Structure and Detailed Syllabus

of the Undergraduate Course (B.Sc.) in Economics under CBCS

Department of Economics

Presidency University

Department of Economics
(Faculty of Natural and Mathematical Sciences)
Presidency University
Hindoo College (1817-1855), Presidency College (1855-2010)
86/1, College Street, Kolkata - 700 073
West Bengal, India

DEPARTMENT OF ECONOMICS
PRESIDENCY UNIVERSITY

Content

Course Structure: There are a total of fourteen economics core courses that students are required to take across six semesters. All the core courses are compulsory. In addition to core courses in economics, a student of B.Sc. (Hons.) Economics will choose four Discipline Specific Elective (DSE) Courses. The Discipline Specific Elective (DSE) Courses are offered in the fifth and sixth semesters and two such courses will be selected by a student from a set of courses specified for each of these semesters (Groups I and II in the attached table).

Contact Hours: Each course has 5 lectures and 1 tutorial (per group) or 4 lectures and 4 practical classes per week.

Note on Course Readings: The nature of several of the courses is such that only selected readings can be specified in advance. Reading lists will be updated and topic-wise readings should be specified at regular intervals, ideally on an annual basis.

Academic Session: Each Semester shall contain at least 16 Teaching Weeks

Odd Semesters: Semesters One and Three - July to December
Even Semesters: Semesters Two and Four - January to June

Credit Structure

COURSE TYPE	CREDITS		
	Total Papers	**Theory + Practical**	**Theory + Tutorial**
Core Courses	14	14x4 + 14x2 = 84	14x5 + 14x1= 84
Skill Enhancement Courses	2	2x4=8	2x4=8
Discipline Specific Elective Courses	4	4x4 + 4x2 = 24	4x5 + 4x1 = 24
Ability Enhancement Compulsory Language Course	1	1x4 = 4	1x4 = 4
Ability Enhancement Compulsory Environmental Science Course	1	1x4 = 4	1x4 = 4
Generic Elective Courses	4	4x4 + 4x2 = 24	4x5 + 4x1 = 24
Total	26	**148**	**148**

Total Marks Distribution

COURSE TYPE	CREDITS	
	Total Papers	**Theory + Tutorial / Practical**
Core Courses	14	14 x 100 = 1400
Skill Enhancement Courses	2	2 x 100 =200
Discipline Specific Elective Courses	4	4 x 100 = 400
Ability Enhancement Compulsory Language Course	1	1 x 100 = 100
Ability Enhancement Compulsory Environmental Science Course	1	1 x 100 = 100
Generic Elective Courses	4	4 x 100 = 400
Total	26	**2600**

Semester-wise Modules of the Undergraduate Course in Economics (Major) under CBCS

FIRST SEMESTER	SECOND SEMESTER
Economics Core Course 1: ECON01C1 Introductory Microeconomics [Credit 6] **Economics Core Course 2: ECON01C2** Mathematical Methods for Economics-I [Credit 6] **Ability Enhancement Compulsory Course 1: AECC1** Environmental Science [Credit 4] **Generic Elective (GE) Course-1** [Credit 6]	**Economics Core Course 3: ECON02C3** Introductory Macroeconomics **[Credit 6]** **Economics Core Course 4: ECON 02C4** Mathematical Methods for Economics-II [Credit 6] **Ability Enhancement Compulsory Course 2: AECC2** English Communication /MIL [Credit 4] **Generic Elective (GE) Course-2** [Credit 6]
THIRD SEMESTER	FOURTH SEMESTER
Economics Core Course 5: ECON03C5 Intermediate Microeconomics-I [Credit 6] **Economics Core Course 6: ECON03C6** Intermediate Macroeconomics-I [Credit 6] **Economics Core Course 7: ECON03C7** **Statistical Methods for Economics** [Credit 6] **Skill Enhancement Course 1: ECON03SEC1** Data management and presentation using Microsoft Excel and R [Credit 4] **Generic Elective (GE) Course-3** [Credit 6]	**Economics Core Course 8: ECON04C8** Intermediate Microeconomics-II [Credit 6] **Economics Core Course 9: ECON04C9** Intermediate Macroeconomics-II [Credit 6] **Economics Core Course 10: ECON04C10** Introductory Econometrics [Credit 6] **Skill Enhancement Course 2: ECON04SEC2** Analyzing contemporary economic issues [Credit 4] **Generic Elective (GE) Course-4** [Credit 6]
FIFTH SEMESTER	SIXTH SEMESTER
Economics Core Course 11: ECON05C11 Indian Economy-I [Credit 6] **Economics Core Course 12: ECON05C12** Development Economics-I [Credit 6] **Discipline Specific Elective Course-I: ECON 05DSE1** (From List of Group-I) [Credit 6] **Discipline Specific Elective Course-II: ECON 05DSE2** (From List of Group-I) [Credit 6]	**Economics Core Course 13: ECON06C13** Indian Economy-II [Credit 6] **Economics Core Course 14: ECON06C14** Development Economics-II [Credit 6] **Discipline Specific Elective Course-III: ECON06DSE3** (From List of Group-II) [Credit 6] **Discipline Specific Elective Course-IV: ECON06DSE4** (From List of Group-II) [Credit 6]

Group-I (DSE1 and DSE2)
(A) Applied Econometrics
(B) Game Theory and Information Economics
(C) Public Economics

Group-II (DSE3 and DSE4)
(A) International Economics
(B) Financial Economics
(C) Environmental Economics

**Semester-wise Modules of the
Undergraduate Generic Elective Courses in Economics under CBCS**

FIRST SEMESTER	SECOND SEMESTER
Generic Elective in Economics 1: ECON01GE1 Introductory Microeconomics [Credit 6]	**Generic Elective in Economics 2: ECON02GE2** Introductory Macroeconomics [Credit 6]
THIRD SEMESTER	**FOURTH SEMESTER**
Generic Elective in Economics 3: ECON03GE3 (Select one from the following list) **ECON03GE3A**: Indian Economy I [Credit 6] **ECON03GE3B**: Money and Banking [Credit 6]	**Generic Elective in Economics 4: ECON04GE4** (Select one from the following list) **ECON04GE4A:** Indian Economy II [Credit 6] **ECON04GE4B:** Public Finance [Credit 6]

Credit Allocation and Marks Distribution for the Undergraduate Course in Economics (Major) under CBCS

Sem	Course Type	Paper Code	Course Name	Credits				Marks			
				Theory	Tutorial	Practical	Total	Theory	Tutorial	Practical	Total
First	Core Course	ECON01C1	Introductory Microeconomics	5	1		6	70	30		100
First	Core Course	ECON01C2	Mathematical Methods for Economics-I	5	1		6	70	30		100
Second	Core Course	ECON02C3	Introductory Macroeconomics	4		2	6	70	30		100
Second	Core Course	ECON 02C4	Mathematical Methods for Economics-II	5	1		6	70	30		100
Third	Core Course	ECON03C5	Intermediate Microeconomics-I	5	1		6	70	30		100
Third	Core Course	ECON03C6	Intermediate Macroeconomics-I	5	1		6	70	30		100
Third	Core Course	ECON03C7	Statistical Methods for Economics	4		2	6	70	30		100
Third	Skill Enhancement Course	ECON03SEC1	Data management and presentation using Microsoft Excel and R			4	4			100	100
Fourth	Core Course	ECON04C8	Intermediate Microeconomics-II	5	1		6	70	30		100
Fourth	Core Course	ECON04C9	Intermediate Macroeconomics-II	5	1		6	70	30		100
Fourth	Core Course	ECON04C10	Introductory Econometrics	4		2	6	70		30	100
Fourth	Skill Enhancement Course	ECON04SEC2	Analyzing contemporary economic issues			4	4			100	100
Fifth	Core Course	ECON05C11	Indian Economy-I	4		2	6	70	30		100
Fifth	Core Course	ECON05C12	Development Economics-I	4		2	6	70	30		100
Fifth	Department Specific Elective	ECON 05DSE1	*Select any two of the followings:* (A) Applied Econometrics	4/5	0/1	2/0	6	70	0/30	30/0	100
Fifth	Department Specific Elective	ECON 05DSE2	(B) Game Theory and Information Economics (C) Public Economics				6	70	0/30	30/0	100
Sixth	Core Course	ECON06C13	Indian Economy-II	4		2	6	70	30		100
Sixth	Core Course	ECON06C14	Development Economics-II	4		2	6	70	30		100

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Sem	Course Type	Paper Code	Course Name	Credits				Marks			
				Theory	Tutorial	Practical	Total	Theory	Tutorial	Practical	Total
Sixth	Department Specific Elective	ECON06DSE3	*Select any two of the followings:*	4/5	0/1	2/0	6	70	0/30	30/0	100
Sixth	Department Specific Elective	ECON06DSE4	(A) International Economics (B) Financial Economics (C) Environmental Economics				6	70	0/30	30/0	100
			Total				**116**				**2000**

Credit Allocation and Marks Distribution for the Undergraduate Generic Elective Courses in Economics under CBCS

Sem	Course Type	Paper Code	Course Name	Credits				Marks			
				Theory	Tutorial	Practical	Total	Theory	Tutorial	Practical	Total
First	Generic Elective	ECON01GE1	Introductory Microeconomics	5	1		6	80	20		100
Second	Generic Elective	ECON02GE2	Introductory Macroeconomics	5	1		6	80	20		100
Third	Generic Elective	ECON03GE3 (Any one from A and B)		5	1		6	80	20		100
		ECON03GE3A	Indian Economy I								
		ECON03GE3B	Money and Banking								
Fourth	Generic Elective	ECON04GE4 (Any one from A and B)		5	1		6	80	20		100
		ECON04GE4A	Indian Economy II								
		ECON04GE4B	Public Finance								
			Total				**24**				**400**

DESCRIPTIONS OF CORE COURSES

FIRST SEMESTER

ECON01C1: INTRODUCTORY MICROECONOMICS
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course is designed to expose the students to the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyze real-life situations.

1. Exploring the subject matter of Economics

Why study economics? Scope and method of microeconomics - reading and working with graphs.
The economic problem: Scarcity and choice - production possibility curve – trade off, opportunity cost and decision making; incentives and information – prices (absolute and relative prices) property rights and profits.
Decision takers- households, firms and central authorities; choice by command and choice by market.
Alternatives to the price system – Rationing by Queues, Rationing by Lotteries, Rationing by Coupons.
Economic Systems

2. Supply and Demand: How Markets Work, Markets and Welfare

a. Elementary theory of demand – determinants of household demand and market demand, and shifts in the demand curves
b. Elementary theory of supply - factors influencing supply, derivation of the supply curve, and shifts in the supply curve
c. Determination of equilibrium price in a competitive market - Existence, Uniqueness and Stability of equilibrium (the Walrasian approach and Marshallian approach).
d. Prices and resource allocation
e. Elasticity and its application
f. Government Interventions and their Effects on market equilibrium – price ceiling, price floor and commodity taxation.
g. Consumer surplus, producer surplus and the efficiency of the markets.

3. The Households

a. Cardinal & Ordinal utility.
b. Axioms of rational choice, the consumption decision – description of preferences (representing preferences with indifference curves) - properties of indifference curves; budget constraint; optimum and consumer's equilibrium.
c. Comparative statics: income and price changes – derivation of price consumption curve, income consumption curve and Engel's curve; demand for all other goods and price changes.
d. Substitution and income-effects and law of demand; Slutsky equation; Compensating and equivalent variation, and consumer surplus – concepts of Marshallian and compensated demand curves.

4. Production and Costs

a. Technology and technological efficiency – general concept of production function – concepts of total product, average product and marginal product –return to factor and returns to scale - isoquants and diminishing rate of factor substitution – elasticity of substitution –some examples of technology (fixed

proportion, perfect substitute, Cobb – Douglas Production Function, CES Production Function), General concept of homogeneous and homothetic production function and their properties.
b. Economic / Opportunity cost and accounting cost, concept of sunk cost; time dimension of cost – cost in the short run – total cost – fixed and variable cost – marginal cost – average cost – derivation of short run cost - long run cost function - functional coefficient and shape of long run average cost.— relation between short run and long run cost; expansion path; relation between expansion path and long run total cost curve.

5. The Firm and Perfect Market Structure

a. Defining a firm - firm's legal forms; profit maximization hypothesis
b. Behaviour of profit maximizing firms and the production process.
c. Short run costs and output decisions.
d. Costs and output in the long run.

Readings

1. Joseph E. Stiglitz and Carl E. Walsh, *Economics*, W.W. Norton & Company, Inc., New York, International Student Edition, 4th Edition, 2007.
2. Karl E. Case and Ray C. Fair, *Principles of Economics*, Pearson Education Inc., 8th Edition, 2007.
3. Hal R. Varian, Intermediate Microeconomics, a Modern Approach, W.W. Norton and Company/Affiliated East-West Press (India), 8th edition, 2010.
4. J. M. Perloff: Microeconomics – Theory and Application with Calculus, Addison Wesley.

ECON01C2: MATHEMATICAL METHODS IN ECONOMICS - I
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This is the first of a compulsory two-course sequence. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

1. Preliminaries: Sets and Functions

a. Basic set operations, convex sets.
b. Real numbers, lowest upper bound, greatest lower bound, maximum, minimum.
c. Sequences and their limits, criteria of convergence, monotone sequences, bounded sequences.
d. Functions and correspondences, into and onto functions, inverse functions, composition of functions, one to one correspondence between sets, convex, concave, quasi concave, homogeneous and homothetic functions.

2. Functions of one variable

a. Continuous functions of different types and their graphs—quadratic, polynomial, power, exponential, and logarithmic.

b. Derivatives of first and second order and their properties.
c. Economic applications.

3. Single variable optimization

a. Geometric properties of functions
b. Implicit functions and their derivatives.
c. Maclaurin series, Taylor series, Lagrange form of remainder.
d. Optimization: Local vs global optimum, necessary and sufficient conditions.
e. Economic applications.

4. Functions of several variables

a. Geometric representations: graphs and level curves.
b. Differentiable functions: characterizations, properties with respect to various operations and applications
c. Second order derivatives: properties and applications.
d. Homogeneous and homothetic functions, Euler's theorem.
e. Economic applications.

5. Linear Algebra

a. Vector spaces: algebraic and geometric properties, scalar products, norms, orthogonality.
b. Linear transformations: properties, matrix representations and elementary operations.
c. Determinants: characterization, properties and applications.
d. Systems of linear equations and Cramer's Rule.
e. Economic applications.

Readings

1. K. Binmore: Mathematical Analysis, Cambridge
2. E. Silberberg & Suen: The Structure of Economics, McGraw Hill.
3. K. Sydsaeter and P. Hammond, Mathematics for Economic Analysis, Pearson Education Asia: Delhi.
4. A. Chiang & K. Wainwright: Fundamental Methods of Mathematical Economics, McGraw Hill.
5. Simon & Blume, Mathematics for Economists, Viva Books.
6. M. Hoy, J. Livernois, C. McKenna, R. Rees & T. Stengos, Mathematics for Economics. MIT Press.

SECOND SEMESTER

ECON02C3: INTRODUCTORY MACROECONOMICS
Credit - 06 [Theory: 04; Practical/Applications: 02]
Theory
Credit: 04
Contact hours per week: 04

Course Description

This course aims to introduce the students to the basic concepts of Macroeconomics. Macroeconomics deals with the aggregate economy. This course discusses the preliminary concepts associated with the determination and measurement of aggregate macroeconomic variables like savings, investment, GDP, money, inflation, and monetary and fiscal policies.

1. Introduction to Macroeconomics and National Income Accounting

Introduction to Macroeconomic variables; microeconomic and macroeconomic approaches; basic issues studied in macroeconomics; measurement of GDP, GNP, NDP, NNP and NI; circular flow of income; problems encountered in measuring National Income; real versus nominal GDP -CPI, WPI and GDP deflator, National Income as a measure of welfare; National Income accounting for an open economy; balance of payments: current and capital accounts.

2. Money

Definitions of money – M1, M2, M3 and M4; Functions of money; determination of money supply; money creation by commercial banks; money multiplier; control of money supply by the central bank tools of monetary policy.

