informational Product Differentiation, Vertical Differentiation and Monopolistic Competition.

*Research and Development:* Classification and Process Innovation, Innovation Race, Competition in R&D, Patent, Licensing and Innovation, Governments and International R&D Races, Patent Laws, R&D Joint Ventures, Legal Approach to R&D Joint Ventures

**Selected Readings:**

1. *The Theory of Industrial Organization* by Jean Tirole (MIT Press, 1988)
2. *Industrial Organization: Theory and Applications* by Oz Shy (MIT Press, 1995)
3. *Industrial Organization: Theory, Evidence and Public Policy* by Kenneth W Clarkson and Roger LeRoy Miller (McGraw Hill, 1982)
4. *Law and Economics Vol. 1 - Theory* by Shubhashis Gangopadhyay and V. Santhakumar (Sage, 2013)
5. *Law and Economics Vol. 2 - Practice* by Shubhashis Gangopadhyay and V. Santhakumar (Sage, 2013)

<b>Course Title</b>	<b>Introduction to Quantitative Finance</b>	
<b>Course No</b>	<b>ECO310 / ECO 610</b>	
<b>Units/Credits:</b>	<b>4 cr.</b>	

**Learning Objectives:**

The purpose of the course is to introduce students to modern data analysis with application to Quantitative Finance. In this course, the relevant concepts will be taught and familiarity with the statistical tool will be developed. This course will develop a working knowledge of tools in quantitative finance.

The prerequisites for this course are minimal, however it is expected that the students have been exposed to introductory course in statistics and are familiar with basic concepts in statistics, which include random variables, expectation, correlation, statistical inference (estimation, tests and confidence intervals) etc. Some basic notation related to linear algebra like vectors and matrix calculus will also be used in the course.

**Course Contents:**

*Introduction to Statistical Programming Language:* Using statistical software routines for data summary and exploration, graphical presentation and data modeling. Working with functions and packages related to the relevant software.

*Risk Management:* Introduction to financial assets and their distributions (including returns, volatility etc.). Methods of goodness of fit - including theoretical and graphical methods. Concepts of percentile to introduce notion of value at risk and conditional value at risk as used in financial sector in the industry.

*Extreme Value Theory:* Extreme value theory and its application in the financial markets. Heavy tail distributions - detection, estimation and simulation using financial data on a relevant statistical software.

*Multivariate Models:* Analysis of multivariate statistical distributions with the case of the well-known normal family. Studying the Correlation Coefficient and give some examples of financial dataset. Modeling the extremal behaviour of two or more (dependent) processes simultaneously.

*Copulas and Dependence:* Modelling of dependence with Copulas and application of Copulas in risk management and expected shortfall.

*Principal Component Analysis:* Identification of principal component analysis, factor rotation and illustrate an application in financial markets.

<b>Course Number</b>	ECO311
<b>Course Title</b>	Economic Theory: Mechanism Design
<b>Credits</b>	4
<b>Learning Objectives</b>	<p>Collective decision making is an important social issue, since it depends on individual preferences that are not publicly observable. Therefore, the question is, whether it is possible to elicit the private information available to individuals and then how to extract the private information in various strategic environments; “Mechanism design” deals with these questions.</p> <p>In this course we introduce the theory of mechanism design from two perspectives. These are based on the assumptions on individual preferences, namely ordinal and cardinal. The particular topics to be covered in this course is given in the course content section.</p>
<b>Other Prerequisites</b>	Game Theory (ECO307) [Desirable]
<b>Text Books</b>	
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. <a href="#">Lecture notes on Mechanism Design by Debasis Mishra.</a></li> <li>2. An Introduction to the Theory of Mechanism Design by Tilman Börgers With a chapter by Daniel Krämer and Roland Strausz, Oxford University Press 2015</li> <li>3. Game Theory and Mechanism Design by Y Narahari, IISc Lecture Notes Series — Vol. 4, World Scientific Publishing Co. Pte. Ltd., 2014</li> <li>4. <a href="#">Lecture Notes on Fair Division by Ulle Endriss</a></li> <li>5. Gibbard, A. (1973) Manipulation of voting schemes: A general result. <i>Econometrica</i> 41:587–602.</li> <li>6. Satterthwaite, MA. (1975) Strategy-proofness and Arrow’s conditions: Existence and correspondence theorems for voting procedures and social welfare functions. <i>Journal of Economic Theory</i> 10:187–207.</li> <li>7. Moulin, H. (1980) On strategy-proofness and single peakedness. <i>Public Choice</i>, 35(4):437–455.</li> <li>8. Gale, D., and L. S. Shapley. (1962) College Admissions and the Stability of Marriage. <i>The American Mathematical Monthly</i>, vol. 69, no. 1, pp. 9–15. <i>JSTOR</i>, JSTOR, <a href="http://www.jstor.org/stable/2312726">www.jstor.org/stable/2312726</a>.</li> <li>9. Hurwicz, L., Walker, M. (1990) On the generic non-optimality of dominant strategy allocation mechanisms: A general theorem that includes pure exchange economies. <i>Econometrica</i> 58: 683–704</li> <li>10. Walker, M. (1980) On the non-existence of dominant strategy mechanisms for making optimal public decisions. <i>Econometrica</i> 48: 1521–1540</li> <li>11. Holmström, B. (1979) Groves’ Schemes on Restricted Domains.</li> </ol>

	<p><i>Econometrica</i> 47: 1137–1144.</p> <p>Myerson, R.B. (1981) Optimal auction design. <i>Mathematics of operations research</i>, 6(1):58–73.</p>
<b>Content</b>	<p>Introduction to mechanism design through direct and indirect mechanisms with examples and social choice function.</p> <p>Cardinal setup:</p> <p>Introduction to incentive compatibility constraints (DSIC and BIC) and revelation principle.</p> <p>Introduction to VCG mechanism and discussion about budget balanced criteria and individual rationality.</p> <p>Illustration through several types of single object auction (First Price, Second Price, Ascending Price, Decending Price etc).</p> <p>Mechanisms for single object auction and discussion about revenue equivalence.</p> <p>Discussion on optimal mechanism for single object auction (Myerson Auction).</p> <p>Ordinal setup:</p> <p>Introduction to some desirable properties (strategyproofness, unanimity, anonimity, neutrality etc.)</p> <p>Discussion of GibbardSatterthwaite impossibility theorem.</p> <p>Resrticted domains (single peaked domain) as a way out of the impossibility theorem.</p> <p>Fainness criteria (envyfreeness, propertionality etc) through fair division (cake cutting) problems.</p> <p>12. Matching (both sided and one sided) problems.</p>
<b>Remark</b>	

IISER Bhopal.

