

DEPARTMENT OF ECONOMICS



UNIVERSITY OF BURDWAN

PG Syllabus – 2020-21 session onwards

(updated May 2022)

Bhaskar

Preamble

The Department of Economics, University of Burdwan proposes to revise the syllabus for Post-Graduate studies in Economics leading to Masters degree, keeping in line with the updated CBCS curriculum at UG level, changing academic scenario and needs of both academics and job-market. The salient features of the syllabus are as follows:

- The PG syllabus shall have 1020 marks divided into 20 courses of 50 marks each and a Community Engagement Course of 20 marks (2 credits).
- Each paper of 50 marks shall be of 5 credits each except Interdisciplinary Elective which shall be of 4 credits.
- A candidate has to earn at least 101 credits to earn PG degree in Economics.
- The credits to be earned are as follows:

| | <i>First Semester</i> | <i>Second Semester</i> | <i>Third Semester</i> | <i>Fourth Semester</i> |
|--|-----------------------|------------------------|-----------------------|---|
| <i>Core Papers (compulsory)</i> | 25 | 25 | 10 | 17 (incl. Community Engagement Course) |
| <i>Major Elective Papers (Departmental)</i> | | | 10 | 10 |
| <i>Interdisciplinary Elective Papers / Course from SWAYAM platform</i> | | | At least 4 | |

- There shall be two types of papers/courses: Core Course – A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course. These are compulsory courses under the department concerned; Elective Course – Generally a course which can be chosen from a pool of courses and which may be very specific / specialized / advanced to the subject of study or which provides extended scope or enables exposure to some other discipline / subject / domain will be called an Elective Course. Elective courses are to be offered by the department of study (Departmental Electives or Major Electives) or by sister / related disciplines (Interdisciplinary Elective) or may be in the form of Course from SWAYAM platform.
- A minimum of 75 credits shall have to be earned from Departmental Core Courses and shall be Compulsory (marked with an * in the framework)
- A minimum of 20 credits shall have to be earned from Departmental Optional papers / Major Electives (marked with a # in the framework)
- A minimum of 4 credits shall have to be earned from Interdisciplinary Elective / Course from SWAYAM platform as stipulated by the university regulations
- A minimum of 2 credit to be earned from Community Engagement Course as stipulated
- For Semester-III, a student shall opt for Course from SWAYAM platform / Interdisciplinary Elective of at least 4 credits from other departments, subject to prior approval of the Department and University Authorities
- Semester wise division of marks:
 - Aggregate Marks: 1025
 - First Semester: 250 marks/25 credits (five courses each with 5 credits for 50 marks)
 - Second Semester: 250 marks/25 credits (five courses each with 5 credits for 50 marks)
 - Third Semester: 250 marks/24 credits (four courses each with 5 credits for 50 marks plus Interdisciplinary / SWAYAM course of 4 credits with 50 marks)
 - Fourth Semester: 275 marks/27 credits (five courses each with 5 credits for 50 marks plus one course with 2 credits for 25 marks)

- The performance of a candidate in a theoretical course (paper) will be assessed for a maximum of 50 marks as explained below (except ECN 405 which is discussed later):
 - 40 marks as end-semester examination
 - 10 marks as Continuous Assessment based on class test, assignment, seminar etc, modalities for which are to be decided by the course-in-charge concerned and notified to the students at the beginning of the semester.
- Each paper of 5 credits shall have 5 hour session of Lectures per week over a period of one semester of 16 weeks for teaching-learning process.

▪ **Syllabus at a Glance**

| Semester | Courses | Remarks |
|-----------------|---|---|
| I | <ul style="list-style-type: none"> • Microeconomics-I (ECN 101)* • Macroeconomics-I (ECN 102)* • Development Economics-I (ECN 103)* • Mathematical Economics & Statistics (ECN104)* • Econometrics (ECN 105)* | <i>All papers are Departmental Core Courses and Compulsory</i> |
| II | <ul style="list-style-type: none"> • Microeconomics-II (ECN 201)* • Macroeconomics-II (ECN 202)* • Development Economics-II (ECN 203)* • Basic Environmental Economics (ECN 204)* • Basin Financial Economics (ECN 205)* | <i>All papers are Departmental Core Courses and Compulsory</i> |
| III | <ul style="list-style-type: none"> • Select Features of Indian Economy (ECN 301)* • International Economics (ECN 302)* • <u>Major Elective-I (ECN 303 A/B/C/D)#</u> • <u>Major Elective-II (ECN 304 A/B/C/D)#</u> • <u>One minor elective of at least 4 credits from other departments</u> • <i>Interdisciplinary Electives for Extra-departmental students[^]</i> <ul style="list-style-type: none"> ▪ ECN 305A-Environment & Economy ▪ ECN 305B - Demography ▪ ECN 305C – Basic Econometrics ▪ ECN 305D – Indian Economy ▪ ECN 305E – Banking, Insurance & Finance | <p><u>Major Elective-I</u></p> <ul style="list-style-type: none"> • 303A: Advanced Econometrics • 303B: Agricultural Economics-I • 303C: Industrial Organisation • 303D: Spatial Econometrics <p><u>Major Elective-II</u></p> <ul style="list-style-type: none"> • 304A: Applied Econometrics-I • 304B: Agricultural Economics-II • 304C: Behavioural Economics • 304D: Data Analysis for Social Sciences |
| IV | <ul style="list-style-type: none"> • <u>Community Engagement Course of 2 credits (ECN 400)</u> • Growth & Planning (ECN 401)* • Public Economics (ECN 402)* • <u>Major Elective-III (ECN 403A/B/C/D)#</u> • <u>Major Elective-IV (ECN 404A/B/C/D)#</u> • Computer Applications & Project (ECN 405)* | <p><u>Major Elective-III</u></p> <ul style="list-style-type: none"> • 403A: Advanced Financial Economics • 403B: Resource Economics & Sustainable Development • 403C: Law & Economics • 403D: Rural Development <p><u>Major Elective-IV</u></p> <ul style="list-style-type: none"> • 404A: Applied Econometrics-II • 404B: Economics of Climate Change & Energy • 404C: Economics of Social Capital • 404D: Game Theory & Information |

* marked courses are Core courses and Compulsory;

marked courses are Major Electives and students have to choose from available options;

[^] marked courses are •Interdisciplinary Electives for Extra-departmental Students and departmental students will not be offered these courses;