3. Inflation and Unemployment

a. Meaning of inflation, cost of inflation and hyperinflation
b. Money supply and Inflation - quantity theory approach
c. Concepts of unemployment, natural rate of unemployment, structural unemployment, frictional unemployment, cyclical unemployment, involuntary and voluntary unemployment; Inflation-unemployment relationship: an introduction

4. The Closed Economy in the Short Run

Simple Keynesian model of income determination - Keynesian consumption function, Autonomous investment and Income-Expenditure equilibrium, multiplier, Paradox of thrift; IS-LM model - Investment function and IS curve, Asset market equilibrium and LM curve, Determination of equilibrium income and interest rate, Comparative Statics - Monetary policies and fiscal policies, Extensions (Classical adjustment in IS-LM model, IS-MP model)

Readings

1. Wilfrid Beckerman, An introduction to national income analysis, ELBS
2. Mankiw, N.G., Macroeconomics, Worth Publishers, 7th edition, 2010.
3. Froyen, R.T., Macroeconomics, Pearson Education Asia, 2nd edition, 2005.
4. Sikdar, S., Principles of Macroeconomics, Oxford University Press, 2nd edition, 2011.
5. Hicks, J. R., M. Mukherjee and Shyamal K. Ghosh, the Framework of the Indian Economy: An Introduction to Economics, Oxford University Press, 1989
6. Dornbusch, R., Fischer, S. and Startz, R., Macroeconomics, McGraw Hill, 12th edition, 2014.
7. David Romer, Keynesian macroeconomics without the LM curve, *Journal of Economic Perspectives*, 2000, 14(2): 149-169.

8. Chandana Ghosh and Ambar Ghosh, Macroeconomics, Second edition, EEE, 2021.

Practical/ Applications
Credit: 02
Contact hours per week: 04

5. Data Analysis and Presentation

ECON 02C4: MATHEMATICAL METHODS IN ECONOMICS – II
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course is the second part of a compulsory two-course sequence. This part is to be taught in Semester II following the first part in Semester I. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this Syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

1. Unconstrained optimization with n variables

a. Unconstrained optimization, necessary and sufficient conditions, local and global optima, notion of saddle point.
b. The implicit function theorem, and its application to comparative statics problems.
c. Economic applications.

2. Constrained optimization

a. Effect of a constraint; Finding Stationary Value.
b. Lagrange Multiplier method: Meaning of Lagrange multiplier, generalization of LM method.
c. Second Order conditions: Bordered Hessian determinant, Quasi concavity and quasi convexity with economic applications.
d. The implicit function theorem, and its application to comparative statics problems.
d. Maximum value function and Envelope Theorem, Le Châtelier principle.
e. Roy's Identity and Shepherds Lemma.

3. Difference and Differential equations

a. First and second order difference equations (first and second order) and their applications - Cobweb Model; Model with inventory; Samuelson's Model, Inflation, Unemployment and Philip's curve
b. First and second order differential equations (first and second order) and their applications – Inflation, Unemployment and Philip's curve

4. Integration of functions

a. Methods of Substitution and by parts; Definite integrals.
b. Economic applications.

Readings

1. K. Sydsaeter and P. Hammond, Mathematics for Economic Analysis, Pearson Educational Asia: Delhi.
2. A. Chiang & K.Wainwright: Fundamental Methods of Mathematical Economics, McGraw Hill.
3. E. Silberberg & Suen: The Structure of Economics, McGraw Hill.
4. M. Hoy, J. Livernois, C. McKenna, R. Rees & T. Stengos, Mathematics for Economics. MIT Press.

THIRD SEMESTER

ECON03C5: INTERMEDIATE MICROECONOMICS - I
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

The course is designed to provide a sound training in microeconomic theory to formally analyze the behaviour of individual agents, especially under uncertainty. Since students are already familiar with the quantitative techniques in the previous semesters, mathematical tools are used to facilitate understanding of the basic concepts. This course looks at the behaviour of the consumer and the producer and also covers the behaviour of a competitive firm.

1. Consumer Theory

a. Choice under uncertainty: Expected utility theorem and attitude towards risk - utility function and expected utility; risk preference and risk aversion; concept of risk premium and certainty equivalence.
Risk spreading: Role of the stock market - demand for risky assets – measuring risk - trade off between risk and return; Reducing risk: demand for Insurance – fair premium, co-insurance, copayments/ deductibles; Risk Pooling.
b. Intertemporal choice.
c. Revealed Preference approach: Strong and weak axioms of revealed preference – derivation of demand function.
d. Labour supply and savings decision - choice between leisure and consumption.

2. Market structure under Monopoly and Monopolistic Competition

a. Monopoly: Pricing with market power; price discrimination; peak-load pricing; two-part tariff; multi-plant monopolist.
b. Monopolistic competition: Product differentiation and demand curve; concept of product group; equilibrium of the firm; excess capacity and its interpretation

3. Input Markets

a. Labour and land markets - basic concepts of derived demand, productivity of an input, marginal productivity of labour and marginal revenue product.
b. Input demand curves; shifts in input demand curves.
c. Labour supply and savings decision - choice between leisure and consumption.
d. Competitive labour markets.
e. Labour markets and public policy.

Readings

1. Hal R. Varian, Intermediate Microeconomics, a Modern Approach, W.W. Norton and Company/Affiliated East-West Press (India), 8th edition, 2010. The workbook by Varian and Bergstrom may be used for problems.
2. C. Snyder and W. Nicholson, Fundamentals of Microeconomics, Cengage Learning (India), 2010.
3. B. Douglas Bernheim and Michael D. Whinston, Microeconomics, Tata McGraw-Hill (India), 2009.
4. Green: Consumer Theory, The Macmillan Press Ltd.
5. Gravelle and Rees: Microeconomics, Pearson

ECON03C6: INTERMEDIATE MACROECONOMICS - I
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course introduces the students to formal modelling of a macro-economy in terms of analytical tools. It discusses various alternative theories of output and employment determination in a closed economy in the short run as well as medium run, and the role of policy in this context.

1. Wage - Price Flexibility and Full Employment

Classical system - Say's law, saving and investment, Friedman's restatement of Quantity Theory of Money; Labour market, Determination of income, employment, wage and interest rate, Dichotomy between real sector and monetary sector - neutrality of money.

2. Aggregate Demand and Aggregate Supply Curves

Derivation of aggregate demand and aggregate and supply curves; interaction of aggregate demand and supply; Explanation of aggregate supply curve with and without price or wage rigidity - Imperfect information model - Worker misperception model; Solution of Complete Keynesian model; Comparative Statics.

3. Fiscal and Monetary Policy

Active or passive; monetary policy objectives and targets; rules versus discretion: time consistency; the government budget constraint; government debt and Ricardian equivalence.

4. Schools of Macroeconomic Thoughts

Keynes versus Classics; New-Classicals and New-Keynesians.

5. Inflation, Unemployment and Expectations

Phillips curve; adaptive and rational expectations; policy ineffectiveness debate.

Readings

1. Dornbusch, R., Fischer, S. and Startz, R., *Macroeconomics*, McGraw Hill, 12th edition, 2014.
2. Mankiw, N.G., *Macroeconomics,* Worth Publishers, 7th edition, 2010.
3. Blanchard, O., *Macroeconomics*, Pearson Education, Inc., 5th edition, 2009.
4. Sheffrin, Steven M., *Rational Expectations*, Cambridge University Press, 2nd edition, 1996.
5. Abel, A. B. and Bernanke, B. S., *Macroeconomics*, Pearson Education, Inc., 7th edition, 2011.
6. Froyen, R.T. *Macroeconomics*, Pearson Education Asia, 2nd edition, 2005.
7. Chandana Ghosh and Ambar Ghosh, Macroeconomics, Second edition, EEE, 2021.

ECON03C7: STATISTICAL METHODS FOR ECONOMICS
Credit - 06 [Theory: 04; Practical/Applications: 02]
Theory
Credit: 04
Contact hours per week: 04

Course Description

This is a course on statistical methods for economics. It begins with the notion of probability, followed by probability distributions of discrete and continuous random variables and of joint distributions. This is followed by a discussion on sampling techniques used to collect survey data. The course introduces the notion of sampling distributions that act as a bridge between probability theory and statistical inference. The semester concludes with some topics in statistical inference that include point and interval estimation.

1. Elementary Probability Theory

a. Sample spaces and events; probability axioms and properties; counting techniques; conditional probability and Bayes' rule; independence.
b. Limitations of the Classical definition, Frequency definition, Axiomatic Approach.

2. Random Variables and Probability Distributions

a. Defining random variables; probability distributions; expected values of random variables and of functions of random variables.
b. Properties of commonly used discrete and continuous distributions (uniform, binomial, Poisson, normal and exponential random variables).

3. Jointly Distributed Random Variables

Density and distribution functions for jointly distributed random variables; computing expected values; covariance and correlation coefficients.

4. Sampling

a. Principal steps in a sample survey; methods of sampling; the role of sampling theory.
b. Properties of random samples.

5. Point and Interval Estimation

a. Estimation of population parameters using methods of moments and maximum likelihood procedures; properties of estimators.
b. Derived distributions: Standard normal, chi-square, t- and F-distributions
c. Confidence intervals for population parameters.

6. Testing of Hypothesis

Framing the null and alternative hypothesis, p-values, Type-I and Type-II Errors, power of a test Simple applications of tests for the Mean and Variance of a univariate normal population and two independent normal populations

Readings

1. Paul G. Hoel, Sidney C. Port, Charles J. Stone: Introduction to Probability Theory, Universal Book Store, Delhi
2. John E. Freund's Mathematical Statistics with Applications, Pearson, 2014.
3 G Casella and R L Berger, Statistical Inference, Duxbury Advanced Series, Cengage Learning, 2002
4. William G. Cochran, Sampling Techniques, John Wiley, 2007.
5. Mood, A.M., F.A.Graybill and D.C. Boes: Introduction to the theory of statistics, McGraw Hill

6. Goon, Gupta and Dasgupta, Fundamentals of Statistics, Volume 1, 2, World Press

Practical/ Applications
Credit: 02
Contact hours per week: 04

7. Sampling, Estimation and Hypothesis Testing

FOURTH SEMESTER

ECON04C8: INTERMEDIATE MICROECONOMICS - II
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course is a sequel to Intermediate Microeconomics I. The emphasis will be on giving conceptual clarity to the student coupled with the use of mathematical tools and reasoning. It covers general equilibrium and welfare, imperfect markets and topics under information economics.

1. Game theory and Oligopoly

a. Game theory: Definition, types – normal vs. extensive forms - Zero sum game - Dominance, iterative dominance, best response function, Nash equilibrium - Prisoner's dilemma - Pure vs. Mixed strategy.
b. Simultaneous Quantity Setting - Cournot Equilibrium; Simultaneous Price Setting: Bertrand Equilibrium and Bertrand Paradox, Product differentiation in Bertrand model; Sequential game with perfect information - Quantity Leadership - Stackelberg Equilibrium; Implications of the Prisoners' dilemma for oligopolistic pricing - Price Rigidity – Price Signalling and Price Leadership; Collusion and Formation of Cartel; Cartel Instability; Threats – Commitments – Credibility and Cartel Stability.

2. General Equilibrium, Efficiency and Welfare

a. Equilibrium and efficiency under pure exchange and production.
b. Overall efficiency and welfare economics, Fundamental theorems of Welfare Economics, Lange-Lerner theorem, Second Best theorem.
c. Introduction to Social Choice: Bergson welfare function, Condorcet and agenda paradox, Strategic voting, Arrow Impossibility theorem.

3. Market Failures

a. Public Goods - Samuelson condition - Private provisioning and market failure - Lindahl model and the problem of preference revelation – Median Voter theorem - Club Goods.
b. Externalities and market inefficiency – Difference between social costs and private costs – Positive and negative externalities – Pigouvian tax and subsidies – Coase Theorem - Transaction costs.
c. Markets with Asymmetric Information - Adverse selection and the market for lemons - Moral hazard and Principal-Agent Problem - Signalling - Pooling vs separating equilibrium.

Readings

1. H. R. Varian, Intermediate Microeconomics, a Modern Approach, 8th edition, W.W. Norton and Company/Affiliated East-West Press (India), 2010.The workbook by Varian and Bergstrom could be used for problems.
2. C. Snyder and W. Nicholson, Fundamentals of Microeconomics, Cengage Learning (India).
3. J. M. Perloff: Microeconomics – Theory and Application with Calculus, Addison Wesley.
4. H. Gravelle and R. Rees: Microeconomics, Pearson.
5. C. E. Ferguson and J. P. Gould: Microeconomic Theory, The Irwin series in economics.
6. P. K. Dutta, Strategies and Games: Theories and Practice, MIT Press.
7. Francis Bator, The simple analytics of welfare maximisation, Quarterly Journal of Economics, 1960.
8. Jean Hindriks and Gareth Myles, Intermediate Public Economics, MIT Press, 2006.
9. A. Sullivan, S. Sheffrin and S. Perez, Economics, Pearson, 2018.

ECON04C9: INTERMEDIATE MACROECONOMICS - II
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course is a sequel to Intermediate Macroeconomics I. In this course, the students are introduced to the long run dynamic issues like growth and technical progress. It introduces the students to various theoretical issues related to an open economy. It also provides the micro-foundations to the various aggregative concepts used in the previous course.

1. Microeconomic Foundations

a. Consumption: Keynesian consumption function and Empirical findings on consumption-income relationship; Theory of optimal intertemporal choice; life-cycle and permanent income hypotheses; rational expectations and random-walk of consumption expenditure.
b. Investment: Business fixed investment – neoclassical theory – Tobin's Q; Theory of inventory investment – acceleration principle
c. Demand for money - Keynesian theory of speculative demand for money, Tobin's theory of speculative demand for money, Baumol-Tobin model of transaction demand for money

2. Open Economy Models

Classical approach to open economy - role of the real exchange rate; Exchange rate determination; Short-run Keynesian approach - Mundell-Fleming model; purchasing power parity; asset market approach; Dornbusch's overshooting model; monetary approach to balance of payments; Effect of devaluation, tariff and export subsidy on output and trade balance; Macro policy in an open economy.

3. Economic Growth

Harrod-Domar model and knife-edge instability; Neoclassical theory of growth - Solow model -golden rule, technological progress; Elements of endogenous growth.

Readings

1. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
2. N. Gregory Mankiw. Macroeconomics, Worth Publishers, 7th edition, 2010.
3. Olivier Blanchard, Macroeconomics, Pearson Education, Inc., 5th edition, 2009.
4. Charles I. Jones, Introduction to Economic Growth, W.W. Norton & Company, 2nd edition, 2002.
5. R J Barrow and Xavier, Sala-i-Martin, Economic Growth, McGraw-Hill, 1995.

ECON04C10: INTRODUCTORY ECONOMETRICS
Credit - 06 [Theory: 04; Practical: 02]
Theory
Credit: 04
Contact hours per week: 04

Course Description

This course provides a comprehensive introduction to basic econometric concepts and techniques. It covers statistical concepts of hypothesis testing, estimation and diagnostic testing of simple and multiple regression models. The course also covers the consequences of and tests for misspecification of regression models.

1. Nature and Scope of Econometrics

What is Econometrics? Economic and Econometric Models; The aims and methodology of Econometrics

2. Simple Linear Regression Model: Two Variable Case

a. Specifications of the; deriving the Ordinary Least Squares (OLS) Estimates; properties of estimators - Gauss Markov Theorem; estimation of the error variance; goodness of fit.
b. Reverse Regression
c. Statistical Inference in the Linear Regression Model – Confidence Intervals for the Estimated Parameters and the Testing of Hypotheses
d. Prediction with the Simple Regression model.

3. Multiple Linear Regression Model

a. Estimation of parameters; properties of OLS estimators
b. R^2 and adjusted R^2; goodness of fit; partial regression coefficients
c. Qualitative (dummy) independent variables

4. Violations of Classical Assumptions: Consequences, Detection and Remedies

a. Multicollinearity
b. Heteroscedasticity
c. Serial correlation

5. Introduction to specification analysis

Omitted variables and functional misspecification

Readings

1. Stock and Watson, Introduction to Econometrics, Pearson.
2. Woolridge, J. M: Econometrics, CENGAGE
3. Johnston and Dinardo, Econometric methods, McGraw Hill

Practical
Credit: 02
Contact hours per week: 04

6. Econometrics with software applications

Introductory Econometrics with Stata and R
Readings
1. Christopher Dougherty, Introduction to Econometrics, Oxford University Press, 3rd edition, Indian edition, 2007.