<b>Course Number</b>	ECO315
<b>Course Title</b>	Applied Production Analysis
<b>Credits</b>	4



<p><b>Learning Objectives</b></p>	<p>Learning Objectives:</p> <p>Nowadays, production economics in general and efficiency and productivity analysis, in particular, have become prevalent tools for performance analysis of decision-making units. The cutting-edge methods of efficiency and productivity analysis have application in applied research in economics and other allied disciplines, including agriculture, energy use, and its environmental aspects, banking, health care, manufacturing, transportation and communication utilities, and even various engineering disciplines. This course will help the students familiarize themselves with the concepts of efficiency and productivity analysis and its application in numerous areas of specialization such as energy and health services. The learning objective of this course are;</p> <p>(1) To understand the fundamental concepts related to production economics and its real life applications.</p> <p>(2) To familiarize with the parametric and non-parametric approaches to measure the efficiency and productivity of decision-making units.</p> <p>(3) To apply the tools of efficiency and productivity analysis in various research fields such as the health care sector, energy, education, agriculture, banking, and for measuring environmental performance.</p>
<p><b>Prerequisites</b></p>	
<p><b>Other Prerequisites</b></p>	<p>Econometrics I (ECO201/ECO351) and Microeconomics I (ECO202/ECO352)</p>
<p><b>Text Books</b></p>	<p>(1) Coelli, Timothy J., Dodla Sai Prasada Rao, Christopher J. O'Donnell, and George Edward Battese. An introduction to efficiency and productivity analysis. Springer Science &amp; Business Media, 2005.</p> <p>(2) Kumbhakar, Subal C., and CA Knox Lovell. <i>Stochastic frontier analysis</i>. Cambridge University Press, 2003.</p> <p>(3) Kumbhakar, S. C., Wang, H., &amp; Horncastle, A. P. A practitioner's guide to stochastic frontier analysis using Stata. Cambridge University Press, 2015.</p> <p>(4) Ray, Subhash C. Data Envelopment Analysis: theory and techniques for economics and operations research. Cambridge University Press, 2004.</p>

Selected Readings:

(1) Abraham Charnes, William W. Cooper, Arie Y. Lewin, Lawrence M. Seiford (Edited). *Data Envelopment Analysis: Theory, Methodology, and Applications*, Springer, 2007.

(2) Chambers, Robert G. *Applied production analysis: a dual approach*. Cambridge University Press, 1988.

(3) Färe, Rolf, Shawna Grosskopf, and Daniel Primont, eds. *Aggregation, efficiency, and measurement*. Springer Science & Business Media, 2010.

(4) Grifell-Tatjé, Emili, CA Knox Lovell, and Robin C. Sickles, eds. *The Oxford handbook of productivity analysis*. Oxford University Press, 2018.

(5) Varian, Hal R. *Microeconomic analysis*. New York, London: WW Norton & Company, 2004.

**Reference Books**

(6) Varian, Hal R. *Intermediate Microeconomics: A Modern Approach: Ninth International Student Edition*. WW Norton & Company, 2014. Papers:

(1) Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management Science*, 30(9), 1078-1092.

(2) Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2(6), 429-444.

(3) Lin, E. Y. Y., Chen, P. Y., & Chen, C. C. (2013). Measuring the environmental efficiency of countries: A directional distance function meta-frontier approach. *Journal of Environmental Management*, 119, 134-142.

(4) Solow, R. M. (1957). Technical change and the aggregate production function. *The review of Economics and Statistics*, 39(3), 312-320.

<b>Content</b>	<p>Course Content:</p> <p><i>Fundamentals of Production Economics:</i></p> <p>Inputs and Outputs-Production function and technology set- Estimating production function: Cobb-Douglas and Translog production functions - Technology and Technological Constraint-Properties of technology: Monotonicity, Convexity and Free Disposability-Technical Rate of Substitution- Returns to scale -Profit Maximization and Returns to Scale-Revealed Profitability-Cost functions and Cost Minimization.</p> <p><i>Introduction to Efficiency Analysis:</i></p> <p>Performance Evaluation: Efficiency, Productivity and Effectiveness-Technical Efficiency: input oriented and output oriented- Allocative efficiency and Cost Efficiency-Parametric approach to efficiency analysis: Corrected ordinary least squares (COLS), Modified ordinary least squares (MOLS) and an introduction to Stochastic Frontier Analysis- Non-Parametric methods of measuring efficiency: Data Envelopment Analysis (DEA) -Relaxing convexity assumption and the Free Disposal Hull (FDH) approach- The concept of Super-efficiency and its applications.</p> <p><i>Productivity Analysis:</i></p> <p>Single factor and total factor productivity- The Solow residual-Technically optimal scale- Measuring Total Factor Productivity Change over Time: The Törnqvist Productivity Index, The Fisher Productivity Index and the Malmquist Productivity Index- An introduction to Parametric and semi-parametric approaches of measuring productivity.</p> <p><i>Empirical Applications of Production Economics:</i></p> <p>Application of efficiency and productivity analysis in various research fields: Health care sector, Energy, Education, Agriculture, Banking and Financial services-DEA for Measuring Environmental Performance- Bootstrap DEA and Hypothesis Testing, Software Packages for Efficiency and Productivity analysis: DEAP, Frontier, R, STATA and MATLAB.</p>
<b>Remark</b>	