Framework of the Syllabus

| Name of Paper | | Type | Credit | Pattern | | |
|--|--|-----------|--------|---------|---|---|
| | | | | L | T | P |
| <u>First Semester</u> <i>[All papers are Departmental Core Courses and Compulsory]</i> | | | | | | |
| • Microeconomics-I (ECN 101)* | Core | 5 credits | 5 | 0 | 0 | |
| • Macroeconomics-I (ECN 102)* | Core | 5 credits | 5 | 0 | 0 | |
| • Development Economics-I (ECN 103)* | Core | 5 credits | 5 | 0 | 0 | |
| • Mathematical Economics & Statistics (ECN 104)* | Core | 5 credits | 5 | 0 | 0 | |
| • Econometrics (ECN 105)* | Core | 5 credits | 5 | 0 | 0 | |
| | | | | | | |
| <u>Second Semester</u> <i>[All papers are Departmental Core Courses and Compulsory]</i> | | | | | | |
| • Microeconomics-II (ECN 201)* | Core | 5 credits | 5 | 0 | 0 | |
| • Macroeconomics-II (ECN 202)* | Core | 5 credits | 5 | 0 | 0 | |
| • Development Economics-II (ECN 203)* | Core | 5 credits | 5 | 0 | 0 | |
| • Basic Environmental Economics (ECN 204)* | Core | 5 credits | 5 | 0 | 0 | |
| • Basic Financial Economics (ECN 205)* | Core | 5 credits | 5 | 0 | 0 | |
| | | | | | | |
| <u>Third Semester</u> <i>[Students have to choose 2 Core Courses, 2 Major Electives and 1 Interdisciplinary Elective from other departments; however, students may opt for a 4credit course from SWAYAM Platform and can avail the option of credit transfer in lieu of Interdisciplinary Elective]</i> | | | | | | |
| • Select Features of Indian Economy (ECN 301)* | Core | 5 credits | 5 | 0 | 0 | |
| • International Economics (ECN 302)* | Core | 5 credits | 5 | 0 | 0 | |
| • Advanced Econometrics (ECN 303A)# | Major Elective | 5 credits | 5 | 0 | 0 | |
| • Agricultural Economics-I (ECN 303B)# | Major Elective | 5 credits | 5 | 0 | 0 | |
| • Industrial Organisation (ECN 303C)# | Major Elective | 5 credits | 5 | 0 | 0 | |
| • Spatial Econometrics (ECN 303D)# | Major Elective | 5 credits | 4 | 0 | 1 | |
| • Applied Econometrics-I (ECN 304A)# | Major Elective | 5 credits | 5 | 0 | 0 | |
| • Agricultural Economics-II (ECN 304B)# | Major Elective | 5 credits | 5 | 0 | 0 | |
| • Behavioural Economics (ECN 304C)# | Major Elective | 5 credits | 5 | 0 | 0 | |
| • Data Analysis for Social Sciences (ECN 304D)# | Major Elective | 5 credits | 3 | 0 | 2 | |
| • Environment & Economy (ECN 305A)^ | Interdisciplinary Elective for Extra dept students | 4 credits | 4 | 0 | 0 | |
| • Demography (ECN 305B)^ | | 4 credits | 4 | 0 | 0 | |
| • Basic Econometrics (ECN 305C)^ | | 4 credits | 4 | 0 | 0 | |
| • Indian Economy (ECN 305D)^ | | 4 credits | 4 | 0 | 0 | |
| • Banking, Insurance & Finance (ECN 305E)^ | | 4 credits | 4 | 0 | 0 | |
| <i># Candidates have to select ONE from 303A/B/C/D and ONE from 304A/B/C/D</i> | | | | | | |
| <i>^ Interdisciplinary Electives for Extra-departmental Students and candidates can select any one</i> | | | | | | |
| Continued..... | | | | | | |

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| Name of Paper | Type | Credit | Pattern | | |
|---|----------------|-----------|---------|---|---|
| | | | L | T | P |
| <u>Fourth Semester</u> <i>[Students have to choose 3 core courses and 2 Major Electives]</i> | | | | | |
| <ul style="list-style-type: none">Community Engagement Course (ECN 400) (30 hours of involvement with at least 50 percent field work) | Compulsory | 2 Credits | 1 | 0 | 1 |
| <ul style="list-style-type: none">Growth & Planning (ECN 401)* | Core | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Public Economics (ECN 402)* | Core | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Advanced Financial Economics -I (ECN 403A)# | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Resource Environment & Sustainable Development (ECN 403B) # | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Law & Economics (ECN 403C)# | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Rural Development (ECN 403D)# | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Applied Econometrics–II (ECN 404A)# | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Economics of Climate Change & Energy (ECN 404B) # | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Economics of Social Capital (ECN 404C)# | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Game Theory & Information (ECN 404D)# | Major Elective | 5 credits | 5 | 0 | 0 |
| <ul style="list-style-type: none">Computer Applications & Project (ECN 405)* | Core | 5 credits | 0 | 0 | 5 |
| <i># Candidates have to select ONE from 403A/B/C/D and ONE from 404A/B/C/D</i> | | | | | |

Question Pattern

ECN 101, ECN 102, ECN 103, ECN 104, ECN 105, ECN 201, ECN 202, ECN 203, ECN 204, ECN 205, ECN 301, ECN 302, ECN 303A, ECN 303B, ECN303C, ECN 303D, ECN 304A, ECN304B, ECN304C, ECN 304D, ECN 401, ECN 402, ECN 403A, ECN 403B, ECN403C, ECN403D, ECN 404A, ECN 404B, ECN404C, ECN404D:

1. In each paper of 50 marks (5 credits) the End-semester examination shall be of 40 marks. There shall be 8 questions of 10 marks each from which 4 questions are to be answered by the candidates (Time: 2 hours).
2. In each paper of 50 marks (5 credits) which has two groups within it, the End-semester examination shall be of 40 marks. There shall be 4 questions of 10 marks each from each group. Candidates are to answer 4 questions taking 2 from each group. (Time 2 hours).

ECN 405 (Project paper): Based on Survey Report, Assignment, Presentation, Viva-Voce and Social Outreach report.

ECN 305A, ECN 305B, ECN 305C, ECN 305D, ECN 305E

1. In each paper of 50 marks (4 credits) the End-semester examination shall be of 40 marks. There shall be 8 questions of 10 marks each from which 4 questions are to be answered by the candidates (Time 2 hours).
2. In each paper of 50 marks (4 credits) which has two groups within it, the End-semester examination shall be of 40 marks. There shall be 4 questions of 10 marks each from each group. Candidates are to answer 4 questions taking 2 from each group. (Time 2 hours).

ECN 400 (Community Engagement Course): Students have to participate in the Community Engagement programmes/ activities of the department for the year concerned and follow it up with a written Report & Presentation and Viva-Voce. The main objectives are to develop an appreciation of rural culture, lifestyle and wisdoms among students, to learn about the states of various agricultural and rural development programmes, to understand causes for rural distress and poverty, and explore solutions for the same and to apply class room knowledge of courses to field realities. Evaluation pattern would be as follows:

- Report writing: 10 marks
 - Viva-voce: 10 marks (in the presence of external expert(s) from other Departments of the Home University)
 - Presentation (internal Assessment): 5 marks
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DETAILED SYLLABUS

[Electives shall be offered on First Come First Served Basis.