FIFTH SEMESTER

ECON05C11: INDIAN ECONOMY I
Credit - 06 [Theory: 04; Practical/ Applications: 02]
Theory
Credit: 04
Contact hours per week: 04

Course Description

Using appropriate analytical frameworks, this course reviews major trends in economic indicators and policy debates in India in the post-Independence period, with particular emphasis on paradigm shifts and turning points. Given the rapid changes taking place in India, the reading list will have to be updated annually.

1. Economic Development since Independence

a. Major features of the economy at independence; growth and development under different policy regimes; regional disparities in growth rates
b. Sector-wise growth profile and changes of its contribution in GDP, structural change in employment.
c. Five Years Plans: Objectives, sources of plan financing, an assessment of performance of different plans
d. Trend of savings and capital formation; measures of mobilization of domestic savings; relation between savings rate, growth rate and ICOR

2. Population and Human Development

Demographic trends and issues; education; health and malnutrition.

3. Growth and Distribution

a. Different concepts of poverty and its measures; different estimates of poverty; recent controversy of poverty reduction; economic reforms and poverty in India; assessment of the poverty alleviation policies since independence.
b. Growth and inequality; trend of nature and causes of income inequality in India; rural urban disparity in income and wealth inequality; public measures to combat inequality in income and wealth; growth of large industrial houses and middle class.
c. Estimates of unemployment and its trend; unemployment rates and growth rates; changing dimensions of unemployment; Government plans and programs for reducing unemployment. Employment Guarantee Act-2005

4. International Comparisons

Comparison of trends of India's key macroeconomic and socio-demographic indicators with other countries

Readings

1. Jean Dreze and Amartya Sen, 2013. *An Uncertain Glory: India and its Contradictions*, Princeton University Press.
2. Pulapre Balakrishnan, 2007, The Recovery of India: Economic Growth in the Nehru Era, *Economic and Political Weekly*, November.
3. Rakesh Mohan, 2008, Growth Record of Indian Economy: 1950-2008. A Story of Sustained Savings and Investment, *Economic and Political Weekly*, May.
4. S.L. Shetty, 2007, India's Savings Performance since the Advent of Planning, in K.L. Krishna and A. Vaidyanathan, editors, *Institutions and Markets in India's Development.*

5. Himanshu, 2010, Towards New Poverty Lines for India, *Economic and Political Weekly*, January.

6. Himanshu, 2011, Employment Trends in India: A Re-examination, *Economic and Political Weekly*, September.

7. Tim Dyson, 2010. Population and development: the demographic transition, Zed Books.

8. P.M. Kulkarni, 2014, The demographic transition in India.

9. K. James, 2008, Glorifying Malthus: Current Debate on Demographic Dividend in India‖*Economic and Political Weekly*, June.

10. Chinmay Tumbe, 2016, Urbanisation, demographic transition and the growth of cities in India: 1870-2020, International Growth Center Working paper.

11. J.B.G. Tilak, 2007, Post Elementary Education, Poverty and Development in India, *International Journal of Educational Development*.

12. Geeta G. Kingdon, 2007, The Progress of School Education in India, *Oxford Review of Economic Policy*.

13. Usha Ram et al., 2013, Neonatal, 1–59 month, and under-5 mortality in 597 Indian districts, 2001 to 2012: estimates from national demographic and mortality surveys, Lancet Global Health.

14. World Health Organisation, 2010, Trends in maternal mortality: 1990-2008.

15. Jean Dreze and Angus Deaton, 2009, Food and Nutrition in India: Facts and Interpretations, *Economic and Political Weekly*, February.

16. Reetika Khera, 2013, Mid-day meals: Looking ahead, *Economic & Political Weekly*.

17. Jean Dreze and Reetika Khera, 2013, Rural poverty and the public distribution system, *Economic & Political Weekly*.

18. Reetika Khera, 2011, India's Public Distribution System: Utilisation and Impact, *Journal of Development Studies*.

19. Kaushik Basu, 2009, China and India: Idiosyncratic Paths to High Growth, *Economic and Political Weekly*, September.

20. Aniruddha Krishna and Devendra Bajpai, 2011, Lineal Spread and Radial Dissipation: Experiencing Growth in Rural India, 1992-2005, *Economic and Political Weekly*, September.

21. Kaushik Basu and A. Maertens, eds, 2013, *The New Oxford Companion to Economics*, Oxford University Press.

22. Government of India, Economic Survey, different years

Practical/ Applications
Credit: 02
Contact hours per week: 04

5. Data Analysis; Group Discussion; Seminar Presentation

ECON05C12: DEVELOPMENT ECONOMICS I
Credit - 06 [Theory: 04; Practical/ Applications: 02]
Theory
Credit: 04
Contact hours per week: 04

Course Description

This is the first part of a two-part course on economic development. The course begins with a discussion of alternative conceptions of development and their justification. It then proceeds to aggregate models of growth and cross-national comparisons of the growth experience that can help evaluate these models. The axiomatic basis for inequality measurement is used to develop measures of inequality and connections between growth and inequality are explored. The course ends by linking political institutions to growth and inequality by discussing the role of the state in economic development and the informational and incentive problems that affect state governance.

1. Concepts of Development

Alternative measures of development, documenting the international variation in these measures, comparing development trajectories across nations and within them.

2. Growth Models and Empirics

The Solow model and its variants, endogenous growth models and evidence on the determinants of growth, theories of balanced and unbalanced growth, increasing returns, the role of history and expectations.

3. Poverty and Inequality: Definitions, Measures and Mechanisms

Inequality axioms; a comparison of commonly used inequality measures; connections between inequality and development; poverty measurement; characteristics of the poor; mechanisms that generate poverty traps and path dependence of growth processes.

4. Political Institutions and the Functioning of the State

The determinants of democracy; alternative institutional trajectories and their relationship with economic performance; within-country differences in the functioning of state institutions; state ownership and regulation; government failures and corruption.

Readings

1. Debraj Ray, *Development Economics,* Oxford University Press, 2009.
2. Abhijit Banerjee, Roland Benabou and Dilip Mookerjee, *Understanding Poverty,* UP, 2006.
3. Amartya Sen, *Development as Freedom,* OUP, 2000.
4. Daron Acemoglu and James Robinson, *Economic Origins of Dictatorship and Democracy*, Cambridge University Press, 2006.
5. Martin Ravallion, *The Economics of Poverty: History, Measurement & Policy*, OUP, 2016
6. Branko Milanovich, *Global Inequality: A New Approach for the Age of Globalization*, Belknap Press, 2016
7. Abhijit V. Banerjee & Esther Duflo, *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*, Public Affairs, NY, 2011
8. Kaushik Basu, *The Oxford Companion to Economics in India,* OUP, 2007.
10. Jonathan Haughton & Shahidur Khandker, *The Handbook on Poverty & Inequality*, The World Bank, 2009

Practical/ Applications **Credit: 02** **Contact hours per week: 04**
5. Data Analysis; Group Discussion; Seminar Presentation

SIXTH SEMESTER

ECON06C13: INDIAN ECONOMY II
Credit - 06 [Theory: 04; Practical/ Applications: 02]
Theory
Credit: 04
Contact hours per week: 04

Course Description

This course examines sector-specific policies and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence. Given the rapid changes taking place in the country, the reading list will have to be updated annually.

1. Macroeconomic Policies and Their Impact

a. Fiscal policy
b. Trade and investment policies
c. Financial and monetary policies
d. Labour regulations

2. Policies and Performance in Agriculture

Growth; productivity; agrarian structure and technology; capital formation; trade; pricing and procurement. Agricultural Market Reforms; land reforms

3. Policies and Performance in Industry

Growth; productivity; diversification; small scale industries; public sector; competition policy; foreign investment. Special Economic Zones

4. Trends and Performance in Services

Composition of service sector in India; trend of growth and contribution of service sector in GDP; share and growth of major services – performance of the services in India's services trade; trend of FDI in India's services sector; policy issues for major services like tourism, shipping and port services, IT including software

Readings

1. Balakrishnan, P.(2014) The Great Reversal A Macro Story, EPW, vol. XLIX no 21
2. Subramanian, A. and Felman, J (2019) India's Great Slowdown: What Happened? What's the Way Out? CID, Harvard University, Working Paper No. 370 December 2019
3. Chatterjee, S. and Subramanian, A. (2020) India's Inward (Re)Turn: Is it Warranted? Will it Work? Ashoka Centre for Economic Policy, Policy Paper No. 1
4. Kumar, A. (2015) Macroeconomic Aspects of Goods and Services Tax, EPW, Vol. 50, No. 29
5. Das, Surajit (2017). Some Concerns Regarding the Goods and Service Tax, EPW, Vol. 52, No.
6. Dhar, B. (2015) India's New Foreign Trade Policy: Pluses and Minuses, EPW, Vol. 50, No. 16 pp. 14-16
7. WTO (2020) TRADE POLICY REVIEW, REPORT BY THE SECRETARIAT, INDIA Ch.2
8. Mohan, R. and Ray, P (2017) Indian Financial Sector: Structure, Trends and Turns, IMF Working paper
9. Rakesh Mohan, 2010, India's Financial Sector and Monetary Policy Reforms, in Shankar Acharya and Rakesh Mohan, editors, *India's Economy: Performances and Challenges: Development and Participation*, Oxford University Press

10. Bhagwati, J. and Panagariya, A. (2012). A Multitude of Labour Laws and Their Reform in India's Tryst with Destiny, Harper Business, Ch 8

11. Deakin, S. and Haldar A. (2015). How Should India Reform Its Labour Laws? EPW, Vol L no 12

12. Chakraborty, A. (2016) Reforming Labour Markets in States: Revisiting the Futility Thesis, EPW, Vol. 50, No. 20

13. Kaushik Basu and A. Maertens, eds, 2013, *The New Oxford Companion to Economics in India*, Oxford University Press

14. Chetan Ghate (Ed), *The Oxford Handbook of the Indian Economy*, OUP, 2012

15. Economic Survey (Latest)

16. Acharya, S and Mehrotra, S. (2020) The Agricultural Market Reforms: Is There a Trade-off Between Efficiency and Equality? Institute for Human Development, WP 02/2020

17. Mahendra Dev, S. (2018) Transformation of Indian Agriculture? Growth, Inclusiveness and Sustainability, IGIDR, Mumbai, WP-2018-026

18. NITI Aayog (2022) A New Paradigm for Indian Agriculture from Agroindustry to Agroecology, Publishing Agency: NITI Aayog.

19. Chand, R. (2017) Doubling Farmers' Income; Rationale, Strategy, Prospects and Action Plans, NITI Policy Paper 1/2017

20 Gulati, A. and Saini, S. (2017) 25 years of Policy Tinkering in Agriculture in Rakesh Mohan (ed) India Transformed, Penguin

21. Government of India (2015) What to Make in India? Manufacturing or Service? Economic Survey 2014-15, Ch 7

22. Kumar, N. (2014) FDI and Portfolio Investment Flows and Development: A Perspective on Indian Experience in Uma Kapila (ed) Indian Economy since independence 2015-16 Academic Foundation Delhi

23. Thomas, J. J. (2018). Economic growth without employment The story of Indian manufacturing in Hill and Patil (eds) Employment Policy in emerging economies, Routledge, London and New York

24. Rupa, C. (2017). Services for Indian Manufacturing in Mahendra Deb, S.(ed) India Development Report, 2017

25. Bhide, Shashanka, V.N. Balasubramanyam and K.L. Krishna (2021) Deciphering India's Services Sector Growth, Taylor and Francis, Ch 2, 4, 5 6 7 and 11

Practical/ Applications
Credit: 02
Contact hours per week: 04

5. Data Analysis; Group Discussion; Seminar Presentation

ECON06C14: DEVELOPMENT ECONOMICS II
Credit - 06 [Theory: 04; Practical/ Applications: 02]
Theory
Credit: 04
Contact hours per week: 04

Course Description

This is the second module of the economic development sequence. It begins with basic demographic concepts and their evolution during the process of development. The structure of markets and contracts is linked to the particular problems of enforcement experienced in poor countries. The governance of communities and organizations is studied and this is then linked to questions of sustainable growth. The

course ends with reflections on the role of globalization and increased international dependence on the process of development.

1. Demography and Development

Demographic concepts; birth and death rates, age structure, fertility and mortality; demographic transitions during the process of development; gender bias in preferences and outcomes and evidence on unequal treatment within households; connections between income, mortality, fertility choices and human capital accumulation; migration.

2. Land, Labor and Credit Markets

The distribution of land ownership; land reform and its effects on productivity; contractual relationships between tenants and landlords; land acquisition; nutrition and labour productivity; informational problems and credit contracts; microfinance; inter-linkages between rural factor markets.

3. Individuals, Communities and Collective Outcomes

Individual behaviour in social environments, multiple social equilibria; governance in organizations and in communities; individual responses to organizational inefficiency.

4. Environment and Sustainable Development

Defining sustainability for renewable resources; a brief history of environmental change; common-pool resources; environmental externalities and state regulation of the environment; economic activity and climate change.

5. Globalization

Globalization in historical perspective; the economics and politics of multilateral agreements; trade, production patterns and world inequality; financial instability in a globalized world.

Readings

1. Debraj Ray, *Development Economics,* Oxford University Press, 2009.
2. Kaushik Basu, *Analytical Development Economics*, OUP, 1998
3. Abhijit Banerjee, Roland Benabou and Dilip Mookerjee, *Understanding Poverty,* OUP, 2006.
4. Raghuram Rajan, *Fault Lines: How Hidden Fractures Still Threaten the World Economy*, 2010.
5. Dani Rodrik, *The Globalization Paradox: Why Global Markets, States and Democracy Can't Coexist*, Oxford University Press, 2011.
6. Michael D. Bordo, Alan M. Taylor and Jeffrey G. Williamson (ed.), *Globalization in Historical Perspective,* University of Chicago Press, 2003.
7. Jean-Marie Baland and Jean-Philippe Plateau, *Halting Degradation of Natural Resources*, OUP, 1996
8. Partha Dasgupta, The Place of Nature on Economic Development, SANDEE

Practical/ Applications
Credit: 02
Contact hours per week: 04

6. Group Discussion; Seminar Presentation

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSES

[ECON 05DSE1 and ECON 05DSE2]

GROUP – I

A: APPLIED ECONOMETRICS Credit - 06 [Theory: 04; Practical: 02]

Course Description

The aim of this course is to provide a foundation in applied econometric analysis and develop skills required for empirical research in economics. Since the emphasis is on application of methods, this course requires understanding of econometric software and computing skills.

Theory Credit: 04 Contact hours per week: 04

1. Regression Diagnostics and Specification

a. Review of Multiple Linear Regression Model: Testing hypotheses – individual and joint,
b. Endogeneity and instrumental variable estimation

2. Specification Analysis

a. Misspecification; functional forms; model selection.
b. Omission of a relevant variable; inclusion of irrelevant variable; tests of specification errors.

3. Modelling Univariate Time Series

Stochastic Time Series, Stationarity and tests of unit root; Box-Jenkins Methodology; Time Series with Trend - Deterministic and Stochastic Trend.

4. Static Panel Data Models

Pooled vs. Panel Data; Fixed Effect vs. Random Effect Models

Readings

1. Johnston, J. and J. Dinardo: Econometric Methods, McGraw Hill.
2. Wooldridge, J. M.: Econometrics, CENGAGE Learning.
3. Stock and Watson: Introduction to Econometrics, Pearson.
4. Maddala and Lahiri: Introduction to Econometrics, John Wiley & Sons Ltd.