<b>Course Number</b>	ECO316
<b>Course Title</b>	Political Economy: Formal Theory and Analysis
<b>Credits</b>	4

<p><b>Learning Objectives</b></p>	<p>The course is aimed at advanced undergraduate and MS/PhD students who are interested in understanding Political Economy using formal methods (theory and empirical). In the first half, the course will focus on the three pillars of a democracy: electoral competition, citizen participation in democratic processes, and political accountability of agents in an elected government. The second half will focus on acquiring game theoretic tools required to formally analyze dynamic political economy. We will use dynamic modeling to understand taxation, public debt, and economic growth. The last part of the course will integrate all the earlier topics in the framework of institutions. We will study (formally and otherwise) the importance of institutions in the development processes of countries. For all the topics, students will be encouraged to draw parallels and understand the main insights in the context of 'Indian Political Economy.'</p> <p>At the end of this course, the students will acquire knowledge of the fundamental topics in Political Economy, and would be able to understand the role of economic policies in the context of the underlying institutional incentives prevalent in a country. The students will be expected to build a simple theoretical model in a topic of their interest (within the topics covered in the course), analyze the results of the model, and propose an empirical methodology to possibly test the result (they are not expected to do the actual empirical analysis as part of this course). Students passing this course will be equipped sufficiently to apply for further studies in political economics/development economics/public policy in a top university in Europe, UK and US.</p>
<p><b>Prerequisites</b></p>	<p>ECO307/ ECO607 Game Theory</p>
<p><b>Other Prerequisites</b></p>	
<p><b>Text Books</b></p>	<ol style="list-style-type: none"> <li>1. Besley, T. (2006). Principled agents? The political economy of good government. Oxford University Press on Demand.</li> <li>2. Persson, T., &amp; Tabellini, G. (2000). Political economics.</li> </ol>
<p><b>Reference Books</b></p>	<ol style="list-style-type: none"> <li>1. Acemoglu, D. (2003). Lecture notes for political economy of institutions and development, 14.773.</li> <li>2. Acemoglu, D. (2013). Political economy lecture notes.</li> <li>3. Osborne, M. J. (1995). Spatial models of political competition under plurality rule: A survey of some explanations of the number of candidates and the positions they take. Canadian Journal of economics, 261-301.</li> </ol>

<b>Content</b>	<p>1. Block I (Electoral Competition and Political Participation in Democracies): Hotelling-Downs model of policy convergence with office motivated candidates; Probabilistic voting model; Policy motivated candidates and policy divergence; Citizen candidate model; (Formal Theoretical Models) Lobbying and influence by interest groups; Campaign contributions and Political access; Political mobilization and grass-roots activism; (Theory and Empirical evidence on Lobbying and campaign contributions, activism and grass-roots mobilization) Discussion of ideas of political competition and participation in the context of the Indian political landscape.</p> <p>2. Block II (Government, Political Agency, and Accountability): Fundamental inefficiencies of Governments -- Size of government, Corruption, Property rights, Trust; Influence; Quality of leadership (Non-formal Theory and Empirical analysis) Elements of Political Agency -- Uncertainty, Motives, Accountability mechanisms, Distortions - unobserved quality (adverse selection) and effort (moral hazard); (Formal Theoretical Models) Decentralization vs Centralization; Autocracy vs Democracy; (Non-formal analysis) Discussion of political agency and accountability in the context of the Indian political landscape.</p> <p>3. Block III (Dynamic Political Economy): Markov Perfect Equilibria in Dynamic Games  Dynamic Voting model; Dynamic Political Agency and Accountability Dynamic Policy Problems: Capital Taxation, Public Debt and Finance, and Political Instability and Growth (Formal Game Theoretic Analysis)</p> <p>4. Block III (Political Economy of Institutions): What Are Institutions; Developmental vs Predatory Institutions; Institutional Origins; Weak and Strong Institutions; (Empirical Evidence on within country and cross-country differences in quality of institutions) Economic Institutions Under Elite Domination; Inefficient Economic Institutions; Modeling Political Institutions; Policy under Democratic Political Institutions; Parliamentary Institutions; (Formal Models and Empirical Evidence)  Discussion of weak-institutional democracies in the context of the Indian political landscape.</p>
<b>Remark</b>	

<b>Course Number</b>	ECO317
----------------------	--------

<b>Course Title</b>	Public Finance
<b>Credits</b>	4
<b>Learning Objectives</b>	The main goals of this course are to develop an understanding of why and how the government may intervene in the economy, and to study the effect of government expenditure programs and taxation systems on the welfare of citizens. This will also develop a thorough understanding of how both Union Government and Federal government do annual budget as an instrument of fiscal policy.
<b>Prerequisites</b>	Microeconomics I (ECO202) and Macroeconomics I (ECO204)
<b>Other Prerequisites</b>	
<b>Text Books</b>	<p>Books</p> <p>Stiglitz J. E and Rosengard, J.K. (2015) Economics of Public Sector, 4th edition (W. W. Norton Company, Inc.)</p> <p>Atkinson, A. and Stiglitz, J. (2015) Lectures on Public Economics, McGraw-Hill; reprinted by Princeton University Press.</p> <p>Gruber, J. (2018) Public finance and public policy, 5th Edition (Worth Publisher)</p> <p>Musgrave, R and Musgrave, P (1989) Public Finance in Theory and Practice, 5th edition (McGraw Hill Education)</p> <p>Hyman, D.N (2010) Public Finance- A Contemporary Application of Theory to Policy, 10th Edition (Cengage Publication)</p> <p>Sharma, J.V.M (2018) Public Finance: Principles and Practices, 1st Edition (Oxford University Press)</p> <p>Reddy, Y.V and Reddy G.R. (2018) Indian Fiscal Federalism, 1st Edition (Oxford University Press)</p>

Journals & Working Paper

Timothy Besley (1994) How Do Market Failures Justify Interventions In Rural Credit Markets? The World Bank Research Observer.