**All electives may not be offered. Electives will be offered
based on resource position of the department]**

Core Paper
MICROECONOMICS-I (ECN 101)
Full Marks: 50
Lecture Hours: 70

- 1. Preference Relations: (18 Lectures)**
 - Axioms of Consumer's choice, Indifference Curve, Utility function, Utility maximization, Interior and corner solution, Ordinary and compensated demand function, Indirect Utility function, Roy's identity, Expenditure function. Properties Shephard's lemma, Additively separable utility function, Quasi-linear utility function.
- 2. Production function: (18 Lectures)**
 - Specification of technology, Input requirement set, Properties of technology – Monotonic, Convex and regular; CD, CES and Leontieff technology. Returns to scale and scale elasticity, Elasticity of factor substitution, Homogenous and Homothetic production function, and case of multiple products.
- 3. Models: (16 Lectures)**
 - Cost minimization model, Derived demand for inputs, properties of cost function, Shephard's lemma. Profit Maximisation – Factor demand and Output supply function, properties of profit function, Hotelling's lemma; Duality in production
- 4. Markets: (18 Lectures)**
 - Perfect Competition; Profit maximization, Derivation of SS curves under external economies, tax and welfare implications; Monopoly, welfare and output, Quality choice, Monopsony; Oligopoly Models – Cournot, Bertrand, Stackelberg and Collusive Oligopoly.

References

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- Gravell H. and R. Reese (1992), Microeconomics, Longman, London (2nd Edition)
- Hilderbrand, W and A. Kirman (1976): Introduction to Equilibrium Analysis, Northern Holland.
- Hirshleifer J and J. Riley (1992): Analysis of Uncertainty and Intonation, Cambridge University Press.

Kreps, David M. (1990) A. Course in Microeconomic Theory, Princeton University Press. Layard, P.R.G. and A W. Walters (1978) Microeconomic Theory. McGraw Hill, New York.

Mass-Colell, A., M. Whinston and J. Green (1995); Microeconomic Theory, Oxford University Press, New Delhi.

Mukherjee, Anjan(1990): Walrasian and Non-Walrasian Equilibria, Oxford University, Press, Oxford.

Sen, A. (1999) Microeconomics; Theory and Applications, Oxford University Press, New Delhi.

Tirole, J. (1988), Theory of Industrial Organization, MIT Press.

Varian, H (2000) Microeconomic Analysis. W.W. Norton, New

Core Paper
MACROECONOMICS – I (ECN 102)
Full Marks: 50
Lecture Hours: 70

- 1. Unemployment (12 Lectures)**
 - The Natural Rate – Types of Unemployment – Full Employment – Costs of Unemployment. Wage rigidity- Generic Efficiency wage Model-General Version of Efficiency wage model, Shapiro-Stiglitz model.
- 2. Wage-Unemployment-Inflation Trade-off (22 Lectures)**
 - Theories of Inflation – A Brief Review; Demand-pull, Cost-push, Monetary, and Structural Inflation; Stagflation; Costs of Inflation; Inflation-Proofing the economy.
 - Why are Wages sticky; The Phillips curve; Lipsey's theoretical rationale behind its existence; Role of Expectations; Adaptive expectation and Rational expectation: Application in Cagan's model. Expectations Augmented Phillips Curve.
 - Inflation and interest rate- Fisher's equation, Tobin-Mundell Effect.
 - Short run Aggregate supply function- The Sticky Wage model, The Workers' Misperception model, The Imperfect Information model and the Sticky Price model.
 - Derivation of Expectation Augmented Phillips Curve from the Short run Aggregate supply function: Okun's law, Supply Shocks.
- 3. The Demand for Money (8 Lectures)**
 - Keynesian Regressive Expectation model
 - Portfolio Balance Approach
 - A General Equilibrium Baumol-Tobin Model.
 - Keynesian macroeconomics without the LM Curve.
- 4. The Supply of Money (6 Lectures)**
 - Balance sheet of RBI- sources & components of High powered money
 - Balance sheet of Commercial Banks-sources & components of money supply
 - Concepts of Money Multiplier.
- 5. Open Economy Macroeconomics (22 Lectures)**
 - Balance of Payments accounting; national product accounting; monetary accounting
 - Different Exchange rate regimes and Measures of exchange rate
 - IS-LM model with goods trade: comparative statics results- Monetary policy, Fiscal policy, Exchange rate policy (Devaluation).
 - Extension to international capital market: perfect capital mobility under fixed exchange rate – Effectiveness of monetary and fiscal policy.
 - Extension to international capital market: perfect capital mobility under flexible exchange rate regime: The Mundell-Flemming Model.
 - Extension to international capital market: imperfect capital mobility under flexible exchange rate.
 - Exchange rate Overshooting.

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- Ackley, G. (1978) – Macroeconomics: Theory and Policy; (Macmillan)
- Branson, W. (1989) – Macroeconomic Theory and Policy; (3rd Ed, Harper & Row)
- David Romer (2001)-Advanced Macroeconomics,(2nd Ed, McGraw Hill)
- Dornbush, R. (1980)- Open Economy Macroeconomics (New York: Basic Books)
- Dornbush, R. and S. Fischer (2004) – Macroeconomics (9th Ed, Tata-McGraw Hill)).
- Errol D’Souza (2008) – Macroeconomics (Pearson Education)
- Jha, R. (1991)– Contemporary Macroeconomic Theory and Policy; (Wiley Eastern)
- Levacic, R and A. Rebman (1986) – Macroeconomics; (2nd Ed, Macmillan).
- Mankiw, N. Gregory (2000) – Macroeconomics (4th Ed, Macmillan-Worth))
- Mankiw, N.G. and D. Romer (eds.) (1991) – New Keynesian Economics; (MIT, Cambridge)

Core Paper
DEVELOPMENT ECONOMICS – I (ECN 103)
Full Marks: 50
Lecture Hours: 70

Group-A (25 Marks) – Development Constraints & Policies

- 1. Poverty (10 Lectures)**
 - Conceptual Issues; Measures of Poverty & their limitations; Impact of Poverty on Development; Strategies for Poverty Eradication.
- 2. Inequality (13 Lectures)**
 - From Growth to Inequality - The Inverted U hypothesis of Kuznets; Possible explanations of Inverted U – Uneven and Compensatory Changes; Tunnel Effect and Tolerance; Empirical Testing of the Inverted U hypothesis: Evidence from different countries – Kuznets, Paukert, Adelman & Morris, Ahluwalia, Kanbur, Fields & Jakubson, Deininger & Squire, Mathur, Shand & Bhide, etc; Lessons from Micro-data – Inter-sectoral Inequality.
 - From Inequality to Growth – Role of Distribution and Redistribution on Growth; Political process; Demand, Savings, Wealth, and Credit; Occupational Choice and Human Capital Formation; Inefficiency of Inequality; Evidence from different countries – Alesina & Rodrik, Deininger & Squire.
- 3. Migration Models of Development (12 Lectures)**
 - Lewis model; Ranis-Fei model; Dixit and Marglin model; Jorgenson model; Labour Turnover Model; Recent Empirical Evidences.