Practical Credit: 02 Contact hours per week: 04

5. Applications of Econometric Software Packages
Econometrics with STATA/R/E-VIEWS

Readings

1. U. Kohler & F. Kreuter Data analysis using Stata, Stata Press.
2. Website of Institute for Digital Research and Education, UCLA: https://stats.idre.ucla.edu/stata/
3. EVIEWS Tutorials, official site: http://www.eviews.com/Learning/index.html

B: GAME THEORY AND INFORMATION ECONOMICS
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course deals with repeated games and games with complete and incomplete information. Ideas related to complete as well as asymmetric information among the interacting economic agents would be the main focus of this course. Students learn the concept of Bayesian and Perfect Bayesian equilibrium. The course ends with the application of game theory to analyse moral hazard, adverse selection and signaling problems.

1. Review of Extensive form Games with Perfect Information

The game tree; strategies; subgame perfection; backward induction in finite games; commitment; bargaining; other applications

2. Repeated Games

Finitely repeated games and backward induction; infinitely repeated games; history dependent strategies; one-step deviation property; the repeated Prisoners' dilemma; idea of folk theorem.

3. Simultaneous move games with incomplete information (Bayesian games)

Strategies; Bayesian Nash equilibrium; auctions; other applications.

4. Extensive form games with imperfect information

Strategies; beliefs and sequential equilibrium; applications

5. Information economics

Adverse selection; moral hazard; signalling games

6. Bargaining

Bargaining as an extensive game, Axiomatic approach due to Nash, Relation between strategic and axiomatic approaches, illustrations.

Readings

1. Martin J. Osborne, *An Introduction to Game Theory*, Oxford University Press, New Delhi, 2004.
2. Hugh Gravelle and Ray Rees, *Microeconomics*, Pearson Education, 3rd edition, 2004.
3. Robert Gibbons, *Game Theory for Applied Economists*, Princeton University Press, 1992.
4. Prajit Dutta, Strategies and Games - Theory and Practice, MIT Press, 1999
5. S. Tadelis, Game theory: An introduction, Princeton University Press.

C: PUBLIC ECONOMICS
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

Public economics is the study of government policy from the points of view of economic efficiency and equity. The paper deals with the nature of government intervention and its implications for allocation, distribution and stabilization. Inherently, this study involves a formal analysis of government taxation and expenditures. The subject encompasses a host of topics including public goods, market failures and externalities. The paper includes both the theory of public economics and the Indian public finances.

1. Premise for the Public Sector

a. Musgrave's three branches: allocation, distribution, stabilization
b. Public goods (social wants) provisioning - The problem of preference revelation:
(i) The voting route: Majority voting and the Juror's theorem, Condorcet paradox, Arrow's Impossibility Theorem, Single-peaked preferences, Median voter, Inefficiency of majority voting equilibrium.
(ii) The tax route: The Benefit Approach to taxation and expenditure, Lindahl model & Pareto efficiency, preference revelation mechanism revisited.

2. Principles of Taxation and Welfare Implication

a. Incidence of taxation
b. Economic efficiency, optimal taxation
c. Administrative simplicity, Flexibility, political responsibility
d. Fairness: The Benefit Approach, Ability-to-pay Approach (horizontal and vertical equity).

3. Public Finance in India

a. Tax System: structure and reforms
b. Budget items and different concepts of deficits and surpluses; public debt; Indian Central and State budgets in practice
c. Principles of fiscal federalism with reference to India

Readings

1. J. Hindriks, G. Myles: *Intermediate Public Economics*, MIT Press, 2006.
2. H. Rosen, T. Gayer: *Public Finance*, 9th ed., McGraw-Hill/Irwin, 2009.
3. Joseph E. Stiglitz, *Economics of the Public Sector,* W.W. Norton & Company, 3rd edition, 2000.
4. R.A. Musgrave and P.B. Musgrave, *Public Finance in Theory & Practice,* McGraw Hill Publications, 5th edition, 1989.
5. Bagchi, Amaresh (ed) Readings in Public Finance, OUP.
6. Report of the Finance Commission (Latest).
7. *Economic Survey*, Government of India (Latest).
8. A. Ghosh and C. Ghosh: *Public Finance,* PHI Learning, 2014

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSES
[ECON06DSE3 and ECON06DSE4]

GROUP – II

A: INTERNATIONAL ECONOMICS
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course develops a systematic exposition of models that try to explain the composition, direction, and consequences of international trade, and the determinants and effects of trade policy. It then builds on the models of open economy macroeconomics developed in courses 08 and 12, focusing on national policies as well as international monetary systems. It concludes with an analytical account of the causes and consequences of the rapid expansion of international financial flows in recent years. Although the course is based on abstract theoretical models, students will also be exposed to real-world examples and case studies.

1. Introduction

a. What is international economics about? An overview of world trade.

b. Basis for and Gains from trade - Arbitrage and basis of trade; Comparative (price) advantage; different sources of Comparative Advantage; Absolute versus comparative Advantage; Gains from Trade - Trade as a positive-sum game - Gains from Trade theorem, illustration and its meaning; GFT theorem and Pareto optimality; Decomposition of GFT; substitution possibilities in production and consumption and magnitudes of GFT; Necessary and sufficient conditions of GFT: Tangency and convexity conditions

c. International Equilibrium - Offer curve under increasing opportunity costs: Derivation and Elasticity; International Equilibrium and determination of terms of trade; Offer curve under constant opportunity cost and distribution of GFT between large and small countries; Stability of International Equilibrium: Marshall-Lerner Condition

2. Theories of International Trade

a. Ricardian Model of Trade - Doctrine of Comparative *Cost* Advantage and GFT; One-factor economy: Production Possibility Frontier, Relative demand and supply, Autarkic terms of trade; Trade in Ricardian model: Technology as basis of trade; complete specialization; Large and small countries revisited; Extensions of Ricardian model: many commodity, many country.

b. Factor Abundance, Trade and Income Distribution - Two factor economy: Factor abundance, factor intensity reversal; Relation between factor endowment and output (Rybczynski Effect or the supply *shift*); Heckscher-Ohlin theorem: Factor abundance as basis for international trade; Relation between Commodity Price and Factor-Price (One-to-one correspondence); Factor Price Equalization theorem and its sources of disruptions (complete specialization; factor intensity reversal; factor immobility; non-traded good); Effect of trade on income distribution (price magnification effect); Leontief Paradox: Testing the model empirically.

c. Specific Factor Model - Specific Factor Model: Commodity Price, Factor Price, Factor Allocation; maintaining full employment under flexible-coefficient production; Alternative interpretation: Specific Factor model as "short run" Heckscher-Ohlin model; Relative price change and Income Distribution

3. Trade Policy

Partial equilibrium analysis of tariff; tariff and quota, tariff-quota equivalence (under perfect competition and monopoly), effective rate of protection; general equilibrium analysis: tariff in small and large country, optimum tariff, Metzler's paradox; tariff and income distribution; wage gap debate; tariff and alternative policy measures for special objectives, infant industry argument for protection; domestic distortion and policy interventions; other trade and non-trade barriers (concepts only) - VER; environmental regulations as non-tariff barriers

4. Effect of Growth on Trade

Factor growth and production possibility; trade and growth induced by technical progress; Growth, terms-of-trade and welfare

5. International Macroeconomic Policy

Fixed versus flexible exchange rates; international monetary systems; financial globalization and financial crises.

Readings:

1. Krugman, P., Obstfeld, M. and Melitz, M., *International Economics: Theory and Policy*, Addison-Wesley (Pearson Education Indian Edition), 9th edition, 2012.
2. Dominick Salvatore, *International Economics: Trade and Finance*, John Wiley International Student Edition, 10th edition, 2011.
3. Caves, R.E., Frankel, J.A., and Jones, R.W., *World trade and payments: An introduction,* Pearson Education, 10th edition, 2007
4. Heller, H R., *International Trade*; *Theory and Empirical Evidence,* Prentice Hall, 1968.
5. Bhagwati, J.N., Panagariya, A. and Srinivasan, T.N. *Lectures on International Trade*.MIT Press, 2nd edition, 1998.

B: FINANCIAL ECONOMICS
Credit - 06 [Theory: 04; Practical: 02]

Course Description

This course introduces students to the economics of finance. Some of the basic models used to benchmark valuation of assets and derivatives are studied; these include the CAPM, and the Binomial Option Pricing models. The course ends with a brief introduction to corporate finance. The theoretical learning is supplemented by some relevant practical application

Theory
Credit: 04
Contact hours per week: 04

1. Investment Theory and Portfolio Analysis

a. Deterministic cash-flow streams; discounting and present value; internal rate of return; evaluation criteria; fixed-income securities; bond prices and yields; interest rate sensitivity and duration; immunisation; the term structure of interest rates; yield curves; spot rates and forward rates.

b. Single-period random cash flows
Random asset returns; portfolios of assets; portfolio mean and variance; feasible combinations of mean and variance; mean-variance portfolio analysis: Markowitz model and the two-fund theorem; risk-free assets and the one-fund theorem.

c. CAPM
The capital market line; the capital asset pricing model; the beta of an asset and of a portfolio; security market line; use of the CAPM model in investment analysis and as a pricing formula.

2. Options and Derivatives

Introduction to derivatives and options; forward and futures contracts; options; other derivatives; forward and future prices; stock index futures; interest rate futures; the use of futures for hedging; duration-based hedging strategies; option markets; call and put options; factors affecting option prices; put-call parity; Introduction to option trading strategies: spreads; straddles; strips and straps; strangles; the principle of arbitrage; discrete processes and the binomial tree model; risk-neutral valuation.

3. Corporate Finance

Patterns of corporate financing: common stock; debt; preferences; convertibles; Capital structure and the cost of capital; corporate debt and dividend policy; the Modigliani- Miller theorem and its modifications.

Readings
1. Luenberger, David G. *Investment Science*, Oxford University Press, USA, 1997.
2. Hull, John C., *Options, Futures and Other Derivatives*, Pearson Education, 6th edition, 2005.
3. Copeland, T.E., Weston, J.F. and Shastri, K. *Financial Theory and Corporate Policy*, Prentice Hall, 4th edition, 2003.
4. Brealey, R.A., Myers, S.C., and Allen, F., *Principles of Corporate Finance*, McGraw-Hill, 12th edition, 2017.
5. Ross, S.A., Westerfield, R.W. and Jordan, B.D. *Fundamentals of Corporate Finance.* McGraw-Hill, 7th edition, 2005.
6. Malkiel, B.G. *A Random Walk Down Wall Street*, W.W. Norton & Company, 2003.
7. Sharpe, W., Alexander, G. and Bailey, J. *Investments,* Prentice Hall of India, 6th edition, 2003.

Practical
Credit: 02
Contact hours per week: 04

1. Practical Applications
Evaluation of bonds and stocks, financial statement analysis, estimation of market models, construction of portfolio and performance analysis, applications in derivative market
Readings
1. Brooks, C., Econometrics for Finance, Oxford University Press
2. Applications related to theories of corporate finance, international finance and financial markets using MS-Excel and Eviews with data from bseindia.com; nseindia.com, moneycontrol.com, rbi.org.in and other relevant database

C: ENVIRONMENTAL ECONOMICS
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description
This course aims to provide an understanding about the application of economic theory and tools of policy analysis on various environmental issues. The course also introduces analytical concepts and theory concerning environmental externalities and optimal allocation of natural resources. Different valuation techniques shall also be discussed which shall enable students to recognize and apply them for non-marketed inputs and outputs. Contemporary environmental issues including climate change, sustainable development, and transboundary pollution shall also be discussed.

1. Changing perspectives on the environment
a. An ecological perspective: Environment as natural capital—Issue of macroeconomic scale—Economy and the environment.
b. Sustainable Development: Club of Rome Report—Entropy Laws—Economics of the coming spaceship earth—Daly's steady state growth—Growth versus Environment: Environmental Kuznets' curve—Brundtland Commission Report.

2. Theory of environmental externalities
a. Theory of externalities: Pollution as externality
b. Economic theory of efficient pollution control: Regulatory instruments and strategies to control pollution—Tax, Standard and Marketable permits—Property rights
c. Trans-boundary pollution: Distinctive features of trans-boundary pollution—Climate change and Planetary boundary conditions—Institutional response—Pollution Haven hypothesis

3. Optimal exploitation of natural resources
a. Natural resource: Types and classification
b. Non-renewable resource: Hotelling's rule and discounting over time
c. Principles of renewable resource management—Selected examples from biodiversity loss, fisheries, forests and water.
d. Common property, open access and property rights

4. Valuing the environment

a. Valuing the environment: Total economic value—Overview of valuation techniques
b. Economic Benefit-Cost analysis: principles—Incorporating environment into the exercise—Discounting

5. National income and environmental accounting

a. Principles: Greening the National Income Accounts— Environmentally adjusted Net Domestic Product
b. Alternative indicators: Genuine Savings—Environmental asset accounts—Gross Ecosystem product—Ecological footprint

Readings

1. J. Harris and B. Roach (2013) Environmental and Resource Economics—A contemporary approach, 3/e, Routledge.
2. B. Field and M. Field (2013) Environmental Economics, 6/e, The Mcgraw-Hill.
3. D. Pearce, R.K. Turner and I. Bateman (1993) Environmental Economics—An elementary introduction, John Hopkins Press.
4. Kolstad C.D. (2011): Intermediate Environmental Economics, OUP
5. Robert N. Stavins (ed.), Economics of *the Environment: Selected Readings*, W.W. Norton, 5th edition, 2005.
6. Roger Perman, Yue Ma, James McGilvray and Michael Common, *Natural Resource and Environmental Economics*, Pearson Education/Addison Wesley, 3rd edition, 2003.
7. Maureen L. Cropper and Wallace E. Oates, 1992, ―Environmental Economics: A Survey, *Journal of Economic Literature*, Volume 30:675-740.

SKILL ENHANCEMENT COURSES (SEC)

THIRD SEMESTER

ECON03SEC1
DATA MANAGEMENT AND PRESENTATION USING MICROSOFT EXCEL AND R
Credit - 04

Course Description

It is a laboratory based hands-on practical training course followed by practical tests. The students will first learn how to handle data and solve basic algebraic problems using Excel. They will learn different logical and statistical functions in Excel to compute descriptive statistics of a univariate and multivariate data set. The course shall inculcate the skill of presentation of data using different types of graphs This exercises will be followed by introduction of R, which is an open access software.

1. Data management and presentation using Microsoft Excel

a. Basics of Microsoft Excel: Opening of Excel files - Workbook and worksheet- Rename of the workbook and worksheet. Brief history of Excel workbook- Advantages and disadvantages of use of excel for statistical analysis. Location of heading/title bar- menu bar, toolbar- Formulae and function- formula space- cell-cell formatting- data entry-data clearing-copy-cut-paste, paste special – paste value-paste formula-paste transpose of data set.

b. Data Management: Data transformation: arithmetic operation- addition, subtraction, multiplication, log transformation, exponential, squaring and square root, indices. Use of 'If' function- nested if, sum, sumif, count countif, countifs, average averageif, averageifs, text to numeric and numeric to text using if function, max, min, large value of the data set, concatenate. Sort - ascending and descending, A-Z, sort row wise /column wise. Filter of the data set and create a subsample- filter according to text filter data according to numeric values or conditions, saving the filtered data in a separate worksheet. Lookup functions.

c. Descriptive Statistics:
(i) Univariate Data:
Measures of Central Tendency: mean, median, mode, Trim mean, geometric mean, harmonic mean,
Measures of Dispersion: Range, quartile deviation, SD, CV,
Moments and Order statistics: skewness, kurtosis, rank and percentile
(ii) Multivariate Data: Covariance and correlation matrix, rank correlation.

d. Graphical Presentation of Data: Different types of charts and applications, Scatter diagram and Curve fitting
e. Indices: Price Indices: WPI, CPI, Development/Poverty and Inequality Indices: HDI, HPI, MPI, Gini Index, Atkinson's Index, Theil Index

2. Data management and presentation using R

a. Introduction: Installing R and RStudio; User Interface, Packages and Help; R Packages

b. The R Language: Expressions, Objects, Symbols, Functions, Special Values; R Objects; R Environment

c. Working with data: Reading and writing data; Preparing Data;

d. Graphics

Readings

1.David M. Levine David F. Stephan, Timothy C. Krehbiel Mark L. Berenson, Statistics for Managers Using Microsoft Excel, 5ed, Prentice Hall, Pearson 2008

2., Joseph Schmuller Statistical Analysis with Excel For Dummies 3RD EDITION, John Wiley & Sons, Inc. 2013

3. David Whigham, Business Data Analysis Using Excel, OUP 2007

4. Martin Lee Abbott, Understanding Educational Statistics Using Microsoft Excel and SPSS JohnWiley & Sons, Inc. 2011

5. Adler, J. 2012 "R in A Nutshell", O'Reilly Media Inc., 2ed.

6. Grolemund, G. 2014 "Hands-On Programming with R", O'Reilly Media Inc.

7. Hilfiger, J. 2016 "Graphing Data with R", O'Reilly Media Inc.

FOURTH SEMESTER

ECON04SEC2

ANALYZING CONTEMPORARY ECONOMIC ISSUES

Credit - 04

Course Description

The course proposes to develop the capacity of students to analyze and appreciate contemporary economic issues and policy pronouncements. Students will be expected to present their analysis in the form of a written report. The course will start with an introduction to the basic principles of report writing. Subsequent modules will involve inter-active lectures, group discussions, and group presentations.