Adema, W., Fron, P., and Ladaique, M., (2011) Is the European Welfare State Really More Expensive? Indicators on Social Spending, 1980–2012,” OECD Social Employment and Migration Working Paper, France.

Afonso, A., Schuknecht, L. & Tanzi, V. (2005) Public sector efficiency: An international comparison. Public Choice

Akerlof, G., (1970) The Market for Lemons: Qualitative Uncertainty and the Market Mechanism,” Quarterly Journal of Economics

Bewley, T., (1981) A Critique of Tiebout’s Theory of Local Public Expenditures, *Econometrica*

M. Govinda Rao (2017) Public Finance in India in the Context of India’s Development, Working Paper No. 219, National Institute of Public Finance and Policy (NIPFP), New Delhi

M. Govinda Rao (2000) Tax Reform in India: Achievements and Challenges, *Asia-Pacific Development Journal*.

Arindam Das-Gupta (2011) Public Expenditure Management Committee Report: A Critical Review, *Economic & Political Weekly*.

Duncombe, W. (1996). Public expenditure research: What have we learned? *Public Budgeting & Finance*, 16(2), 26-58.

Musgrave, R. A. (1939). The voluntary exchange theory of public economy. *The quarterly journal of economics*, 53(2), 213-237.

Peacock, A. T., & Wiseman, J. (1961). Front matter, the growth of public expenditure in the United Kingdom. In *The growth of public expenditure in the United Kingdom* (pp. 32-0). Princeton University Press.

Aschauer, D. A. (1989). Is public expenditure productive? *Journal of monetary economics*, 23(2), 177-200.

Graham, D. A. (1992). Public expenditure under uncertainty: the net-benefit criteria. *The American Economic Review*, 822-846.

Davis, L. E., & Huttenback, R. A. (1977). Public expenditure and private profit: budgetary decision in the British Empire, 1860-1912. *The American Economic Review*, 67(1), 282-287.

McCaleb, T. S. (1980). Excess burden, benefit taxation, and efficiency in public expenditure. *The American Economic Review*, 70(3), 501-506.

Strayer, P. J. (1949). Public Expenditure Policy. *The American Economic Review*, 39(2), 383-404.

Jack Diamond (1977) Wagner's “Law” And The Developing Countries, *The developing Economies*.

Dev, M.S (2019) Social Sector in the 2019 Union Budget, *Economic & Political*

**Reference Books**

Weekly.

Ajit Kumar Singh (2018) Priorities of Uttar Pradesh Budget: As Infrastructure Expenditure Rises, Health and Education Face Neglect, Economic & Political Weekly.

EPW ENGAGE (2021) Union Budget 2021–22: Is Capital Expenditure Enough for an Economic Recovery? Economic & Political Weekly.

JBIC (2001) India: Fiscal Reforms and Public Expenditure Management, JBIC Research Paper No. 11

Pew-MacArthur Results First Initiative (2014) New Mexico's Evidence-based Approach to Better Governance.

World Bank (2003) Performance-based budgeting: beyond rhetoric, PREMnote, The World Bank.

Puja Dutta, Rinku Murgai, Martin Ravallion, Dominique van de Walle (2012) Does India's Employment Guarantee Scheme Guarantee Employment? The World Bank working paper.

ISGulati (1961) An Analysis of Central Government Expenditure, Economic & Political Weekly

M. Govinda Rao and Mita Choudhury (2012) Health Care Financing Reforms in India, Working Paper No: 2012-10. National Institute of Public Finance and Policy, New Delhi

Rajeev Jain and Prabhat Kumar (2013) Size of Government Expenditure Multipliers in India: A Structural VAR Analysis, W P S (DEPR): 07 /2013, RBI Working Paper Series.

Nicoletta Batini ; Luc Eyraud ; Lorenzo Forni ; Anke Weber (2014) Fiscal Multipliers: Size, Determinants and Use in Macroeconomic Projection, Fiscal Affairs Division, IMF.

Olson, M. (1969). The principle of "fiscal equivalence": the division of responsibilities among different levels of government. The American economic review, 59(2), 479-487.

Reports and Newspaper

Economic Surveys of India, Department of Economic Affairs, Ministry of Finance, Govt. of India

Union Budget of India, Ministry of Finance, Govt. of India.

RBI's Report on State Finances-A study of budgets of 2020-21

Study Reports of XV Finance Commission of India.

Reforming The Direct Tax System, Lok Sabha Secretariat Parliament Library and Reference, Research, Documentation and Information Service (Larrdis)



Interim Report of the Tax Reforms Committee (Raja J. Chelliah committee report)

Appraisal document Of Twelfth five-year plan 2012-17, NITI Aayog.

Report of the Working-Group on Estimation of Investment, its Composition and Trend for Twelfth Five-Year Plan (2012-13 to 2016-17), Planning Commission, Perspective Planning Division, Government of India.

Report of the Task Force on Direct Taxes 2002 (Dr. Vijay L. Kelkar committee report)

ADB report on Economic Analysis, Bihar State Highways II Project (RRP IND 41629)

ADB report on Stepping Up Investments for Growth Acceleration Program Subprogram 2 (RRP INO 48134)

Relevant News Paper Clippings from Mint, Business Standard, Economic Times, Financial Times, The Financial Express, The Wire, The Wall Street Journal, Harvard Business Review, BBC news, The New York Times, Forbes, Vox,

Introduction to Public Finance: Motivations, Fiscal Institutions, Theoretical Tools of Public Finance, Empirical Tools of Public Finance.

Externalities and Public Goods: Types of externalities, Market inefficiency, Government intervention, Internalization of externality through Tax and Regulation, Coase theorem, Price versus Quantity Regulation. Application of Quantity Regulation to Thermal Power Plant. Public Provision for Social Goods and Market Failure, Public Private Partnerships (PPPs) versus Privatization, Incentives and Outcomes under PPP Contracts. Some case studies.