Group-B (25 Marks) – Demographic Issues in Development

- 1. Basic Concepts and Indicators (6 Lectures)**
 - Vital Rates – Fertility, Mortality, Age Pyramids, and Life Tables
- 2. Human Resource and Development (9 Lectures)**
 - From Development to Population; Theory of Demographic Transition; Historical Trends; Adjustment of Birth and Death Rates; Household Choice Models
 - From Population to Development; Malthusian View; Growth Impact; Population and Environment; Population and Innovation; Markets and Inputs.

3. Population Projection

(10 Lectures)

- National Projection of Total Population and Age-Sex composition – Mathematical Methods and Cohort-Component Methods; Methods of National & Sub-National Projection of Population; Projection of the Economically Active Population
- Concepts of Stable, Stationary, and Quasi-Stationary Population

4. Trends in Population and Population Policy in India

(10 Lectures)

- Major demographic features of India's population – Spatial, Age, Sex, Occupational Structure of Indian Population; Birth rate, Death rate, Life Expectancy & Infant Mortality; Trends & Patterns;
- Evaluation of family welfare programmes in India - National Population Policies - Manpower Planning in India.
- Migration in India – Concepts, Determinants and Consequences; Measures of Internal Migration;
- Urbanization in India – Components of Urban Population Growth; Forces of Urbanization in the Developed and Developing Countries and the Over-Urbanization Phenomenon;

READING LIST

Adelman, I. and C.T. Morris (1973) – *Economic Growth and Social Equity in Developing Countries*, Stanford, USA

Ahluwalia, M. (1976) – “Inequality, Poverty, and Development”, *Journal of Development Economics*, Vol. 6

Anand, S. and R. Kanbur (1993) – “The Kuznets Process and the Inequality-Development Relationship”, *Journal of Development Economics*, Vol. 40

Anand, S. and R. Kanbur (1993a) – “Inequality and Development: A Critique”, *Journal of Development Economics*, Vol. 41

Banerjee, Abhijit, Benabou, Roland and Mookherjee, Dilip, (2006), *Understanding Poverty*, Oxford University Press,

Basu, K. - Analytical Development Economics

Behrman and Srinivasan Ed.-Handbook of Development Economics, vol. 3

Bhatia, H L - History of Economic Thought

Bhattacharya, Debesh - Political Economy of Development

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Chenery and Srinivasan Ed.- Handbook of Development Economics, vol.1&2

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- Jorgenson, D. – ‘The Development of a Dual Economy’, *Economic Journal*, Vol. 71, Reprinted in S. P. Singh (ed.) Underdevelopment to Development.
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- Lewis W. A. – ‘Economic Development with Unlimited Supplies of Labour’ in Agarwala and Singh (ed.) *Economics of Underdevelopment*
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- Meir, G.M. - Leading Issues in Economic Development**
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- Pathak, J.B and F. Ram: *Techniques of Demographic Analysis*, Himalaya Publishing House
- Paukert, F. (1973) – “Income Distribution at Different Levels of Development: A Survey of Evidence, *International Labour Review*, Vol. 108
- Ranis, G. and J. Fei - ‘A Theory of Economic Development’, *American Economic Review*, Vol. 51, 1961, Reprinted in Eicher and Witt (ed.) *Agriculture in Economic Development*
- Ray, Debraj - Development Economics**
- Ronald Lee (2003) “The Demographic Transition: Three Centuries of Fundamental Change,” *Journal of Economic Perspectives* v. 17, n. 4, Fall 2003, pp.167-190.
- Saxena, P. C. and Talwar P. P. (Eds.), *Recent Advances in the Techniques of Demographic Analysis*, Himalayan Publishers, Bombay, 1988.
- Shand, Ric and S. Bhide (2000), “Sources of Economic Growth: Regional Dimensions of Reforms,” *Economic and Political Weekly*, Vol. 35, No. 42, October 14.
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- Sinha, V.C and E. Zacharia : *Elements of Demography*
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- Srinivasan, K., *Basic Demographic Techniques and Applications*, Sage Publications, New Delhi, 1992.
- Stiglitz, J. – Article in *American Economic Review*, May, 1989
- Sudarshan and A. Shariff (1999), *Gender Population and Development*, Oxford University Press, New Delhi.
- Thirlwall, A.P.- Growth and Development**
- United Nations - Human Development Report (various issues)**
- United Nations Publications, *The Determinants and Consequences of population Trends* (Series No.50)
- Visaria, V. (1985), "Infant Mortality in Indian : Level Trends and Determinants" *Economic and Political Weekly*, Vol.20, No.32, August 10, 1985.
- World Bank - World Development Report (various issues)**
- World Bank (1993) - *The World Development Report, 1993 : Investing in Health*, Oxford University Press, New York.

Core Paper
MATHEMATICAL ECONOMICS & STATISTICS (ECN 104)
Full Marks: 50
Lecture Hours: 70

Group: A
(Mathematical Economics)

1. Static Optimisation (9 Lectures)
 - Global/Local; Unconstrained optimization (single variable case) –First Derivative Test, Second Derivative Test, (Unconstrained optimization) –Multi-variable case; Constrained Multi-variable case; Constrained Multi-variable optimization with Equality Constraints Application of Matrices and determinants; - Lagrange Multipliers Method; Envelope Theorem; Applications.
2. Dynamic Optimization (9 Lectures)
 - Optimal Control Methods: Pontryagin optimization principles –Continuous Model, Discrete Model; Phase Diagram Approach to continuous Time Control Models; Applications.
 - Dynamic programming: Bellman's equation, Solution procedure, Economic Applications.
3. Linear Programming (12 Lectures)
 - Theory of Simplex Method, An Overview of Simplex Algorithm; Duality Theorems, Economic Interpretation of Duality; Dual Simplex Method; Applications.
 - Sensitivity Analysis: Changes in coefficients of variables in the objective function (C), changes in Right Hand Side Constants of Constraints (b), changes in Input –Output Coefficients, Addition of New Constraint; Applications.
4. Non-linear Programming (5 Lectures)
 - Kuhn-Tucker Conditions, Graphical Solution, Economic Interpretation of Kuhn – Tucker Conditions, constraint Qualification, Kuhn-Tucker Sufficiency Theorem; Applications.
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Group: B
(Statistics)

1. Estimation (10 Lectures)
 - Point Estimation –Desirable Properties of Point Estimator; Methods of Estimation – OLS, Maximum Likelihood and their Properties; Cramer-Rao Inequality.
 - Interval Estimation –Interval Estimators of Population Mean, Population Variance, and Population Proportion.
2. Testing of Hypothesis (25 Lectures)
 - Neyman-Pearson Theory of Testing of Hypothesis –Type I & Type II Errors - Power of Test.