1. Guidance for project writing

a. Identifying the topic
b. Review of Literature
c. Writing Project Report – Referencing Styles and use of referencing software

2. Analyzing economics in the news

Writing article about contemporary economic event (National &/or Global) using knowledge of economic theory

3. Analysis of contemporary Indian Economic Data and Policies

Economic survey, budget, annual policy data, RBI, Monthly Economic Data - Ministry of Finance

Readings

1. The Key to Budget Documents, Budget at a Glance, Macroeconomic Framework Statement, Medium Term Fiscal Policy Statement and Fiscal Policy Strategy Statement, all available at indiabudget.nic.in.
2. Economic and Social Classification of the Budget, available at
http://finmin.nic.in/reports/FunClass201415.pdf.
3. http://www.unionbudget.nic.in
4. Pranab Mukherjee (2012), "Budget Making", in K. Basu and A. Maertens (eds), The New Oxford Companion to Economics in India, OUP.
5. Finance Commission Report - http://finmin.nic.in
6. The Economists, https://www.economist.com/

GENERIC ELECTIVE COURSES IN ECONOMICS

FIRST SEMESTER

ECON01GE1: INTRODUCTORY MICROECONOMICS
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course is designed to expose the students to the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyse real-life situations.

1. Exploring the subject matter of Economics

Why study economics? Scope and method of microeconomics - reading and working with graphs.
The economic problem: Scarcity and choice - production possibility curve – trade off, opportunity cost and decision making; incentives and information – prices (absolute and relative prices) property rights and profits.
Decision takers- households, firms and central authorities; choice by command and choice by market.
Alternatives to the price system – Rationing by Queues, Rationing by Lotteries, Rationing by Coupons.
Economic Systems

2. Supply and Demand: How Markets Work, Markets and Welfare

a. Elementary theory of demand – determinants of household demand and market demand, and shifts in the demand curves
b. Elementary theory of supply - factors influencing supply, derivation of the supply curve, and shifts in the supply curve
c. Determination of equilibrium price in a competitive market - Existence, Uniqueness and Stability of equilibrium (the Walrasian approach and Marshallian approach).
d. Prices and resource allocation
e. Elasticity and its application
f. Government Interventions and their Effects on market equilibrium – price ceiling, price floor and commodity taxation.
g. Consumer surplus, producer surplus and the efficiency of the markets.

3. The Households

a. The consumption decision – description of preferences (representing preferences with indifference curves) - properties of indifference curves; budget constraint; optimum choice.
b. Comparative statics: income and price changes – derivation of price consumption curve, income consumption curve and Engel's curve; demand for all other goods and price changes.
c. Substitution and income effects and law of demand – concepts of Marshallian and compensated demand curves
d. Labour supply and savings decision - choice between leisure and consumption.

4. The Firm and Perfect Market Structure

a. Defining a firm- firm's legal forms; profit maximization hypothesis
b. Behaviour of profit maximizing firms and the production process.
c. Short run costs and output decisions.
d. Costs and output in the long run.

5. Imperfect Market Structure
a. Monopoly and antitrust policy; government policies towards competition. b. Concepts of different forms of imperfect competition.
6. Input Markets
a. Labour and land markets - basic concepts of derived demand, productivity of an input, marginal productivity of labour and marginal revenue product. b. Input demand curves; shifts in input demand curves. c. Competitive labour markets. d. Labour markets and public policy.
Readings
1. Joseph E. Stiglitz and Carl E. Walsh, *Economics*, W.W. Norton & Company, Inc., New York, International Student Edition, 4th Edition, 2007. 2. N. Gregory Mankiw, *Economics: Principles and Applications*, India edition by South Western, a part of Cengage Learning, Cengage Learning India Private Limited, 4th edition, 2007. 3. Karl E. Case and Ray C. Fair, *Principles of Economics*, Pearson Education Inc., 8th Edition, 2007.

SECOND SEMESTER

ECON02GE2: INTRODUCTORY MACROECONOMICS
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course aims to introduce the students to the basic concepts of Macroeconomics. Macroeconomics deals with the aggregate economy. This course discusses the preliminary concepts associated with the determination and measurement of aggregate macroeconomic variables like savings, investment, GDP, money, inflation, and monetary and fiscal policies.

1. Introduction to Macroeconomics and National Income Accounting

Introduction to Macroeconomic variables; microeconomic and macroeconomic approaches; basic issues studied in macroeconomics; measurement of GDP, GNP, NDP, NNP and NI; circular flow of income; problems encountered in measuring National Income; real versus nominal GDP -CPI, WPI and GDP deflator, National Income as a measure of welfare; National Income accounting for an open economy; balance of payments: current and capital accounts.

2. Money

Definitions of money – M1, M2, M3 and M4; Functions of money; determination of money supply; money creation by commercial banks; money multiplier; control of money supply by the central bank tools of monetary policy.

3. Inflation and Unemployment

a. Meaning of inflation, cost of inflation and hyperinflation
b. Money supply and Inflation - quantity theory approach
c. Concepts of unemployment, natural rate of unemployment, structural unemployment, frictional unemployment, cyclical unemployment, involuntary and voluntary unemployment

4. The Closed Economy in the Short Run

Simple Keynesian model of income determination - Keynesian consumption function, Autonomous investment and Income-Expenditure equilibrium, multiplier, Paradox of thrift; IS-LM model - Investment function and IS curve, Asset market equilibrium and LM curve, Determination of equilibrium income and interest rate, Comparative Statics - Monetary policies and fiscal policies

Readings

1. Dornbusch, R., Fischer, S. and Startz, R., Macroeconomics, McGraw Hill, 12th edition, 2014.
2. Mankiw, N.G., Macroeconomics, Worth Publishers, 7th edition, 2010.
3. Froyen, R.T., Macroeconomics, Pearson Education Asia, 2nd edition, 2005.
4. Sikdar, S., Principles of Macroeconomics, Oxford University Press, 2nd edition, 2011.
5. Hicks, J. R., M. Mukherjee and Shyamal K. Ghosh, the Framework of the Indian Economy: An Introduction to Economics, Oxford University Press, 1989

THIRD SEMESTER

ECON03GE3A: INDIAN ECONOMY I
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

Using appropriate analytical frameworks, this course reviews major trends in economic indicators and policy debates in India in the post-Independence period, with particular emphasis on paradigm shifts and turning points. Given the rapid changes taking place in India, the reading list will have to be updated annually.

1. Economic Development since Independence

a. Major features of the economy at independence; growth and development under different policy regimes; regional disparities in growth rates
b. Sector-wise growth profile and changes of its contribution in GDP, structural change in employment.
c. Five Years Plans: Objectives, sources of plan financing, an assessment of performance of different plans
d. Trend of savings and capital formation; measures of mobilization of domestic savings; relation between savings rate, growth rate and ICOR

2. Population and Human Development

a. Demographic transition theory and dynamics of population in India; age, sex composition and development issues.
b. Education – literacy rate, enrolment ratio- gender discrimination in enrolment – trend in public expenditure for education; right to education and education policies
c. Health as an indicator of human development, life expectancy, child health, infant mortality; nature, causes and consequences of malnutrition; Trend in public expenditure for health and hygiene; mid-day meal programme and other policies of child and family welfare.
d. Human development index and progress of human development; HDI for several states over time.
e. Population policy; demographic dividend

3. Growth and Distribution

a. Different concepts of poverty and its measures; different estimates of poverty; recent controversy of poverty reduction; economic reforms and poverty in India; assessment of the poverty alleviation policies since independence.
b. Growth and inequality; trend of nature and causes of income inequality in India; rural urban disparity in income and wealth inequality; public measures to combat inequality in income and wealth; growth of large industrial houses and middle class.
c. Estimates of unemployment and its trend; unemployment rates and growth rates; changing dimensions of unemployment; Government plans and programs for reducing unemployment. Employment Guarantee Act-2005

4. International Comparisons

Comparison of India with other countries with reference to GNI and its inequality; GDP and employment share; income poverty; multidimensional poverty; Human development and other indicators

Readings

1. Jean Dreze and Amartya Sen, 2013. *An Uncertain Glory: India and its Contradictions*, Princeton University Press.

2. Pulapre Balakrishnan, 2007, The Recovery of India: Economic Growth in the Nehru Era, *Economic and Political Weekly*, November.

3. Rakesh Mohan, 2008, ―Growth Record of Indian Economy: 1950-2008. A Story of Sustained Savings and Investment, *Economic and Political Weekly*, May.

4. S.L. Shetty, 2007, ―India's Savings Performance since the Advent of Planning, in K.L. Krishna and A. Vaidyanathan, editors, *Institutions and Markets in India's Development.*

5. Himanshu, 2010, Towards New Poverty Lines for India, *Economic and Political Weekly*, January.

6. Jean Dreze and Angus Deaton, 2009, Food and Nutrition in India: Facts and Interpretations, *Economic and Political Weekly*, February.

7. Himanshu. 2011, ―Employment Trends in India: A Re-examination, *Economic and Political Weekly*, September.

8. Rama Baru et al, 2010, ―Inequities in Access to Health Services in India: Caste, Class and Region,*Economic and Political Weekly*, September.

9. Geeta G. Kingdon, 2007, ―The Progress of School Education in India, *Oxford Review of Economic Policy.*

10. J.B.G. Tilak, 2007, ―Post Elementary Education, Poverty and Development in India, *International Journal of Educational Development.*

11. T. Dyson, 2008, ―India's Demographic Transition and its Consequences for Development‖ in Uma Kapila, editor, *Indian Economy Since Independence*, 19[th]edition, Academic Foundation.

12. Kaushik Basu, 2009, ―China and India: Idiosyncratic Paths to High Growth,*Economic and Political Weekly*, September.

13. K. James, 2008, ―Glorifying Malthus: Current Debate on Demographic Dividend in India‖*Economic and Political Weekly*, June.

14. Reetika Khera, 2011, ―India's Public Distribution System: Utilisation and Impact*Journal of Development Studies*.

15. Aniruddha Krishna and Devendra Bajpai, 2011, ―Lineal Spread and Radial Dissipation: Experiencing Growth in Rural India, 1992-2005, *Economic andPolitical Weekly*, September.

16. Kaushik Basu and A. Maertens, eds, 2013, *The New Oxford Companion to Economics*, Oxford University Press.

17 Datt and Mahajan, 2017 Datt and Sudharam's Indian Economy (latest edition)

18. Government of India, Economic Survey, 2015-16, 16-17, 17-18

19. Human Development Reports UNDP ((latest)

20. M. Rakshit, Macroeconomics of Post Reform India, Oxford University Press, 2011.

ECON03GE3B: MONEY AND BANKING
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course exposes students to the theory and functioning of the monetary and financial sectors of the economy. It highlights the organization, structure and role of financial markets and institutions. It also discusses interest rates, monetary management and instruments of monetary control. Financial and banking sector reforms and monetary policy with special reference to India are also covered.

1. Money

Concept, functions, measurement; theories of money supply determination.

2. Financial Institutions, Markets, Instruments and Financial Innovations

a. Role of financial markets and institutions; problem of asymmetric information – adverse selection and moral hazard; financial crises.
b. Money and capital markets: organization, structure and reforms in India; role of financial derivatives and other innovations.

3. Interest Rates

Determination; sources of interest rate differentials; theories of term structure of interest rates; interest rates in India.

4. Banking System

a. Balance sheet and portfolio management.
b. Indian banking system: Changing role and structure; banking sector reforms.

5. Central Banking and Monetary Policy

Functions, balance sheet; goals, targets, indicators and instruments of monetary control; monetary management in an open economy; current monetary policy of India.

Readings

1. F. S. Mishkin and S. G. Eakins, Financial Markets and Institutions, Pearson Education, 6th edition, 2009.
2. F. S. Mishkin, The Economics of Money, Banking and Financial Markets, Pearson Education, 11th edition, 2014
3. F. J. Fabozzi, F. Modigliani, F. J. Jones, M. G. Ferri, Foundations of Financial Markets and Institutions, Pearson Education, 3rd edition, 2009.
4. L. M. Bhole and J. Mahukud, Financial Institutions and Markets, Tata McGraw Hill, 5th edition, 2011.
5. M. Y. Khan, Indian Financial System, Tata McGraw Hill, 7th edition, 2011.
6. Various latest issues of R.B.I. Bulletins, Annual Reports, Reports on Currency and Finance and Reports of the Working Group, IMF Staff Papers.

DEPARTMENT OF ECONOMICS
PRESIDENCY UNIVERSITY

FOURTH SEMESTER

ECON04GE4A: INDIAN ECONOMY II
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course examines sector-specific policies and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence. Given the rapid changes taking place in the country, the reading list will have to be updated annually.

1. Macroeconomic Policies and Their Impact

a. Fiscal policy
b. Trade and investment policies
c. Financial and monetary policies
d. Labour regulations

2. Policies and Performance in Agriculture

Growth; productivity; agrarian structure and technology; capital formation; trade; pricing and procurement. NABARD and agricultural credit; land reforms

3. Policies and Performance in Industry

Growth; productivity; diversification; small scale industries; public sector; competition policy; foreign investment. Special Economic Zones

4. Trends and Performance in Services

Composition of service sector in India; trend of growth and contribution of service sector in GDP; share and growth of major services – tourism, hotel and restaurant; transport and storage; communication, information and broadcasting; public administration and defense; financial services; housing and real estate, research and development services, performance of the services in India's services trade; trend of FDI in India's services sector; policy issues for major services like tourism, shipping and port services, IT including software

Readings

1. Shankar Acharya, 2010, ―Macroeconomic Performance and Policies 2000-8,‗ in Shankar Acharya and Rakesh Mohan, editors, *India's Economy: Performances and Challenges: Development and Participation*, Oxford University Press.
2. Rakesh Mohan, 2010, ―India‗s Financial Sector and Monetary Policy Reforms,‖in Shankar Acharya and Rakesh Mohan, editors, *India's Economy: Performances and Challenges: Development and Participation*, Oxford University Press.
3. Pulapre Balakrishnan, Ramesh Golait and Pankaj Kumar, 2008, ―AgriculturalGrowth in India Since 1991, *RBI DEAP Study no. 27*.
4. B.N. Goldar and S.C. Aggarwal, 2005, ―Trade Liberalisation and Price-CostMargin in Indian Industries, *The Developing Economics*, September.
5. P. Goldberg, A. Khandelwal, N. Pavcnik and P. Topalova, 2009, ―TradeLiberalisation and New Imported Inputs, *American Economic Review, Papersand Proceedings*, May.
6. Kunal Sen, 2010, ―Trade, Foreign Direct Investment and IndustrialTransformation in India, ïnPremachandraAthukorala, editor, *The Rise of Asia*,Routledge.

7. A. Ahsan, C. Pages and T. Roy, 2008, ―Legislation, Enforcement andAdjudication in Indian Labour Markets: Origins, Consequences and the WayForward, in D. Mazumdar and S. Sarkar, editors, *Globalization, Labour Marketsand Inequality in India*, Routledge.

8. Dipak Mazumdar and Sandeep Sarkar, 2009, ―The Employment Problem in Indiaand the Phenomenon of the ‗Missing Middle‖, *Indian Journal of LabourEconomics*.

9. J. Dennis Rajakumar, 2011, ―Size and Growth of Private Corporate Sector inIndian Manufacturing, *Economic and Political Weekly,* April.