Public Expenditure in Theory and Practice: Framework for Analysis of Expenditure Policy, Evaluating Public Expenditure, Welfare Programs and the Redistribution of Income. Public Expenditure in India: Trends and Pattern of expenditure, Portfolio of Capital Outlay, Evidence Based Policy (EBP) Framework, Outcome Budgeting.

Taxation in Theory and Practice: The Efficiency cost of Taxation, Tax incidence in multi-sector models, Taxation and labour supply, Tax rules and taxable income, Tax expenditures, Tax policy, rates of return, and saving, Targeted tax subsidies to saving, Taxation of corporate capital, Optimal commodity taxes: Ramsey and beyond, Static vs. Dynamic Taxation.

Taxation in India: Structure, trends, and pattern of Union and State Taxes and Non-Taxes, Corporate Tax cut policy, Implication of indirect tax reforms-Value Added Tax (VAT) and Goods and Service Tax (GST)

<p><b>Content</b></p>	<p>Taxation in Theory and Practice: The Efficiency cost of Taxation, Tax incidence in multi-sector models, Taxation and labour supply, Tax rules and taxable income, Tax expenditures, Tax policy, rates of return, and saving, Targeted tax subsidies to saving, Taxation of corporate capital, Optimal commodity taxes: Ramsey and beyond, Static vs. Dynamic Taxation.</p> <p>Taxation in India: Structure, trends, and pattern of Union and State Taxes and Non-Taxes, Corporate Tax cut policy, Implication of indirect tax reforms-Value Added Tax (VAT) and Goods and Service Tax (GST)</p> <p>Theory of Intergovernmental Fiscal Relations: Fiscal Federalism, Optimal Fiscal Federalism, The Tiebout Model, Vertical and Horizontal Fiscal Imbalances, Fiscal Equalization: Redistributions of Public Funds, Fiscal Federalism in U.S, Canada, Australia, and EU. Fiscal Federalism in India, Asymmetric Federalism, Union Finance commission Transfer, Non-Finance Commission Transfer. Local self-government - Sources of revenue and expenditure needs, Tied and Untied Grants.</p> <p>Fiscal Deficits and Government Debt: Theory of debt sustainability, Theory of Fiscal Rules, Debt situation in India, Debt and growth, Debt Trap Diplomacy, Sovereign default risk and austerity in European countries, and Evaluating the Fiscal Rules in India. Some case studies.</p>
<p><b>Remark</b></p>	

<b>Course Number</b>	ECO318
<b>Course Title</b>	Money, Banking and Financial Markets
<b>Credits</b>	4
<b>Learning Objectives</b>	<p>This course is designed to provide an introduction to the flow of funds in the economy, the banking sector and to financial markets and systems, all of which are essential to the functioning of modern economies. Instruction includes an overview of monetary policy and how the central bank regulates and supervises the banking system, as well as the tools it employs as it manages the cost and availability of money in the economy. Although the module is about financial systems in general, there will be frequent reference to contemporary issues and problems, and to their historical antecedents. The approach will incorporate a blend of published economic and financial data, and as far as possible, international comparisons.</p>
<b>Prerequisites</b>	Courses like POE II/ Econometrics I/II/ Macroeconomics I
<b>Text Books</b>	<p>Benjamin M. Friedman, Michael Woodford (2010) Handbook of Monetary Economics, Volume 3A [1 ed.] &amp; Volume 3B [1 ed.]</p> <p>Benjamin M. Friedman, F.H. Hahn (1990) Handbook of Monetary Economics Vol. 1 &amp; 2</p> <p>Ball, L.M, (2012), Money, Banking and Financial Markets, Worth</p> <p>Mishkin, F, (2013), The Economics of Money Banking &amp; Financial Markets (European Edition), Harlow: Pearson</p>

## Reference Books

Agustín Carstens (2021), Digital currencies and the future of the monetary system, Bank for International settlements.

Benjamin J. Cohen (2001), Electronic Money: New Day or False Dawn? Review of International Political Economy 8(2).

Michael D Bordo and Andrew T Levin (2017) central bank digital currency and the future of monetary policy, NBER Working Paper 23711

IMF (2018) Money Transformed, the future of currency in a digital world, Finance and Development, International Monetary Fund.

Friedman, Benjamin M. 2000. "Decoupling at the Margin: The Threat to Monetary Policy from the Electronic Revolution in Banking." International Finance, 3 (2)

Woodford, Michael. 2000. "Monetary Policy in a World without Money." International Finance, 3 (2)

Bech, M. and R. Garratt (2017) 'Central bank cryptocurrencies', BIS Quarterly Review September 2017, Bank for International Settlements

BIS (2018) Cryptocurrencies: looking beyond the hype, BIS Annual Economic Report, Bank for International Settlements

Stevens, A. (2017) 'Digital currencies: Threats and opportunities for monetary policy', NBB Economic Review June 2017, National Bank of Belgium

Relevant News Paper Clippings: Mint, Business Standard, Economic Times, Financial Times, The Financial Express, The Wire, The Wall Street Journal, Harvard Business Review, The New York Times

<b>Content</b>	<p>Foundation: The financial system, Money and central banks.</p> <p>Financial markets and institutions: Assets prices and interest rate, Risk and term structure of interest rates, Stock market, theory of rational expectations, and efficient market hypothesis, foreign exchange markets, Economic analysis of financial structure and regulations</p> <p>Banking industry: Structure and competition, Asymmetric information in financial system, Business of banking, Bank regulations, financial crisis in advanced economies and emerging economies</p> <p>Monetary theory: Monetary aggregates: the supply of money and interest rate, credit creation, money market instruments, the quantity theory of money, inflation and demand for money, Inflation Expectations and The Phillips curve</p> <p>Central banking and Monetary Policy: Optimal Monetary Policy, Optimal Monetary Stabilization Policy, Simple and Robust Rules for Monetary Policy, Optimal Monetary Policy in Open Economies, Constraints on Monetary Policy, The Interaction Between Monetary and Fiscal Policy, The Politics of Monetary Policy, Inflation Expectations, Adaptive Learning and Optimal Monetary Policy, Transmission mechanisms of monetary policy, Taylor's Rules</p> <p>Monetary Policy in Practice: Monetary Policy Regimes and Economic Performance, Inflation Targeting, The Performance of Alternative Monetary Regimes, Monetary Policy in Emerging Markets, Negative Interest Rate Policy</p> <p>Digital Currency: Digital currencies, Digital currencies and the future of the monetary system, Monetary policy in digital age, Central Bank Digital Currency, Cryptocurrencies and its implication for monetary system</p>
----------------	--

IISER Bhopal.