- Simple Parametric Tests based on τ , t , χ^2 and F Distributions –Small Sample Tests, Large Sample Tests.
- Non-parametric Tests: Median Test, Run Test, Wilcoxon Rank Sum Test, Kruskal-Wallis Test, Concordance Test.
- Analysis of Variance (Fixed Models) –One-way Classified Data; Two-way Classified Data: One observation per cell, m observations per cell.

References

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- Spiegel, M. R. (1992) Theory and Problems of Statistics, McGraw Hill Book Co. London.
- Sukhatme, P.V. and B.V. Sukhatme (1970) Sampling Theory of Survey with Applications, Ioa State University Press.

Core Paper
ECONOMETRICS (ECN 105)
Full Marks: 50
Lecture Hours: 70

1. **Classical Linear Regression Model** (15 Lectures)
 - An overview of Two-variable Model. K-variable GLM – Assumptions, Estimation (using Matrix Algebra), Properties of Estimators, ANOVA in GLM, Inference Analysis, Prediction, Applications.
2. **Violation of the OLS Assumptions** (25 Lectures)
 - Heteroscedasticity – Meaning, Consequences (with proof) and Testing for its presence, Estimating Methods in its Presence.
 - Autocorrelation – Meaning, Consequences (with proof) and Testing for its presence, Estimating Methods in its Presence.
 - Multicollinearity – Meaning, Consequences (with proof) and Testing for its presence, Estimating Methods in its Presence. Principal Component Analysis – Estimation of Loadings, Test for the Significance of Loadings – Applications.
3. **Qualitative Variables** (15 Lectures)
 - Regression with Qualitative Regressors: Dummy Independent Variables –When to use; Dummy Variable Trap; Interpretation of estimated coefficients; Class-effect and Interaction-effect; Applications
 - Qualitative Response Models: Nature and types of Qualitative Response Models –Linear Probability Model (LPM) and its application, Problems with LPM; Logit Model – Estimation of the Logit Model and its application; Tobit Model and its application.
4. **Simultaneous Equation System** (15 Lectures)
 - Basic Concepts - Structural Form, Reduced Form, and Final Form; Identification problem -Rank and Order conditions; Reduced Form approach to identification.
 - Methods of Estimation - Single Equation Approach – Problems of applying OLS in simultaneous equation system – Simultaneous Bias –Contemporaneous Correlation –OLS in Recursive System. Estimation through the methods of: Indirect Least Squares (ILS); Instrumental Variable (IV); 2-Stage Least Square; Limited Information Maximum Likelihood (LIML); Least Variance Ratio (LVR); Properties of various estimators.

References

1. Gujarati D. Basic Econometrics, Tata Mc Graw Hill, New Delhi.
2. Johnston and Dinardo, Econometric Methods, McGraw Hill.
3. Maddala, GS –Econometrics, McGraw Hill, N.Y.
4. Koutsoyiannis: Theory of Econometrics.
5. Maddala, G.S (1983), Limited-Dependent and Qualitative Variables in Econometrics, Econometric Society Monographs, Cambridge
6. Stock, James H. and Mark W. Watson (2007), Introduction to Econometrics, 2/E, Pearson

Core Paper
MICROECONOMICS – II (ECN 201)
Full Marks: 50
Lecture Hours: 70

- 1. Economics of Uncertainty: (14 Lectures)**
Distinction between risk and uncertainty-Individuals behaviour towards risk- Contingent Consumption- Von-Neumann –Morgenstern expected utility function- Properties- uniqueness of the expected utility function – positive affine transformation-consumer's equilibrium under uncertainty- utility function and the measures of risk –aversion-example Gambling and Insurance -Risk Aversion- Arrow-Pratt measures of risk aversion-absolute and relative measures- - Convexity of Indifference curves and the shape of Von-Neumann-Morgenstern utility function-Allocation of wealth to risky asset-output decision under uncertainty.
- 2. Asymmetric Information: (12 Lectures)**
Economics of Information- Imperfect Information-the market for Lemons-Akerlof's Model- Adverse Selection- Moral Hazard- Signaling- the Principal-Agent Model.
- 3. Exchange Under Uncertainty: (10 Lectures)**
Risky Asset- Mean-Variance Utility-Measuring risk-equilibrium in a market for risky asset -Risk Spreading-The Arrow –Lind Theorem- Risk-Pooling and Diversification.
- 4. Managerial Economics: (8 Lectures)**
Limit Pricing- Bain's Model- Managerial Theories of the Firm-Baumol's theory of Sales Maximization- -Behavioural theory of the Firm-Cyert and March.
- 5. General Equilibrium: (12 Lectures)**
Walrasian General Equilibrium- a Pure Exchange Model- An aggregate Excess demand function- Walras Law- composite commodity theorem-existence of a general equilibrium- Mechanism for attaining Walrasian general equilibrium-Tatonnement process- Uniqueness and stability of General equilibrium –Perfect and imperfect stability.
- 6. Welfare Economics: (14 Lectures)**
Social Welfare Functions-The Pareto conditions-Pure Exchange –Pure Production-the Classical Theorem of Welfare Economics- -The Theory of the second Best- Market Failure - Public Good and Pareto Optimality ,Concept of Social Optimum – Equity-efficiency trade-off. Incomplete markets – Property rights – Coase Theorem, Arrow's Social Welfare function-General Possibility theorem- Compensation Principle-Kaldor-Hicks-Scitovsky.

References

- Hall and Varian: Microeconomic Analysis
- Hall and Varian: Intermediate Microeconomics
- Silberberg and Suen: The structure of Economics-a mathematical analysis
- Maddala and Miller: Microeconomics-Theory and Applications
- Kreps: A course in Microeconomic Theory
- Baumol: Economic theory and Operational Analysis
- Koutsoyannis: Modern Microeconomics
- Henderson and Quandt: Microeconomic Theory

Core Paper
MACROECONOMICS – II (ECN 202)
Full Marks: 50
Lecture Hours: 70

- 1. Real Business Cycle Theory (10 Lectures)**
 - Some Facts about Economic Fluctuations.
 - Theories of Fluctuations.
 - A Baseline Real Business Cycle Model.
 - Household Behaviour.
 - A Special Case of the Model and its Solution.
 - Productivity Shocks, Consumption and Capital Accumulation.
 - Output and Employment Fluctuations.
 - Unemployment, Heterogeneity, Shocks and Imperfect Information.
- 2. Consumption (4 Lectures)**
 - Consumption under Uncertainty: The Random Walk Hypothesis.
 - The Interest Rate and Saving
 - Consumption and Risky Assets.
- 3. Investment (10 Lectures)**
 - Investment and the Cost of Capital
 - Neo-classical Theory of Investment: Jorgenson's Model.
 - Flexible Accelerator Model: Eisner and Strotz Model.
 - A Model of Investment with Adjustment Costs.
 - Tobin's q Model: Analysing & Implications of the model.
 - The Effects of Uncertainty.
 - Financial Market Imperfections.
- 4. Consumption and Investment: Basic Infinite Horizon Model (12 Lectures)**

The Ramsey Problem: The Keynes Ramsey Rule.
The Decentralized Economy.
The Government in the Decentralized Economy.
Overlapping Generations Model: (a) Two-Period Lives. (b) Social Security and Capital Accumulation. (c) A Model of Perpetual Youth. (d) Fiscal Policy: Debt and Deficit Financing.
- 5. Money (8 Lectures)**
 - The Overlapping Generation Model with Money.
 - Money in the Utility Function.
 - Money: Inside and Outside.
 - Seigniorage and Inflation.
 - Sirdrauski Model.
 - Dynamics of Hyper-inflation.