10. Ramesh Chand, 2010, ―Understanding the Nature and Causes of Food Inflation,‖*Economic and Political Weekly*, February.

11. BishwanathGoldar, 2011, ―Organised Manufacturing Employment: Continuing the Debate‖, *Economic and Political Weekly,* April.

12. Kaushik Basu and A. Maertens, eds, 2013, *The New Oxford Companion toEconomics in India*, Oxford University Press.

13. Chetan Ghate (Ed),*The Oxford Handbook of the Indian Economy*, OUP, 2012

14. Economic Survey (Latest)

ECON04GE4B: PUBLIC FINANCE
Credit - 06 [Theory: 05; Tutorial: 01]
Contact hours per week: 06

Course Description

This course is a non-technical overview of government finances with special reference to India. The course does not require any prior knowledge of economics. It will look into the efficiency and equity aspects of taxation of the centre, states and the local governments and the issues of fiscal federalism and decentralisation in India. The course will be useful for students aiming towards careers in the government sector, policy analysis, business and journalism.

1. Theory

a. Overview of Fiscal Functions, Tools of Normative Analysis, Pareto Efficiency, Equity and the Social Welfare.
b. Market Failure, Public Good and Externalities.
c. Elementary Theories of Product and Factor Taxation (Excess Burden and Incidence).

2. Issues from Indian Public Finance

a. Working of Monetary and Fiscal Policies.
b. Current Issues of India's Tax System.
c. Analysis of Budget and Deficits
d. Fiscal Federalism in India
e. State and Local Finances

Readings

1. Musgrave, R.A. and P.B. Musgrave, Public Finance in Theory and Practice, Mc- Graw Hill, 1989.
2. Mahesh Purohit, "Value Added Tax: Experience of India and Other Countries", Gayatri Publications, 2007.
3. Kaushik Basu, and A. Maertens (ed.), The Oxford Companion to Economics in India, Oxford University Press,2007.
4. M.M Sury, Government Budgeting in India, Commonwealth Publishers, 1990.
5. Shankar Acharya, "Thirty years of tax reform" in India, Economic and Political Weekly, May 2005.
6. Government of India, Report of the 13th Finance Commission.
7. Economic Survey, Government of India (latest).
8. State Finances: A Study of Budgets, Reserve Bank of India (latest).

ECONOMICS DEPARTMENT

SYLLABUS
for
M. Sc. in Applied Economics

PG SYLLABUS

DEPARTMENT OF ECONOMICS
PRESIDENCY UNIVERSITY
M.Sc. in Applied Economics

Courses offered

SEVENTH SEMESTER	ECON 0701	Advanced Microeconomics I	50 marks Credit 4
	ECON 0702	Advanced Macroeconomics I	
	ECON 0703	Advanced Mathematical Economics	
	ECON 0704	Econometric Methods I	
	ECON 0791	Applied Econometrics I (Computer Application based Paper)	
EIGHTH SEMESTER	ECON 0801	Advanced Microeconomics II	50 marks Credit 4
	ECON 0802	Advanced Macroeconomics II	
	ECON 0803	Issues in Development Economics	
	ECON 0804	Econometric Methods II	
	ECON 0891	Applied Econometrics II (Computer Application based Paper)	
NINTH SEMESTER	ECON 0901	Special Paper I – paper 1	50 marks Credit 4
	ECON 0902	Special Paper I – paper 2	
	ECON 0903	Special Paper II – paper 1	
	ECON 0904	Special Paper II – paper 2	
	ECON 0991	Special Paper I (Computer Application based Paper)	
TENTH SEMESTER	ECON 1091	Special Paper II (Computer Application based Paper)	50 marks Credit 4
	ECON 1092	Project Paper	200 marks Credit 16

NOTE

In semester IX and X students are required to take two special/elective courses of 150 marks each.

The special/elective fields offered are:
1. Advanced Econometrics: Theory and Applications
2. Financial Economics
3. Advanced Optimization Techniques (subject to availability of the resource person)
4. Applied Health Economics (subject to availability of the resource person)
5. International Economics (subject to availability of the resource person)

DEPARTMENT OF ECONOMICS
PRESIDENCY UNIVERSITY
DETAILED SYLLABUS
M.Sc. in Applied Economics

[Figures in extreme right indicate the number of contact hours]

SEVENTH SEMESTER

ECON 0701: Advanced Microeconomics I
[50 marks; Credit 4]

Module 1	**Consumer choice**	**06**
Unit 1	Commodities	
Unit 2	Consumption set	
Unit 3	Competitive budgets	

Module 2	**Production**	**06**
Unit 1	Production sets	
Unit 2	Profit maximization	
Unit 3	Aggregation	
Unit 4	Efficiency	

Module 3	**General equilibrium analysis**	**20**
Unit 1	Pure exchange economy	
Unit 2	Model with production: one consumer, one producer	
Unit 3	General versus partial equilibrium	
Unit 4	Walrasian and Edgeworthian foundations of perfect competition	
Unit 5	Existence, uniqueness and stability of the equilibrium	
Unit 6	Concepts of core and equilibria	
Unit 7	Welfare theorems	
Unit 8	Externalities and Market Failure	

Module 4	**Choice under Uncertainty**	**16**
Unit 1	Preferences over lotteries	
Unit 2	Representation functions	
Unit 3	Expected utility theorem	
Unit 4	Risk preference	
Unit 5	Measures of absolute and relative risk aversion	
Unit 6	Equivalence theorems	
Unit 7	Stochastic dominance	

Module 5	**General equilibrium under Uncertainty**	**16**
Unit 1	Market economy with contingent commodities	
Unit 2	Arrow-Debreu equilibrium	
Unit 3	Sequential trade	
Unit 4	Asset market	

Unit 5   Firm behavior under general equilibrium under uncertainty

References:
- Mas-Colell, A. , M. Whinston and J Green: Microeconomic Theory, Oxford University Press, 1995
- Cowell, F. : Microeconomics, Oxford University Press, 2006
- Dreze, J. H. (1972): Market Allocation under Uncertainty. European Economic Review, Vol. 2 (2), pp 133-165.
- Malinvaud, E. Lectures on Microeconomic Theory. Elsevier Science Publishers B. V., Revised Edition, 1985.
- Mukherji, A.: Walrasian and Non-Walrasian Equilibria: An Introduction to General Equilibrium Analysis, Claredon Press, Oxford, 1990
- Varian, H.: Microeconomic Analysis, W.W. Norton, 3rd Edition, 1992
- Gravelle, H and R. Rees: Microeconomics, Pearson Education, 3rd Edition, 2004
- Jehle, G. and J. Reny: Advanced Microeconomic Theory, Pearson Education, 2000
- Starr, R. M: General Equilibrium Theory: An Introduction, Cambridge University Press, 1997
- Jean-Jacques Laffont, John P. Bonin and Hélène Bonin The Economics of Uncertainty and Information

ECON 0702: Advanced Macroeconomics I
[50 marks; Credit 4]

Module 1   Long-run Macroeconomics   52
Unit 1   The Solow Model as a bench mark

Reference:
- D. Romer, Advanced Macroeconomics (3rd ed), McGraw-Hill, 2006. Ch 1

Unit 2   The Representative Agent Neoclassical Macro Model or the Ramsey-Cass-Koopmans (RA model)
References:
- D. Romer, Advanced Macroeconomics (3rd ed), McGraw-Hill, 2006. Ch 2
- D. Dasgupta, Modern Growth Theory, 2nd Edition.

Unit 3   The Overlapping Generations Model (OLG model) or the Diamond model

References:
- D. Romer, Advanced Macroeconomics (3rd ed), McGraw-Hill, 2006. Ch2
- Costas Azariadis, Intertemporal Macroeconomics, Blackwell, 1993

Unit 4   The Market Clearing Model or the New Classical Model

Reference:
- Robert Barro, Macroeconomics, MIT Press, 1997

Unit 5   New Growth Theory

References:
- Charles I Jones, Introduction to Economic Growth (2nd edition), W. W. Norton & Co. (Indian edition: Viva Books Private Ltd., 2006)
- D. Romer, Advanced Macroeconomics (3rd ed), McGraw-Hill, 2006. Ch 3
- R J Barrow and Xavier, Sala-i-Martin, Economic Growth, McGraw-Hill, 1995.

Module 2   Fluctuations and Short-run problems   12
Real Business Cycles and New Keynesian Models lectures

Reference:
- D. Romer, Advanced Macroeconomics (3rd ed), McGraw-Hill, 2006. Chs 4-6

ECON 0703: Advanced Mathematical Economics
[50 marks; Credit 4]

Module 1   Advanced Set Theory   24
Unit 1   Sets and Functions
Unit 2   Metric Spaces

Module 2   Point Set Topology   24
Unit 1   Examples of Topological Spaces
Unit 2   Continuity and Compactness
Unit 3   Application: Existence of equilibrium

Module 3   Introduction to Measure Theory   16
Unit 1   Lebesgue Measure
Unit 2   Lebesgue Integration
Unit 3   Probability Measure

References:

- Tom Apostol: Mathematical Analysis
- H. L. Royden: Real Analysis
- G. F. Simmons: Introduction to Topology and Modern Analysis
- Efe A. Ok: Real Analysis with Economic Applications

ECON 0704: Econometric Methods I
[50 marks; Credit 4]

Module 1   Statistical Background   06
Reviewing the Fundamentals of Probability and Fundamentals of Mathematical Statistics

References:
- Miller, I. & Miller, M.: John E. Freund's Mathematical Statistics with Applications, Prentice Hall.
- Hoel, Port and Stone: Introduction to Probability Theory, Houghton Mifflin.

Module 2   **Multiple Regression Analysis**   **20**
Unit 1   Inference and Prediction
Unit 2   Qualitative Information- Binary (or Dummy) Variables

Module 3   **Nonspherical Disturbances**   **16**
Unit 1   Generalised Least Squares (GLS) methods of estimation.
Unit 2   Heteroscedasticity – detection and remedial methods; Autocorrelations - detection and remedial methods.

Module 4   **Stochastic Regressors**   **06**

Module 5   **Multicollinearity**   **06**

Module 6   **Model Evaluation and Diagnostic Tests**   **10**

References:
- Johnston, J. and J. Dinardo: Econometric Methods, McGraw Hill.
- Wooldridge, J. M.: Econometrics, CENGAGE Learning.
- Maddala, G.S.: Introduction to Econometrics, John Wiley & Sons Ltd.
- Greene, W.H.: Econometric Analysis, Prentice Hall.
- Davidson, J.: Econometric Theory, Blackwell Publishers
- Cameron A. Colin and Pravin K. Trivedi: Microeconometrics: Methods and Applications, Cambridge University Press

ECON 0791: Applied Econometrics I
(Computer Application Based)
[50 marks; Credit 4]

Module 1   **Descriptive Statistics, Economic Statistics and Introductory Econometrics with MICROSOFT EXCEL**   **20**

References:
- Whigham, D.: Managerial Economics Using Excel, Thomson Learning
- Barreto, H.: Intermediate Microeconomics with Microsoft Excel, Cambridge University Press

Module 2   **Data Management and Introductory Econometrics with STATA / EVIEWS/ SPSS / R**   44

Note: The time allocation is indicative; the references have to be supplemented as required

EIGHTH SEMESTER

ECON 0801: Advanced Microeconomics II
[50 marks; Credit 4]

Module 1	**Topics in Game Theory**	**32**
Unit 1	Introduction	
Unit 2	Dynamic games with complete information	
Unit 4	Static games with incomplete information	
Unit 5	Dynamic games with incomplete information	
Unit 6	Introduction to Cooperative Game Theory	

Module 2	**Topics in Economics of Asymmetric Information**	**32**
Unit 1	Principal-Agent Model, Moral Hazard Problem and Applications	
Unit 2	Adverse Selection Problem	
Unit 3	Signaling and Informed Principal Model	
Unit 4	Screening: Basic Models and Applications	
Unit 5	Introduction to Auction Theory	

References:
- Mas-Colell, A., M. Whinston and J. Green: Microeconomic Theory, Oxford University Press, 1995
- Jehle, G. and J. Reny: Advanced Microeconomic Theory, Pearson Education, 2000
- *G*ravelle, H. and R. Rees: Microeconomics, Pearson Education, 3rd Edition, 2004
- Gibbons, R.: Game Theory for Applied Economists, Princeton University Press
- Osborne, M.J. and A. Rubinstein: A Course in Game Theory, The MIT Press, 1994.
- Tirole, J.: The Theory of Industrial Organization, The MIT Press, 1988
- Shy, O.: Industrial Organization, The MIT Press
- Salanie, Bernard R.: The Economics of Contracts: A Primer, The MIT Press, 2005
- Osborne, Martin J.: An Introduction to Game Theory, OUP 2003
- Laffont, J.J. and D. Martimort: The Theory of Incentives, Princeton University Press, 2002

ECON 0802: Advanced Macroeconomics II
[50 marks; Credit 4]

Module 1	**World Bank- IMF model**	**5**
Module 2	**Kalecki framework and Structuralist Macroeconomics**	**14**
Module 3	**Structural Change and Unbalanced Growth**	**10**
Module 4	**Complete Markets. Incomplete Markets**	**10**
Module 5	**Financial Repression. Exchange Rate Dynamics. International Financial Markets and Financial Crises**	**10**
Module 6	**Monetary Dynamics. Money and Economic Growth**	**15**

References:
- A Bhaduri, Macroeconomics, Macmillan 1986; chs1-3
- M Kalecki, Essays on Developing Economies, Harvester Press, 1976

6

- P Patnaik (ed), Macroeconomics, OUP, 1995: essays by A K Bagchi and A K Dutt
- M K Rakshit (ed) Studies in the Macroeconomics of Developing Countries, OUP Delhi, 1989
- K Basu, Analytical Development Economics, OUP India, 1998
- Blanchard & S Fischer, Lectures on Macroeconomics, Prentice-Hall of India 1996
- Ljungqvist & Sargent, Recursive Macroeconomic Theory, 2nd ed, MIT Press, 2004
- D Acemoglu, Introduction to Modern Economic Growth, Princeton University Press, 2009

ECON 0803: Issues in Development Economics
[50 marks; Credit 4]

It is recommended that this course be based on class presentations made by students as much as possible. The final evaluation should have a 20 mark component on an essay written by the student on any contemporary issue of economic development. The topic for each student should be finalized in consultation with the instructor. The following is only a suggested structure for the course. The instructor should feel free to choose which aspects to relatively put more emphasize on, and feel free to add and subtract references.

Module 1   Approaches to Development   24

There is a plurality of approaches and a wealth of literature. The purpose of this module would be to guide the student to some of the alternative approaches. It will be assumed that the students are conversant with basic micro and macro economic analysis, and have been exposed to some discussion on economic development in their undergraduate curriculum.

References:
- **T.N. Srinivasan and H. Chenery** (Edited) Handbook of Development Economics Volume 1, North Holland 1988 Chapters 1-5 (Chapters by Amartya Sen, W. Arthur Lewis, Pranab Bardhan, Gustav Ranis and Joseph Stiglitz)
  - Amartya Sen: The Concept of Development
  - W. Arthur Lewis: The Roots of Development Theory
  - Pranab Bardhan: Alternative Approaches to Development Economics
  - Gustav Ranis: Dualism
  - Joseph Stiglitz: Economic Organization, Information and Development
- **T. P. Schultz and J. Strauss** (Edited) Handbook of Economic Development Volume 5. North Holland 2009 Chapter 74 by Partha Dasgupta: The Place of Nature in Economic Development
- **Eric Sheppard, Philip W. Porter, David R. Faust and Richa Nagar**: A World of Difference: Encountering and Contesting Development *(Second Edition)* The Guilford Press London and New York, 2009. Chapters 1-5

Module 2   Economic Development: Measurement and Special Aspects   12

There are different ways of measuring economic development. A brief exposure to some of these measures and their significance is the purpose of this module. Some of the special aspects include measurement of poverty, inequality, human development, capabilities, and the gender gap

References:
- **S. Subramanian**: Measures of Inequality and Poverty, OUP
- **D. Ray**: Development Economics OUP. Chapters 6,7,8
- **Mahbub ul Haq**: Reflections on Human Development OUP

Module 3   Development Policy   12

This module is supposed to focus on selective aspects of development policy that span both micro and macro interventions in the economy.