<b>Course Number</b>	ECO319
<b>Course Title</b>	Time Series Analysis and Forecasting
<b>Credits</b>	4
<b>Learning Objectives</b>	The main objective of this course is to develop the skills needed to do empirical research on time series data in fields of monetary policy, fiscal policy, international trade, etc. The course aims to provide students hands-on experience with analyzing economic time series data, estimation and forecasting. Attention will be given to limitations of different methods and recent developments in Time Series Analysis.
<b>Prerequisites</b>	Econometrics I(ECO201)
<b>Other Prerequisites</b>	

**Text Books**

Box, G. E., Jenkins, G. M., Reinsel, G. C., & Ljung, G. M. (2015). Time series analysis: Forecasting and control. New York: Wiley.

Enders, W. (2008). Applied econometric time series. John Wiley & Sons.

Hamilton, J. D. (2020). Time series analysis. Princeton university press.

Lütkepohl, H. (2005). New introduction to multiple time series analysis. Springer Science & Business Media.

## Journals

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, 74(366a), 427-431.

Elder, J., & Kennedy, P. E. (2001). Testing for unit roots: what should students be taught? *The Journal of Economic Education*, 32(2), 137-146.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335-346.

Perron, P. (1990). Testing for a unit root in a time series with a changing mean. *Journal of Business & Economic Statistics*, 8(2), 153-162.

Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root?. *Journal of econometrics*, 54(1-3), 159-178.

Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: journal of the Econometric Society*, 1-48.

Zellner, A. (1962). An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of the American statistical Association*, 57(298), 348-368.

Zivot, E., & Andrews, D. W. K. (2002). Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis. *Journal of business & economic statistics*, 20(1), 25-44.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica: Journal of the econometric society*, 987-1007.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of econometrics*, 31(3), 307-327.

Robert, E., & Victor, N. (1993). Measuring and testing the impact of news on volatility. *The journal of Finance*, 48(5), 1749-1778.

Nelson, D. B. (1990). Stationarity and persistence in the GARCH (1, 1) model. *Econometric theory*, 318-334.

Engle, R. (2001). GARCH 101: The use of ARCH/GARCH models in applied econometrics. *Journal of economic perspectives*, 15(4), 157-168.

Bauwens, L., Laurent, S., & Rombouts, J. V. (2006). Multivariate GARCH models: a survey. *Journal of applied econometrics*, 21(1), 79-109.

Sims, C. A. (1972). Money, income, and causality. *The American economic review*, 62(4), 540-552.

Stock, J. H., & Watson, M. W. (2001). Vector autoregressions. *Journal of Economic perspectives*, 15(4), 101-115.

Lütkepohl, H. (2013). Vector autoregressive models. In *Handbook of Research Methods and Applications in Empirical Macroeconomics*. Edward Elgar Publishing.

Lupoletti, W. M., & Webb, R. H. (1986). Defining and improving the accuracy

## Reference Books

<b>Content</b>	<p>Course Contents:</p> <p>Stationary Univariate Models: Difference equation, ARMA models, Box-Jenkins methodology, Model Selection, Forecasting, Seasonal Auto Regression Integrated Moving Average (SARIMA), Applications to macroeconomic time series data.</p> <p>Testing for Trend and Unit Roots: Unit root process, Dickey-Fuller test, Extension of Dickey-Fuller test, Phillips–Perron test, other unit root tests, Testing Unit root for structural change. Zivot-Andrew’s test, Problems in testing for unit roots.</p> <p>Time series model of heteroskedasticity: Auto Regressive Conditional Heteroskedasticity (ARCH), Generalized ARCH (GARCH), Exponential GARCH etc. The empirical applications will be drawn primarily from macroeconomics.</p> <p>Stationary multivariate models: Vector Auto Regression (VAR), Granger causality, Impulse response function, Structural VARs, Short run SVAR, Long run SVAR, The Blanchard and Quah decomposition. Applications to macroeconomic time series data.</p> <p>Non-stationary multivariate models: Spurious regression, Co-integration, The Engel-Granger method, Johansen test, Autoregressive distributed lag (ARDL) model, Vector Error Correction (VECM) model. Applications to macroeconomic time series data.</p> <p>Long Memory Models: Auto Regression Fractionally Integrated Moving Average (ARFIMA)</p> <p>Structural break and Nonlinear models: Test for structural change with unknown change point, Chow test, Bai and Perron test, Regime switching models, Nonlinear Least square, Threshold Regression, Threshold Auto-Regressive (TAR), Nonlinear ARDL. Applications to macroeconomic time series data.</p>
----------------	--

<b>Course Number</b>	ECO320
<b>Course Title</b>	Social Choice Theory
<b>Credits</b>	4
<b>Learning Objectives</b>	<p>This is a course in pure theory, which will discuss in detail the literature on the Theory of Rational Choice for an individual and then extend the framework to discuss Social Choice. The course will highlight the difficulties and contradictions involved in democratic decision making processes with Arrow Impossibility Theorem as a starting point and bringing in the later developments. It is visualized as a self-contained course with elements of deductive logic covered along with the lectures. The course extends the knowledge a student has learnt in an advanced Microeconomic Theory course.</p>