6. Rational Expectation Model (10 Lectures)

- Some Basic Issues.
- Lucas Supply Function.
- A Complete Rational Expectations Macro Model.

7. Unemployment (10 Lectures)

- Model of Implicit Contracts.
- Insider-Outsider Models.
- Hysteresis.
- Search and Matching Models.

8. Open Economy Macro Dynamics (6 Lectures)

- Disequilibrium analysis and its implication: Exchange rate overshooting.
- Traded and Non-Traded Goods: Wage Dynamics, Capital Stock Dynamics.
- Temporary and Permanent Shocks: Anticipations & News.

References

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- Ackley (1961): Macroeconomic Theory
- Allen (1968): Macroeconomic Theory
- Baumol (1952): Economic Dynamics
- Baumol (1977): Economic Theory and Operations Analysis
- Begg (1982): The Rational Expectations Revolution.
- Dorfman, Samuelson and Solow (1958): Linear Programming and Economic Analysis
- Friedman (1956) in Studies in the Quantity Theory of Money, (ed.), Friedman
- Hansen (1953): A Guide to Keynes.
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- Jha, J. (1999): Contemporary Macroeconomic Theory and Policy, New Age International, New Delhi.
- Jhonson Bruce F. (1971): Household Behaviour.
- Jhonson Harry G. (1964): Money Trade and Economic Growth.
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- Junankar (1972): Investment
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- Laidler, D.F.W. (1977): Demand for Money: Theory and Evidence, Dum-Don Valley, New York.
- Leijonhufvud, A. (1968): On Keynesian Economics and Economics of Keynes, OUP, London.
- Lerner (1946): Economics of Control.
- Levacic, R. and A. Rebman (1986): Macro Economics: An Introduction to Keynesian and Neo-Classical Controversies, Macmillan, London.
- Mankiw, N.G. and D. Romer (ed.) (1991): New Keynesian Economics, (2 volumes), MIT Press, Cambridge.
- Mathews (1959): The Trade Cycle
- Samuelson (1939): Review of Economics and Statistics
- Schneider (1962): Money, Income and Employment.
- Shackle (1949): Expectations in Economics
- Sheffrin, S.M.(1996): Rational Expectations, Cambridge University Press, Cambridge.
- Tobin (1951): in Money, Trade and Economic Growth: Essays in Honor of Jhon H. Williams.
- Turnovsky, S. J (1995): Methods of Macroeconomics Dynamics (Prentice Hall of India Private Ltd.)
- Turvey (1961): Interest rates and Asset Prices.

Core Paper
DEVELOPMENT ECONOMICS – II (ECN 203)
Full Marks: 50
Lecture Hours: 70

Group-A (25 Marks) – Economics of Social Sector

- 1. Introduction to Social Sector (5 Lectures)**
 - Components of Social Sector – Importance of Social Sector in Development
- 2. Education and Development (15 Lectures)**
 - Components of Human Capital; Human Capital vs. Physical Capital;
 - Education as means of Development – Cost-Benefit Analysis in Education – Cost of Education - Private costs & Social costs; Wastage and Stagnation;
 - Benefits of Education - Direct and Indirect benefits; Private and Social benefits; Methods to measure benefits from Education
 - Externalities in Education – Market failure – Public vs Private Debate – Education and Socio-Economic Status
 - Significance of Women's education; Gender gaps in educational achievements; Policies and Programmes for promoting women's education.
- 3. Health and Development (15 Lectures)**
 - Health dimensions of development – Why health is important – Direct and Indirect effects on private and social development; Concept of human life value; Burden of Disease
 - Determinants of health – poverty, malnutrition and environmental issues;
 - Institutional issues in health care delivery; Health Financing Models; Health Insurance & Risk Pooling
 - Health Inequality and Socio-Economic Status - Concentration Index and Concentration Curve; Inequalities in health – class and gender perspectives;
 - Life cycle approach to gender specific health needs; Reproductive Rights; Gender dimension of national health policies and programmes; Reproductive and Child Health.

READING LIST

Ray, Debraj - Development Economics
Meir, G.M. - Leading Issues in Economic Development
Thirlwall, A.P. - Growth and Development
United Nations - Human Development Report (various issues)

- Adelman, I. and C.T. Morris (1973) – *Economic Growth and Social Equity in Developing Countries*, Stanford, USA
- Berman, P. (Ed.) (1995) - *Health Sector Reform in Developing Countries : Making Health Development Sustainable*, Boston: Harvard Series on Population and International Health.
- Blaug, M (1972) - *Introduction to Economics of Education* (Penguin)
- Cohen, E and T. Gaske (1989) - *Economics of Education*. Pergamon Press, London
- McMohan, W.W. (1999) - *Education and Development : Measuring the Social Benefits*, Oxford University Press, Oxford.
- Schultz, T. W(1971) - *Investment in Human Capital*, Free Press, New York.
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- Visaria, V. (1985), "Infant Mortality in Indian : Level Trends and Determinants" *Economic and Political Weekly*, Vol.20,No.32, August 10, 1985.
- World Bank (1993) - *The World Development Report, 1993 : Investing in Health*, Oxford University Press, New York.

Group-B (25 Marks) – Gender Issues in Development

1. Concepts and Theoretical Approaches (8 Lectures)

- Concept of gender economics; Gender issues in economic theory; Measurement Techniques - GII, MPI, WEIA, SIGI.
- Approaches: Women in development (WID); Women and development (WAD), Gender and development (GAD); Neoliberal approaches.

World Bank. 2012. Gender Equality and Development: World Development Report 2012. Washington, D.C: The World Bank. Overview, pp. 2-21.

Sen, Gita. 2010. "Poor households or poor women: is there a difference?" In The International Handbook of Gender and Poverty by Sylvia Chant. Edward Elgar, Northampton. pp.101-104

Bessell, Sharon. 2010. "Methodologies for gender-sensitive and pro-poor poverty measures." In The International Handbook of Gender and Poverty by Sylvia Chant. Edward Elgar, Northampton. pp. 59-64

*Berik, Gunseli. 1997. "The need for crossing the method boundaries in feminist research." *Feminist Economics*.3(2). pp. 121-125*

Beneria, Lourdes, Gunseli Berik, and Maria Floro. 2015. Gender, Development and Globalization: Economics as if all People Mattered. Second Edition. Ch. 1.