References:
- Handbook of Development Economics, Volume 5 (Ed. **T.P. Schultz and J. Strauss**)
  - Introductory Article by Dani Rodrik and Mark R. Rosenzweig, Development Policy and Development Economics: An Introduction
    - Stability with Growth: Macroeconomics, Liberalization and Development by **J. Stiglitz, J. Ocampo, S. Spiegel, R. Ffrench-Davis and D. Nayyar**. OUP 2007, Chapters 3-9
    - Coordination Failures, Clusters and Microeconomic Interventions Working Paper #544 by **Andres Rodriguez-Clare** December 2005 Inter-American Development Bank.
- Economic Development as Self-Discovery by **R. Hausman and D. Rodrik** in Journal of Development Economics 2003 72(2)
- Understanding Economic Policy Reform by **D. Rodrik** in Journal of Economic Literature 34 (1996)
- Beyond Rosenstein-Rodan: The Modern Theory of Coordination Problems in Development by **K. Hoff** (2000) in Proceedings of the Annual World Bank Conference on Development Economics World bank Washington DC

Module 4   International trade and global economic changes   16

The purpose of this module is to focus on the role of international trade and capital flows in economic development, with some emphasis on current debates about globalization and its effects.

References:
- Handbook of Development Economics Volume 2 **(Srinivasan and Chenery Ed.)** Chapters 24 and 25
  - C. Bliss: Trade and Development: Theoretical Issues and Policy Implications
  - D. Evans: Alternative Perspectives on Trade and Development
- **J. Stiglitz:** Globalization and its Discontents (Penguin)
- **J. Bhagwati:** In Defence of Globalization (OUP)
- **D. Rodrik:** The Globalization Paradox (Norton)
- **K. Basu**: Globalization, Poverty and Inequality: What is the Relationship? What can be done? In World Development (2006)

Module 1   Limited Dependent Variable Models   16

Binary Choice Models - Linear Probability Model, Probit and Logit Models Censored and Truncated Regression Models

References:
- Wooldridge, J. M.: Econometrics, CENGAGE Learning
- Cameron A. Colin and Pravin K. Trivedi: Microeconometrics: Methods and Applications, Cambridge University Press
- Greene, W.H.: Econometric Analysis, Prentice Hall.

Module 2   Stationary Time Series   34

Stochastic Time Series and Stationarity; Box-Jenkins Methodology of Stationary Time Series Analysis; Time Series with Trend - Deterministic and Stochastic Trend; Tests of Unit Root.

References:
- Chatfield, C.: The Analysis of Time Series: An Introduction
- Enders, W.: Applied Econometrics Time Series, John Wiley and Sons
- Granger, C.W.G. and Newbold, P.: Forecasting Economic Time Series

Module 3   Static Panel Data Models   14

Pooled *vs*. Panel Data; Fixed Effect *vs*. Random Effect Models

References:
- Cameron A. Colin and Pravin K. Trivedi: Microeconometrics: Methods and Applications, Cambridge University Press
- Greene, W.H. Econometric Analysis, Prentice Hall.
- Hsiao, C. Analysis of Panel Data, Cambridge University Press.

ECON 0891: Applied Econometrics II
(Computer Application Based)
[50 marks; Credit 4]

Module 1	**Limited Dependent Variable Models**	**17**
Module 2	**Time Series Models**	**30**
Module 3	**Panel Data**	**17**

Note: The time allocation is indicative; the references have to be supplemented as required

NINTH SEMESTER
ECON 0901: Advanced Econometrics I
[50 marks; Credit 4]

Module 1   **Advanced Discrete and Limited Dependent Variable Models**   **32**

Unit 1   Multinomial Response Models – Ordered and Sequential response Models
Unit 2   Grouped Data
Unit 3   Selection and Hurdle Models

Reference:
- J.M. Woolridge (2002) Econometric analysis of cross section and panel data, MIT Press, Cambridge, Mass.
- Maddala, G.S. Limited Dependent and Qualitative Variables in Econometrics, Cambridge University Press
- Greene, W.H. Econometric Analysis, Prentice Hall.
- Lancaster, T.: Econometrics of Transition Data.
- Cameron, C. and Trivedi: Regression Analysis of Count Data.

Module 2   **Introduction to Non-parametric and semi-parametric analysis**   **32**

Unit 1   Distribution free methods and Order Statistics: non-parametric inferences
Unit 2   Non-parametric density estimation and regression
Unit 3   Semi-parametric or Semi non-parametric estimation
Unit 4   Data envelopment analysis and analysis of Revealed Preference

Reference:
- Colin A. Cameron and Pravin K. Trivedi: Microeconometrics: Methods and Applications, Cambridge University Press
- Q. Li and J. S. Rasine: Nonparametric Econometrics, Princeton University Press
- A.R.T. Pagan and Amanullah: Nonparametric econometrics, Cambridge University Press.
- Fox, J.: Non parametric simple regression: Smoothing scatter plots, Sage.
- D. Ruppert, M.P. Wand and R.J. Carroll: Semiparametric Regression, Cambridge University Press.
- Yatchew, A: Semi-parametric regression for applied econometrician, Cambridge University Press.
- WA Barnett, J Powell, GE Tauchen: Nonparametric and semi parametric methods in econometrics and statistics -proceedings of the Fifth International Symposium in Economic Theory and Econometrics, Cambridge University Press.
- JD Gibbons, S Chakraborti: Nonparametric statistical inference, Marcell Dekker Inc., New York
- P Sprent, NC Smeeton: Applied nonparametric statistical methods, Chapman and Hall
- J DiNardo, JL Tobias: 'Nonparametric density and regression estimation', The Journal of Economic Perspectives, Vol 15 (4), Fall 2001, P. 11-28
- A Yatchew: 'Nonparametric regression techniques in economics', Journal of Economic Literature, Vol 36, 1998, P. 669-721

ECON 0902: Advanced Econometrics II
[50 marks; Credit 4]

Module 1   **Advanced Time Series Econometrics**   **32**

Unit 1   Modeling Volatility – ARCH and GARCH Model 10
Unit 2   Introduction to VAR Analysis – Estimation and Identification - Granger
          Causality Cointegration and Error Correction Models

Reference:
- Maddala & Kim : Unit Roots, Cointegration, and Structural Change, Cambridge University Press
- Enders, W.: Applied Econometrics Time Series, John Wiley and Sons
- Hamilton, J.: Time series analysis, Princeton Univ. Press
- Hendry, D.: Dynamic econometrics, OUP

Module 2   **Dynamic Panel Data Models**   **20**

Reference:
- J.M. Woolridge (2002) Econometric analysis of cross section and panel data, MIT Press, Cambridge, Mass.
- Arrelano, M.: Panel Data Econometrics, OUP
- Maddala, G. S. & Kim, In-Moo : Unit Roots, Cointegration, and Structural Change, Cambridge University Press
- Hsiao, C.: Analysis of Panel Data, Cambridge University Press

Module 3   **Exploratory Data Analysis**   **12**

Reference:
- Johnson, R. A, and Wichern, D. W.: Applied Multivariate Statistical Analysis
- Hair, Black, Babin, Anderson, Tatham: Multivariate Data Analysis, Pearson Education

ECON 0903: Financial Economics I
[50 marks; Credit 4]

Module 1   Introduction to Corporate Finance   1

Corporate Finance, Corporate Firm and the Goals of the Corporate Firm: Basic concepts and ideas

Module 2   Financial Markets, characteristics and operations   20

Unit 1   *Stock market* – types of shares, primary and secondary market; Market indexes, GDR and ADR, Stock Market and Macroeconomic Variables, Stock Market and issues of Foreign Capital Inflows.

Unit 2   *Bond Market* - Present Value, Price and Yield, Yield-To-Maturity, Yield-To-Call, Current Yield, Holding Period Return; Risks in Bonds, G-secs Market and Corporate Bond Market in India

Unit 3   *Money market* - Call Money Market, Treasury Bill Market, Commercial Bill Market,Certificate of Deposit, Commercial Paper, Money Market Mutual Fund(MMMF), Repo and Reverse Repo

Module 3   Corporate Financial Reporting   5

Unit 1   Overview of financial statement analysis

Unit 2   Structure of Financial Statements: Balance Sheet, Income Statement, Statement of Cash Flow

Unit 3   Financial Ratios and Financial Statement Analysis, Financial Cash flow analysis

Module 4   Value and capital Budgeting   10

Unit 1   Valuation of financial assets using Net Present Value

Unit 2   NPV versus some alternative investment rules: Pay Back Period, Discounted Pay Back period, Average Accounting Return, Profitability Index and Internal Rate of Return

Unit 3   Strategy and Analysis using Net Present Value: Decision tree, Sensitivity Analysis, Scenario Analysis and Break Even Analysis.

Unit 4   Pricing of derivatives – futures and options

Module 5   Risk and Capital Budgeting   10

Unit 1   Introduction to risk, return and opportunity cost of capital: measuring portfolio risk, diversification and its limits

Unit 2   Return and risk: Capital Asset Pricing Model, validity and role of Capital Asset Pricing Model, Some alternative view of risk and return: Consumption betas, the Arbitrage Pricing Theory, Three-Factor model

Unit 3   Risk, return and capital budgeting: Cost of equity capital, estimation of beta, determinants of beta, cost of capital with debt.

Unit 4   Practical problems in capital budgeting

Module 6   Capital Structure and Pay-out policy   12
Unit 1   Corporate Financing and Efficient Market Hypothesis: Anomalies and lessons of Market Efficiency
Unit 2   The capital structure and the pie theory, Maximizing firm value versus maximizing stockholders' interest, Financial Leverage and Firm Value –Modigliani and Miller Propositions, Implications of Corporate Taxes, Personal taxes and costs of financial distress; Financial leverage and growth.
Unit 3   Valuation and capital budgeting for levered firm – APV, Flow-to-Equity and WACC approach
Unit 4   Pay-out policy: different types of dividends, standard method of cash dividend payment, The Pay-out Controversy - Irrelevance of dividend policy, Taxes, issuance costs and dividends, Dividend payments and stock repurchase, Dividend and taxes.

Module 7   Sources of short-term and long-term Financing   3

Cash and Credit Management; Issuing equity securities to public, Long-term Debt, Options, Warrants, Convertibles, Leasing (concepts only)

Module 8   Special Topics   3

Mergers and Acquisitions

References:
- Ross, S.A., Westerfield, R.W. and J. Jaffe (1999), Corporate Finance, McGraw Hill International Edition, Finance Series, 5th Edition
- Brealey, R.A., Myers, S.C., Allen, F. and P. Mohanty. (2007), Principles of Corporate Finance, Tata McGraw-Hill Publishing Company Limited, New Delhi, 8th Edition
- Sharpe, W.F., Alexander, G.J., and J.V. Bailey (2000), Investments, Prentice Hall of India, 5th Edition
- Wild, J.J., Subramanyam, K.R. and R.F.Halsey (2007), Financial Statement Analysis, Tata McGraw-Hill Publishing Company Limited, New Delhi, 9th Edition
- Copeland, T. E., Weston, J.F., and Shastri, K. (2005), Financial Theory and Corporate Policy, Pearson Higher Education, International Edition, 4th edition

ECON 0904: Financial Economics II
[50 marks; Credit 4]

Module 1   The Balance of Payments and International Economic Linkages   5

Balance of payments categories, The international flow of goods, services and capital, Coping with the current account deficit.

Module 2   Foreign Exchange and Derivative Markets   10
Unit 1   Organization of the foreign exchange market

Unit 2	The Spot market- organization of the interbank spot market, direct, indirect and cross rates, Bid-ask spread, triangular arbitrage
Unit 3	Forward market – premium and discount, forward rate and expected future spot rate, pay-off profile, outright forward exchange and swaps, forward quotation
Unit 4	Introduction to Currency futures and currency options.

| **Module 3** | **Parity Conditions in International Finance** | **12** |
| Unit 1 | The Law of one price- Purchasing Power Parity, The Fisher Effect, The International Fisher Effect, The Interest Rate Parity, The Unbiased Forward Rate Hypothesis |

Module 4	**Foreign Exchange Risk Management**	**22**
Unit 1	Foreign Exchange Exposure and Risk Management, alternative measures of foreign exchange exposure, concept of hedging, cost and benefit of standard hedging technique
Unit 2	Measuring and managing Economic Exposure
Unit 3	Measuring Translation Exposure: Alternative currency translation methods – Current/Non-current method, Monetary/Non-monetary method, Temporal method and Current method, Managing Translation Exposure
Unit 4	Measuring and managing Transaction Exposure: forward market hedge, money market hedge, risk shifting, exposure netting, currency risk sharing, currency collars and cross hedging
Unit 5	Hedging through Derivatives: Foreign currency futures and options; Swaps and interest rate derivatives

Module 5	**Financing the Multinational Corporation**	**5**
Unit 1	International Financing and national capital markets: Corporate sources and use of fund, National Capital Markets as International Financial Centers, Development Banks, Project Finance
Unit 2	The Euro markets: Eurocurrency markets, Eurobonds, Note issuance facilities, Euro notes, Euro commercial papers, Asia currency markets
Unit 3	Cost of capital for foreign investment: cost of equity, cost of debt, WACC for foreign projects, discount rates for foreign investment,

| **Module 6** | **Foreign Investment Analysis** | **5** |
| Unit 1 | International Portfolio Investment, Corporate strategy and FDI, Capital Budgeting for MNC |

| **Module 7** | **Multinational Working Capital Management** | **5** |
| Unit 1 | International Cash Management, Accounts Receivable Management, Inventory Management, Short-term Financing. |

Reference:
- Shapiro, A.C. (2003), Multinational Financial Management, John Wiley and Sons, Inc. 7th Edition.
- Levi, M.D. (2005), International Finance, Routledge.
- Hull, J.C. (2008), Options, Futures and other derivatives, Prentice Hall, 7th Edition

(Laboratory Based)
[50 marks; Credit 4]

Module 1	**Quantal and Limited Choice Models**	**18**
Module 2	**Dynamic Panel Data**	**8**
Module 3	**Time Series Analysis**	**18**
Module 4	**Exploratory data analysis**	**8**
Module 5	**Non-parametric and semi-parametric methods**	**10**

Computational Tools: use of software like STATA, EVIEWS, TSP, GAUSS, MICROFIT, SPSS, SAS, R.

TENTH SEMESTER

ECON 1091: Quantitative Finance
(Laboratory Based)
[50 marks; Credit 4]

Module 1	**Financial Statement Analysis**	**8**
Unit 1	Assessing company health using corporate data-base	

Module 2	**Valuation of Financial Asset**	**15**
Unit 1	Pricing of stocks, Fundamental and technical analysis, Real-sector financial sector interdependence, Testing and denial of Efficient Market Hypothesis	
Unit 2	Applications related to money market	

Module 3	**Portfolio Selection problem**	**9**
Unit 1	Portfolio construction, evaluation and revision	

Module 4	**Econometrics for finance**	**20**
Unit 1	Univariate financial time series: linear and non-linear stochastic models and forecasting	
Unit 2	Modeling financial returns distribution	
Unit 3	Multivariate financial time series	
Unit 4	Modeling long-run relationships in finance	
Unit 5	Modeling volatility and correlation	
Unit 6	Logit, Probit and Panel data applications	
Unit 7	Application of Survival Analysis	

Module 5	**Applications in International Finance**	**7**
Unit 1	Testing Parity conditions in international finance, Derivative pricing	

Module 6   Special topics   5
Unit 1   Stochastic processes, non-linearity and chaos in financial time-series data, other contemporary issues

Data base: RBI website, Economic Survey, International Financial Statistics, PROWESS

Econometric Softwares to be used: E-Views, LIMDEP, Microfit, SPSS

References:
- Brooks, C. (2008), Introductory Econometrics for Finance, Cambridge University Press, 2nd edition.
- Mills, T.C. (2005), The Econometric Modelling of Financial Time Series, Cambridge University Press, 2nd Edition.

ECON 1092: Project
[200 marks; Credit 16]

Students need to complete a project under the guidance of Internal &/or External Supervisor.