<b>Prerequisites</b>	Microeconomics II
<b>Text Books</b>	<p>A. K. Sen (2017), <i>Collective Choice and Social Welfare</i>, Expanded Edition, Penguin.</p> <p>A.K. Sen (1983), <i>Choice, Welfare and Measurement</i>, OUP.</p> <p>A.K. Sen (1986), <i>Social Choice Theory in Arrow and Intrilligator (ed) Handbook of Mathematical Economics</i>, Vol III, North Holland.</p>
<b>Reference Books</b>	<p>Kenneth J. Arrow (1963), <i>Social Choice and Individual Values</i>, 2nd ed., Wiley.</p> <p>K. Suzumura (1983), <i>Rational Choice, Collective Decisions and Social Welfare</i>, Cambridge University Press.</p> <p>Wriglesworth (1985), <i>Libertarian Conflicts in Social Choice</i>, Cambridge University Press.</p> <p>M. Richter (1966), <i>Revealed Preference Theory</i>, <i>Econometrica</i>.</p> <p>M. Richter (1967), <i>Rational Choice in Chipman et al. (ed) Preference, Utility and Demand</i>.</p> <p>Prasanta K. Pattanaik (1994), <i>Some non-welfarist issues in Welfare Economics in Dutta (ed) Welfare Economics</i>, OUP.</p> <p>Gaertner, Pattanaik and Suzumura (1992), <i>Individual Rights Revisited</i>, <i>Economica</i>.</p> <p>A. Gibbard (1974), <i>A Pareto Consistent Libertarian Claim</i>, <i>Journal of Economic Theory</i>.</p>
<b>Content</b>	<p>Topic 1: Rational Choice and Revealed Preference  Preference relations and their properties, Choice induced from a preference relation, Rationality and Consistency of Choice functions, Characterization of degrees of rationality, Importance of domain assumptions on the standard results.</p> <p>Topic 2: Arrow Impossibility Theorems  Arrow Impossibility Theorem, Relaxation of the assumptions taken by Arrow, Oligarchy and Gibbard's Impossibility Theorem, Veto theorem and hierarchy of vetoers.</p> <p>Topic 3: Characterization of Majority Rule and some Possibility Results  Simple Majority Rule, Characterization of Simple Majority Rule, Domain Restrictions and some Possibility results.</p> <p>Topic 4: Liberal Paradox  Sen's Liberal Paradox, Gibbard's modification, Escape routes, Game Forms and Liberal Paradox.</p>

<b>Course Number</b>	ECO322
----------------------	--------

<b>Course Title</b>	Topics in Advanced Microeconomic Theory
<b>Credits</b>	4
<b>Learning Objectives</b>	<p>Objective: The focus in this course will be a rigorous presentation of Arrow Debreu model.</p> <p>Starting with an axiomatic analysis of the behavior of a consumer and a producer, the micro agents in any economy, it goes on to analyses how equilibrium is obtained when numerous selfish agents interact with each other and its welfare implications. Emphasis will be put on proving some of the most important results in the area.</p>
<b>Prerequisites</b>	Microeconomics II
<b>Text Books</b>	
<b>Reference Books</b>	<p>Readings:</p> <ol style="list-style-type: none"> <li>1. G. Jehle and P. Reny (2004): Advanced Microeconomic Theory, Pearson, 2nd edition.</li> <li>2. H. Varian (1992): Microeconomic Analysis, Norton, 3rd edition.</li> <li>3. A. Mascolell, M. Whinston and J. Green (1995): Microeconomic Theory, Oxford University Press.</li> <li>4. Allan Feldman and Roberto Serrano (2006): Welfare Economics and Social</li> <li>5. Choice Theory, Springer.</li> </ol>

<b>Content</b>	<ol style="list-style-type: none"> <li>1. CONSUMER <ol style="list-style-type: none"> <li>a. Axiomatic Foundation of Utility Analysis</li> <li>b. Comparative Static Results</li> <li>c. Duality</li> <li>d. Revealed Preference</li> <li>e. Measurement of Welfare Change</li> </ol> </li> <li>f. Consumer choice under uncertainty</li> <li>2. PRODUCER <ol style="list-style-type: none"> <li>a. Technology</li> <li>b. Profit Maximisation of a competitive firm</li> <li>c. Cost minimisation</li> <li>d. Duality</li> <li>e. Efficiency</li> </ol> </li> <li>3. General Equilibrium <ol style="list-style-type: none"> <li>a. Concept of Walrasian equilibrium, Walras' law</li> <li>b. Problem of existence, uniqueness and stability of competitive equilibrium</li> <li>c. Core of an Exchange Economy</li> </ol> </li> <li>4. Welfare Economics <ol style="list-style-type: none"> <li>a. Conditions for Pareto optimality under exchange and with production</li> <li>b. The two welfare theorems</li> <li>c. Social welfare functions and Arrow impossibility theorem</li> </ol> </li> </ol>
<b>Remark</b>	

<b>Course Number</b>	ECO613
<b>Course Title</b>	Mathematics for Economists
<b>Credits</b>	4
<b>Learning Objectives</b>	<p>The course is specifically designed to demonstrate the importance of the use of mathematical techniques in theoretical economics and to enable students to develop skills in mathematical modelling.</p> <p>At the end of this course, and having completed the essential reading and activities, the student should be able to use and explain the underlying principles, terminology, methods, techniques and conventions used in the subject to solve economic problems using the mathematical methods described in the subject.</p>