ALTERNATIVE COMBINATIONS
Health Economics
(As an alternative to Advanced Econometrics)

ECON 0901: Health Economics I
[50 marks; Credit 4]

Module 1   Introduction to Health Economics   08

Uniqueness of health as a commodity – Market failures – Characteristics of health market – Evolution of health economics as a separate discipline.

References:
- Arrow K (1963). Uncertainty and the welfare economics of medical care. A*merican Economic Review*, 53(5):941-973.
- Hammer PJ, Haas-Wilson D, Sage WM (2001). Kenneth Arrow and the changing economics of health care: "Why Arrow? Why now?" *Journal of Health Politics, Policy and Law*, 26(5):835-849.
- Glied, S. and Smith P. C. Edtd. (2011) The Oxford Handbook of Health Economics, Oxford

Module 2   Individuals as Producers of their Health   10

Health as a part of human capital – Grossman model - Production of health as modification of a stochastic process

References:
- Grossman, M. (2000) "The Human Capital Model" in Culyer, A. J. And Newhouse, J. P. (edtd.) Handbook of Health Economics, Vol. IA, Chap. 7, North Holland
- Grossman, M. (1972) "On the Concept of Health Capital and the Demand for Health," *Journal of Political Economy*, 80(2): 223-255.
- Glied, S. and Smith P. C. Edtd. (2011) The Oxford Handbook of Health Economics, Oxford
- Zweifel, P. (1997) *Health economics*, Springer.
- Morris, *Economic Analysis of Health care,* John Wiley.
- Folland et al., *Economics of Health and Health Care*, 5th Edition, Pearson.

Module 3   Demand for Health Capital   22

Demand for health care as an investment – Marginal Efficiency of Investment (MEI) and rate of return Changes in equilibrium – Age, Wage, Education and Uncertainty Is medical care a public health issue? When is medical care a public health responsibility? Hospitals and long-term care

References:
- Morris, *Economic Analysis of Health care,* John Wiley.
- Folland et al., *Economics of Health and Health Care*, 5th Edition, Pearson.
- Henderson, Health Economics and policy, South-western Press.
- Dranove, D. and Satterthwaite, M. A.(2000) "The Industrial
- Halfon, Larson & Russ (2010) Why Social determinants? *Healthcare Quarterly*, October.
- Helen Keleher & B. Murphy (2004) *Understanding Health – A determinants approach*, Oxford.
- Glied, S. and Smith P. C. Edtd. (2011) The Oxford Handbook of Health Economics, Oxford
- Mary Jone Schneider, *Introduction to Public Health*, Jones & Bartlett.

Module 4   The Medical Care Market   10

The Industrial Organization of Health Care Markets – Agency and demand for health care
A Special Note on Pharmaceutical Industry

References:
- Organization of Health Care Markets" in Culyer, A. J. and Newhouse, J. P. (edtd.) Handbook of Health Economics, Vol. IB, Chap. 20, North-Holland
- Glied, S. (2000) "Managed Care" in Culyer, A. J. and Newhouse, J. P. (edtd.) Handbook of Health Economics, Vol. IA, Chap. 13, North-Holland
- Scherer, F. M. (2000) "The Pharmaceutical Industry"in Culyer, A. J. And Newhouse, J. P. (edtd.) Handbook of Health Economics, Vol. IA, Chap. 25, North-Holland

Module 5   Market Failure and Some Possible Response   14
Health Goods and Market Failure
Asymmetric Information – Moral Hazard - Health Insurance - Market failure in Health Insurance Market
Development and Growth of Managed Care

References:
- Morris, *Economic Analysis of Health care*, John Wiley.
- Folland et al., *Economics of Health and Health Care*, 5th Edition, Pearson.
- Culter, D. M. and Zeckhauser, R. J. (2000) "The Anatomy of Health Insurance" in Culyer, A. J. and Newhouse, J. P. (edtd.) Handbook of Health Economics, Vol. IA, Chap. 11, North-Holland
- Glied, S. and Smith P. C. Edtd. (2011) The Oxford Handbook of Health Economics, Oxford

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ECON 0902: Health Economics II
[50 marks; Credit 4]

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Module 1   Health Issues in Developing Countries   16

Investing in health in developing countries – Linkage between health, growth, inequality and poverty – Burden of disease – Concepts of QALY, HYE and DALY – Empirical evidence on disease burden in developing countries.

References:
- World Bank, *World Development Report, 1993: Investing in Health*, World Bank.
- Alleyne & Cohen (2002) *Health, Economic Growth and Poverty Reduction: Report of the Working group on Macroeconomics of Health*, WHO, Geneva.
- Duraiswamy and Mahal (2005) *Health, poverty and economic growth in India*, Background papers to National Commission on Macroeconomics of Health, MoHFW.
- Wagstaff A. (2001) *Poverty and health*. Commission on Macroeconomics and Health Working Paper Series WGI: 5, Geneva: WHO.

Module 2   Maternal and Child Health   16

Importance of Maternal and Child Health
Infant, Child and Maternal Mortality
Nutritional Issues in Child and Women Health
Reproductive health
Policy measures in India

References:
- Mary Jone Schneider, *Introduction to Public Health*, Jones & Bartlett.
- Sen & Ostlin, "Gender as a social determinant of health: Evidence, policies and innovations", in Sen & Ostlin (ed) (2010) *Gender equity in Health*, Routledge.
- Rajiv Dasgupta (2010) Child health inequity in India. In S. Bhattacharya, S. Messenger & C. Overy (ed) *Social determinants of health*, Orient Blackswan

Module 3   Equity, Needs and Ethics in Healthcare   16

Healthcare consequences of socio-economic change
Understanding reasons for health inequality: Conceptual issues
Measuring health inequality
* Social exclusion and care of elderly

* Epidemiology and Economics - evidence for policy and intervention
* Ethical issues in medical care & medical resource allocation
* Physician's Practice: Conflict between public health and medical profession, Licensing and Regulation
* Concept of Community Financing

[Topics marked * may be covered at discretion of faculty]

References:
- Leon & Walt (ed) (2001) *Poverty, Inequality and Health: An International Perspective*, Oxford.
- Hurley, J. (2000) ''An Overview of the Normative Economics of Health Sector'' in Culyer, A. J. and Newhouse, J. P. (edtd.) Handbook of Health Economics, Vol. IA, Chap. 2, North-Holland

Module 4   Environmental Health   16
Importance of Environmental Health
Role of Government
Identification of Hazard
Setting of standard
Occupational Health

Reference:
- Mary Jone Schneider, *Introduction to Public Health*, Jones & Bertlett.

ECON 0905: Biostatistics & Health Econometrics
[50 marks; Credit 4]

Module 1   Analyzing Categorical Data   8
Goodness of fit test - 2 X 2 Contingency Table: Odds Ratio, Fisher's Exact Test, Matched Pair studies - r X c Contingency Tables: Testing absence of association, testing absence of trend - Multiple 2 X 2 Contingency Tables: Analyzing Tables separately, Cochran-Mantzel-Haenszel test, Mantzel-Haenszel Common Odd ratio.

References:
- R. N. Forthofer, E. S. Lee and M. Hernandez (2007) *Biostatistics: A guide to design,analysis and discovery*, 2/e, Elsevier Academic Press, Amsterdam.
- Jones, A. M. 'Health Econometrics' in Culyer, A. J. and Newhouse, J. P. (edtd.) Hand Book of Health Economics, Vol. 1A, Chapter 6, North-Holland.

Module 2   Survival and Duration Data   16

References:
- Jones, A. M. 'Health Econometrics' in Culyer, A. J. and Newhouse, J. P. (edtd.) Hand Book of Health Economics, Vol. 1A, Chapter 6, North-Holland.
- R. N. Forthofer, E. S. Lee and M. Hernandez (2007) *Biostatistics: A guide to design, analysis and discovery*, 2/e, Elsevier Academic Press, Amsterdam.

Module 3   Advanced Discrete and Limited Dependent Variable Models   30

Multinomial Response Models
Selection and Hurdle Models

References:
- J.M. Woolridge (2002) Econometric analysis of cross section and panel data, MIT Press, Cambridge, Mass.
- Maddala, G.S. Limited Dependent and Qualitative Variables in Econometrics, Cambridge University Press
- Greene, W.H. Econometric Analysis, Prentice Hall.

Module 4   Exploratory Data Analysis   14

Reference:
- Johnson, R. A, and Wichern, D. W.: Applied Multivariate Statistical Analysis
- Hair, Black, Babin, Anderson, Tatham: Multivariate Data Analysis, Pearson Education

Advanced Optimization Techniques
(As an alternative to Financial Economics)

ECON 0903: Nonlinear Programming and Dynamic Optimization in Continuous Time
[50 marks; Credit 4]

Module 1   Nonlinear Programming   32

Unit 1	The Nonlinear Programming Problem
Unit 2	Linear Inequalities and Theorems of the Alternative
Unit 3	Convex Sets in R^n
Unit 4	Convex and Concave Functions
Unit 5	Differentiable Convex and Concave Functions
Unit 6	Optimality Criteria in Nonlinear Programming with Differentiability
Unit 7	Duality in Nonlinear Programming

References:
- Olvi Mangasarian: Nonlinear Programming
- Willard Zangwill: Nonlinear Programming

Module 2   Dynamic Optimization in Continuous Time   32

Unit 1	Examples of Economic Problems involving Dynamic Optimization in Continuous Time
Unit 2	Optimal Control Theory

Unit 3   Fixed Endpoint Problems
Unit 4   Various Endpoint Problems
Unit 5   Discounting Current Values and, Comparative Dynamics
Unit 6   Infinite Horizon Problems
Unit 7   The Pontriyagin Maximal Principle
Unit 8   The Transversality Condition in infinite horizon problems
Unit 9   Comparisons with the Overtaking Principle

References:
- Morton Kamien and Nancy Schwartz: Dynamic Optimization
- Koopmans: The Vatican Volume Essay

More References would be provided in due course, especially for the infinite horizon problem.

The students will need some familiarity with the Theory of Differential Equations.

ECON 0904: Dynamic Optimization in Discrete Time
[50 marks; Credit 4]

Module1   **Examples of dynamic problems in discrete time**
Module 2   **Reduced Form Statement of the Dynamic Optimization Problem**
Module 3   **Dynamic Programming and the Value Function**
Module 4   **The Policy Function**
Module 5   **Duality Theory**
Module 6   **Continuity of the Policy Function**
Module 7   **Existence of a Stationary Optimal Stock and the Golden Rule**
Module 8   **Differentiability of the Value Function**
Module 9   **Uniqueness of the Stationary Optimal Stock**
Module 10   **Stability of the Stationary Stock**
Module 11   **Problems with Turnpike Properties**

Reference:
- Tapan Mitra: Introduction to Dynamic Optimazation Theory, in Majumdar, Mitra and Nishimura (ed) Optimization and Chaos

ECON 1001: Stochastic Dynamic Programming
[50 marks; Credit 4]

Module1   **Examples of Stochastic Dynamic Problems from Theory of Finance , Theory of Economic Growth etc.**
Module 2   **Measure and Integration**
Module 3   **Markov Processes**
Module 4   **Stochastic Dynamic Programming and the Principle of Optimality**
Module 5   **Applications of Stochastic Dynamic Programming**

References:

- Nancy Stokey, Robert Lucas and Edward Prescott: Recursive Methods in Economic Dynamics, Chapters 7, 8, 9 and 10.

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International Economics
(As an alternative to Financial Economics)

ECON 0903: International Economics I
[50 marks; Credit 4]

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Module 1	**Generalization of the traditional theory**	**06**
Unit 1	Extensions of the Ricardian model: multi-country case, multi-commodity case, World PPF	
Unit 2	Extensions of the Heckscher-Ohlin Model	
Unit 3	Merger of Ricardian and Heckscher-Ohlin model	

Module 2   **Specific Factor Model**   **04**
Specific Factor Model: Factor Allocation, Rybsczynski effect and Stolper-Samuelson effect

Module 3	**Refinements of the traditional theory**	**25**
Unit 1	Transportation costs and international trade	
Unit 2	International Trade and Intermediate goods- pure intermediate inputs, final goods as inputs	
Unit 3	International Trade and Non-traded goods	
Unit 4	Natural Resources, Dutch Disease, deindustrialization	
Unit 5	International Trade and International factor mobility	

Module 4	**New Theories of International Trade**	**25**
Unit 1	Increasing Returns, Monopolistic Competition and International Trade	
Unit 2	Scale Economies, Product Differentiation and International Trade	
Unit 3	Intra-industry Specialization and Gains from Trade	
Unit 4	Reciprocal dumping model of international trade	
Unit 5	Technology Gap model of international trade	
Unit 6	Endogenous innovation, Trade and Growth	

Module 5	**Neo Ricardian Theories of International Trade**	**04**
Unit 1	Intermediate and capital goods in the Ricardian Theory	
Unit 2	The debate between orthodox and neo-Ricardian theory	

References:
- Jones, R. International Trade: Essays in theory, North Holland, 1979
- Bhagwati, et al. Lectures on international trade, MIT press, 1998
- Krugman, P.R., Rethinking International Trade, MIT Press, 1994

<p style="text-align:center">ECON 0904: International Economics II
[50 marks; Credit 4]</p>

Module 1   **Tariff, Protection and Economic Integration**   **24**

Unit 1   Partial and General Equilibrium Effects of tariff, Tariff as a device for raising revenue, Tariff and the distribution of income, Tariff and alternative policy measures for special objectives
Unit 2   Intermediate goods - Effective rate of protection and content protection scheme
Unit 3   Quotas and other non-tariff barriers
Unit 4   Free trade versus protection: Domestic Distortion and policy intervention
Unit 5   Non-economic motives for protection, Theory of second best

Module 2   **Market Power and Protection**   **16**

Unit 1   Domestic Market Power and Protection: Case of an import competing monopolist, Protection in an oligopolistic domestic market
Unit 2   Foreign Market Power and Protection: Trade Policies against foreign monopolist, Trade taxes and quotas, Trade Policies against foreign oligopolist: Kinked Demand model, Cournot model, Bertrand model

Module 3   **Strategic Trade Policy**   **16**

Unit 1   Strategic Export Policy: Competitive Foreign Conduct, Profit shifting, Price competition, Entry with increasing return, Resource constraints, Consumption effects
Unit 2   Strategic Import Policy: Tariff in the Cournot case, Tariff in the Bertrand case, Import quotas

Module 4   **Multilateral Trade Policy, Trading Bloc and Economic Integration**   **08**
References:
- Helpman and Krugman, Trade Policy and Market Structure, MIT Press, 1989.
- Corden,M. Theory of Protection

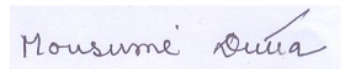<p style="text-align:center">ECON 1091: International Economics III
(Laboratory Based)
[50 marks; Credit 4]</p>

Module 1   Using Empirical Methods in International Economics: Time Series Models Estimation of the ARMA models of time series, Box-Jenkins methodology, Extensions of the ARMA model.
Module 2   Modeling exchange rate volatility, Use of GARCH family models, introduction to non-linearity-BDS test.
Module 3   Use of forecasting methods in International Economics, Basic principles of forecasting, types of forecasting, Testing accuracy of forecasts.
Module 4   Testing International Parity Conditions

Module 5   Testing the Balassa-Samuelson effect.Definition, assumptions, consequences and empirical evidence.
Module 6   Empirical assessment of comparative advantage gains, approaches to test the HOV model
Module 7   Testing the Gravity Equation, Concept, types of gravity equation, empirical applications and approaches to testing gravity equation.

References:

- Enders, W. (2004). Applied Econometric Time Series, 2nd ed., John Wiley & Sons, Inc.
- Feenstra, R. (2004). Advanced International Trade: Theory and Evidence. Princeton University Press.
- Hamilton, J. (1994). Time Series Analysis, Princeton University Press.
- Kocenda, E., Cerny, A. (2007). Elements of Time Series Econometrics: An Applied Approach, Karolinum Press.
- Ramanathan, R. (1998). Introductory Econometrics with Applications, 4th ed., Harcourt Brace College Publishers.
- Wang, P. (2005). The Economics of Foreign Exchange and Global Finance. Springer.

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