<b>Prerequisites</b>	Microeconomics I (ECO202) and Macroeconomics II (ECO302)
<b>Other Prerequisites</b>	
<b>Text Books</b>	
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. Simon, Carl P., and Lawrence Blume. <i>Mathematics for economists</i>. Vol. 7. New York: Norton, 1994.</li> <li>2. Sundaram, Rangarajan K. <i>A first course in optimization theory</i>. Cambridge university press, 1996.</li> <li>3. De la Fuente, Angel. <i>Mathematical methods and models for economists</i>. Cambridge University Press, 2000.</li> <li>4. Ok, Efe A. <i>Real analysis with economic applications</i>. Vol. 10. Princeton University Press, 2007.</li> <li>5. Mas-Colell, Andreu, Michael Dennis Whinston, and Jerry R. Green. <i>Microeconomic theory</i>. Vol. 1. New York: Oxford university press, 1995.</li> </ol>
<b>Content</b>	<p>Review of Set Theory and Logic: Sets, Unions, Intersections, Propositions - Contrapositives and Converses, Quantifiers and Negation, Necessary and Sufficiency Condition</p> <p>Review of One variable Calculus: Functions on <math>R^1</math>, Linear and Non-linear Functions, Differentiability and Continuity, Higher order derivatives and Conexity, Tails and Horizontal Asymptotes, Maxima and Minima, Composite functions and Chain rule, Inverse functions, Exponents and Logarithms and their derivatives, Applications to Economics</p> <p>Linear Algebra: Examples of Linear models, Systems of Linear Equations, Matrix Algebra, Determinants and Cramer's rule, Points and Vectors in Euclidean Space, Vector algebra, Length and Inner Product in <math>R^N</math>, Vector Spaces and Sub-spaces, Basis and Dimensions, Row Space, Column Space, Null Space, Spanning Sets in <math>R^N</math>, Lines and Planes, Linear Independence, Eigen values and Eigen Vectors, Diagonalization of Matrices, Economic Applications</p> <p>Analysis: Sequence of Real Numbers, Sequences in <math>R^m</math>, Cauchy Sequences, Open and Closed Sets, Compact Sets, Connected Sets, Alternative Norms</p> <p>Functions and Calculus of Several Variables: Functions between Euclidean Spaces, Geometric representation of functions, Functions between Euclidean Spaces, Geometric Representation of Functions, Continuous Functions, Calculus</p>

	<p>of Several variables, Partial Derivative, Total Derivative and the Chain Rule, Directional Derivative and Gradients, Explicit Functions from <math>R^n</math> to <math>R^m</math>, Higher Order Derivatives, Implicit Functions and their Derivatives, Level Curves and their Tangents, System of Implicit Functions, Implicit Function Theorem, Weistrauss Theorem, Mean Value Theorem, Taylor Polynomials in <math>R^1</math> and <math>R^N</math>, Comparative Statics using Economic Applications</p> <p>Static Optimization:</p> <p>Quadratic Forms, Definiteness of Quadratic Forms, Second-Order Optimization Conditions, Linear Constraints and Bordered matrices,</p> <p>Unconstrained Optimization – First Order Conditions, Second-Order Sufficient and Necessary Conditions, Global maxima and Minima, Economic Applications</p> <p>Constrained Optimization – Equality Constraints, Inequality Constraints, Mixed Constraints, Constrained Minimization Problems, Kuhn-Tucker Formulation, Meaning of Multiplier, Envelope Theorem, Second-Order Conditions, Smooth Dependence on the Parameters, Constraint Qualifications</p> <p>Homogeneous and Homothetic Functions</p> <p>Concave and Convex Functions, Properties of Concave Functions, Quasiconcave and Quasiconvex functions, Pseudoconcave functions, Concave programming</p> <p>Economic Applications</p>
<b>Remark</b>	

<b>Course Number</b>	ECO324
<b>Course Title</b>	General Equilibrium and Welfare Economics
<b>Credits</b>	4
<b>Learning Objectives</b>	The course considers the behaviour of individual agents and builds from this foundation to a theory of aggregate economic outcomes. The aim is to develop deeper and advanced understanding of the working of the market mechanism, in terms of both ideal outcomes and market failure. It discusses the problem of existence, uniqueness and stability of competitive equilibrium and its optimality properties in a rigorous way.
<b>Prerequisites</b>	Microeconomics II and Macroeconomics II
<b>Other Prerequisites</b>	
<b>Text Books</b>	<ol style="list-style-type: none"> <li>1. G. Jehle and P. Reny (2004): Advanced Microeconomic Theory, Pearson, 2nd edition.</li> <li>2. H. Varian (1992): Microeconomic Analysis, Norton, 3rd edition.</li> <li>3. A. Mascolell, M. Whinston and J. Green (1995): Microeconomic Theory, Oxford University Press.</li> <li>4. Allan Feldman and Roberto Serrano (2006): Welfare Economics and Social Choice Theory, Springer</li> <li>5. James Moore (2010): General Equilibrium and Welfare Economics, Springer.</li> </ol>

<p><b>Reference Books</b></p>	<ol style="list-style-type: none"> <li>1. G. Jehle and P. Reny (2004): Advanced Microeconomic Theory, Pearson, 2nd edition.</li> <li>2. H. Varian (1992): Microeconomic Analysis, Norton, 3rd edition.</li> <li>3. A. Mascolell, M. Whinston and J. Green (1995): Microeconomic Theory, Oxford University Press.</li> <li>4. Allan Feldman and Roberto Serrano (2006): Welfare Economics and Social Choice Theory, Springer</li> <li>5. James Moore (2010): General Equilibrium and Welfare Economics, Springer.</li> </ol>
<p><b>Content</b></p>	<p>General Equilibrium: Review of consumer and producer behaviour, Simple model of General Equilibrium, Extension to a general model and characteristic of Walrasian Equilibrium, Existence of Competitive Equilibrium, Problem of Uniqueness and Stability of Equilibrium, Manipulability of a competitive equilibrium: concept of Core. Applications.</p> <p>Welfare Economics: Optimality properties of equilibrium, conditions for Pareto Optimality, 1st and 2nd Welfare Theorems, Market failure, Compensation Principles, Social Welfare Functions and Arrow Impossibility Theorem.</p>
<p><b>Remark</b></p>	