2. Gender and Work (15 Lectures)

- Conceptualizing and measuring women's contribution to national income and growth;
- Labour market issues—occupational segregation, wage disparity, housewifization, feminization, flexibility and casualization.
- Women in Agriculture – Disparities in Land ownership; Difference in Productivity and contribution
- Globalisation & Gender Impacts – SAP & Land Grabs – Working Conditions in Global Factories

Film: *Who's Counting? Marilyn Waring on Sex, Lies and Global Economics* (1995) 52 mins.

Beneria, Lourdes, Gunseli Berik, and Maria Floro. 2015. *Gender, Development and Globalization: Economics as if all People Mattered. Second Edition. Ch. 5.*

Folbre, Nancy. 1986. "Cleaning house: New perspectives on households and economic development." *Journal of Development Economics*. 22, pp. 5-40.

Himmelweit, Susan. 1995. "The discovery of "unpaid work": the social consequences of the expansion of "work"." *Feminist Economics* 1(2) pp. 1-19.

Shahra Razavi (ed.) (2009.) "The gendered impacts of liberalization: Towards embedded liberalism?" New York: Routledge (for UNRISD).

I Ahmed (1994), "Technology and Feminization of work", *Economic and Political Weekly*, 29 (18), WS34-38.

Guy Standing. (1999) "Global Feminisation through flexible labour- A theme revisited", *World Development*, 27 (3).

Jayati Ghosh. (2002) "Globalisation, export oriented employment for women and social policy: A Case study of India", *Social Scientist*, Vol 30(11 and 12), pp. 17-60.

Neetha N. (2006), "Invisibility continues? Social Security and Unpaid women workers", *Economic and Political Weekly*, Vol XLI (32).

Doss, Cheryl. 2011. "The role of women in agriculture." *ESA Working Paper.No. 11-02*.pp 3-13

Agarwal, Bina. 1988. "Who sows? Who reaps? Women and land rights in India." *The Journal of Peasant Studies* 15(4) pp. 531-581.

Doss, Cheryl. 2001. "How does gender affect the adoption of agricultural innovations? The case of improved maize technology in Ghana." *Agricultural Economics* 25 pp. 27-39.

Doss, Cheryl. 2015. "Women and Agricultural Productivity: What Does the Evidence Tell Us?." *Economic Growth Center Discussion Paper No. 1051.*

Beneria, Lourdes, Gunseli Berik, and Maria Floro. 2015. *Gender, Development and Globalization: Economics as if all People Mattered. Second Edition. Ch. 3, pp. 93-100*

Beneria, Lourdes, Gunseli Berik, and Maria Floro. 2015. *Gender, Development and Globalization: Economics as if all People Mattered. Second Edition. Ch.4, pp. 135-142.*

Kabeer, Naila. 2004. "Globalization, Labor Standards, and Women's Rights: Dilemmas of Collective (In)action in an Interdependent World." *Feminist Economics* 10 (1): 3-35.

Film: *China Blue* (2005) 87 mins.

3. Women& Poverty

(12 Lectures)

- Women's Rights; Deprivation and marginalization of women; Feminization of poverty: extent, causes and consequences; Welfare-oriented Programmes to empowerment-oriented programmes; Need for gender concerns in designing social security policy; Examples - Conditional Cash Transfers

Chant, Sylvia. 2008. "The 'Feminization of Poverty' and the 'Feminization' of Anti-poverty Programmes: Room for Revision?" *Journal of Development Studies*, 44(2).

Medeiros, Marcelo and Joana Costa. 2010. "The feminisation of poverty: a widespread phenomena?" In *The International Handbook of Gender and Poverty* by Sylvia Chant. Edward Elgar, Northampton. pp. 95-100

Cagatay, Nilufer. 1998. "Gender and poverty." *UNDP Working Paper no. 5. (Section I & II)*

Patel, Leila and Tessa Hochfeld. 2011. "It Buys Food but Does it Change Gender Relations? Child Support Grants in Soweto, South Africa." *Gender and Development* 19(2): 229-240.

- M A Oommen (2008) Microfinance and poverty alleviation: The case of Kerala's Kudumbashree, CSES Working Paper No. 17. [available from <http://csesindia.org/admin/modules/cms/docs/publication/17.pdf>]*
- Sen, Anindita and Arijita Dutta (2018) West Bengal's Successful Kanyashree Prakalpa Programme Needs More Push From State and Beneficiaries, Economic & Political Weekly, Vol. 53, Issue No. 17, 28 Apr, 2018*
- Nanda, Priya, Nitin Datta, Elina Pradhan, Priya Das and Sneha Lamba (2016): "Making Change with Cash? Impact of a Conditional Cash Transfer Programme on Age of Marriage in India," US AID and ICRW.*

Core Paper
BASIC ENVIRONMENTAL ECONOMICS (ECN 204)
Full Marks: 50
Lecture Hours: 70

- 1. Relationship between Environment and Economy (4 Lectures)**
 - Laws of thermodynamics
- 2. Environmental Asset as public good (4 Lectures)**
 - Concept of market failure and its causes: incomplete markets, externality, non-rivalry and non-excludability
- 3. Economics of Renewable Resource (4 Lectures)**
 - Economic of Fishery - Growth function – logistic model – The sustained yield function – Schaefer model - Underlying assumptions – Drawbacks of MSY – Static model of fishery – bio-economic model and private property regime.
 - Economics of Forestry – The volume function and the mean annual increment – optimal single rotation – The rotation. Timber supply the short run and in long run, socially optimal depletion of forest in the presence of amenity benefits
 - Economics of Land and Water - Are Land and Water Renewable or Non Renewable Resource? – Optimum use of them and their re-use
- 4. Economics of Non Renewable Resource (4 Lectures)**
 - Basic concepts – Hotelling rule – The concept of backstop - A simple model of optimal depletion – Perfect competition and monopoly in non-renewable resource market
- 5. Environment and Development (4 Lectures)**
 - Environmental issues: local regional and global: Air pollution, water pollution, noise pollution, waste pollution – measurements issues.
 - Trade-off between Development and Environment; Environmental Kuznets Curve - Concept, Genesis, Factors and Lessons
- 6. Environmental Policy (4 Lectures)**
 - Pollution as negative externality – optimal pollution, Taxation and optimal pollution – The optimal Pigovian tax, The concept of property right - Coase theorem, Potential for

market bargain in externality – criticism of Coase theorem. Tradable Pollution Permits
– Type of Permits – advantage of TPPs

7. Sustainable Development

(4 Lectures)

- Context and the concept – Difference between Economic Growth, Development and Sustainable Development – Values and measures of S.D. SDG goals 2030 and targets

8. Institutions and their functions

(4 Lectures)

- UNEP, IPCC, CPCB, Green Bench

References:

- D Pearce and RK Turner: *Economic of Natural Resources and the Environment*, Prentice Hall.
- N. Hanley, J. Shogren and B. White: *Environmental Economics in Theory and Practice*, MacMillan.
- R. P. Sengupta, *Ecological Limits and Economic Development*, OUP
- J.M. Conrad: *Resource Economics*, Cambridge Univ. Press
- Ian Hodge, *Environmental Economics*, Palgrave MacMillan
- J.M. Conrad and C. Clark : *Natural Resource Economics*, CUP
- R.N. Bhattacharyya (Ed.) : *Environmental Economics*, OUP
- S. Dinda, Environmental Kuznets Curve Hypothesis: A Survey, *Ecological Economics*, Vol.-49(4), 431-455.
- World Bank, World Development Report 1992, New York, OUP

Core Paper
BASIC FINANCIAL ECONOMICS (ECN 205)
Full Marks: 50
Lecture Hours: 70

- 1. Introduction (10 Lectures)**
 - Real and Financial Assets; Securities –Types and Attributes; Financial Markets; Capital Market –Primary & Secondary; Trading of Stocks.
 - Financial Computations: Time Value of Money - Interest Rates, Annuities, Bond Yields, Capital Asset Returns.
- 2. Security Analysis (15 Lectures)**
 - Fundamentals –Economic Analysis, Industry Analysis, Company Analysis;
 - Technical Analysis – Use of different Charts and Diagrams.
- 3. Efficient Market Hypothesis (10 Lectures)**
 - Efficient Versus Perfect Market; Allocation, Internal & External Efficiencies; Weak, Semi-strong and Strong Forms of Pricing Efficiency-Meaning and Tests.
- 4. Portfolio Analysis (15 Lectures)**
 - Risk and Return of Individual Securities; Portfolio Risk and Return; Efficient Portfolios; Portfolio Selection Models.
- 5. Capital Market Theories (10 Lectures)**
 - Capital-Asset Pricing Model; Arbitrage Pricing Theory and Multi-factor Models of Risk.
- 6. Foreign Exchange Rates and Markets (10 Lectures)**
 - Determination of Foreign Exchange Rates ; Functions of Foreign Exchange Markets –Spot Market, Forward Market ; Interest Arbitrage –Uncovered and Covered ;
 - Theories of Foreign Exchange Rate Movements -Purchasing Power Parity Theory, Expectations Theory, International Fisher Effect Theory, Interest Rate Parity Theory.

References

Bodie, Kane, Marcus & Mohanty: Investments, Tata McGraw-Hill Publishing Company Limited.
Elton and Gruber: Modern Portfolio Theory and Investment Analysis, John Wiley & Sons.
Fischer & Jordan: Security Analysis and Portfolio Management, Prentice-Hall of India Private Limited.
Fuller and Farrel (Jr.): Modern Investments and Security Analysis, McGraw Hill
Giancarlo Gandolfo: International Finance and Open-Economy Macroeconomics. Springer, 2002.
I.M. Bhole : Financial Institutions and Markets, Tata McGraw Hill Publishing Company Limited
Ravi M. Kishore: Financial Management, Taxmann Allied Services Pvt. Ltd.
Rick Bensuson (Ed.): New Thinking in Technical Analysis, Viva Books Private Limited.
Tinic & West: Investing in Securities: An Efficient Markets Approach Addison-Wesley Publishing Company.
Yuh-Dauh Lyuu : Financial Engineering and Computation, Cambridge University Press.

Semester - III
Compulsory Papers
SELECT FEATURES OF INDIAN ECONOMY (ECN 301)
Full Marks: 50
Lecture Hours: 70

1. **Planning and Growth:** (8 Lectures)
 - Economic Growth in India: Pattern and Structure, Center-State financial relations, Finance Commission of India.
2. **Agricultural Sector:** (10 Lectures)
 - Pattern and Structure of Growth: Major Challenges and Responses, Issues in Indian agricultural policy, agricultural price policy, agricultural marketing, Food Security, Public distribution system in India, Agriculture and W.T.O.
3. **Industrial Sector:** (10 Lectures)
 - Pattern and Structure of Growth: Major Challenges and Responses, Trends in Industrial production and productivity, Development of entrepreneurship in India.
4. **Foreign Sector:** (8 Lectures)
 - India's foreign trade –Structure and Direction, India's BOP problem, Foreign capital, Trade Policies..
5. **Structural Changes:** (8 Lectures)
 - Occupational structure and economic development – growing importance of the tertiary sector, an analysis of trends since 1951.
6. **Labour Market:** (8 Lectures)
 - Unemployment and Underemployment – Wages & Remunerations – Discrimination in Labour Market
7. **Poverty & Inequality:** (8 Lectures)
 - Poverty and Inequality – Inequality & Growth

References

- Ahluwalia, I.J. and I M D Little (Eds.) (1999) India's Economic Reforms and Development (Essays in honour of Manmohan Singh), Oxford University Press, New Delhi.
- Bandyopadhyay, Kaushik Ranjan (2010) Poverty in India: A Chronological Review on Measurement and Identification,
- Bardhan, P.K. (9th Edition) (1999) The Political Economy of Development in India, Oxford University Press, New Delhi.

- Bawa, R.S. and P.S. Raikhy (Ed.) (1997) *Structural Changes in Indian Economy*, Guru Nanak Dev University Press, Amritsar
- Bhaduri, Amit and Deepak Nayyar- *Intelligent person's guide to Liberalisation*.
- Brahmananda, P.R. and V.R. Panchmukhi (Eds.) (2001), *Development Experience in the Indian Economy* Inter State Perspectives, Bookwell, Delhi.
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- Chakravarty, S. (1987) *Development Planning; The Indian Experience*, Oxford University Press, New Delhi.
- Dandekar, V.M. and N. Rath, *Poverty in India, 1971*, (Pune: Indian School of Political Economy).
- Dantwala, M.L. (1996) *Dilemmas of Growth; The Indian Experience*, Sage Publication New Delhi.
- Datt, R. (Ed.) (2001) *Second Generation Economic Reforms in India*, Deep & Deep Publications, New Delhi.
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- Deaton, Angus and Valerie Kozel (2005) *The Great Indian Poverty Debate*, Delhi: MacMillan, 2005.
- Dutt, R and KPS Sundaram – *Indian Economics* (Latest Edition)
- Ghose, Ajit (2014) *Globalisation, Growth and Employment in India*, *Working Paper No. WP 05/2014*, *Institute of Human Development*, New Delhi
- Ghose, Ajit (2016) *India Employment Report 2016*, IHD, New Delhi, Executive Summary Here
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- Himanshu (2010) *Towards New Poverty Lines for India*, *Economic and Political Weekly*, Vol. 45, Issue No. 01, 02 Jan, 2010
- Himanshu (2013) *Poverty and Food Security in India*, ADB Economics Working Paper Series No. 369, September, 2013, ADB
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- Jalan B. (1992) *The Indian Economy - Problems and Prospects*. Viking, New Delhi,
- Jalan, B (1996) *India's Economic Policy - Preparing for the Twenty First Century*, Viking, New Delhi.
- Jha, R. (2004). *Reducing Poverty and Inequality in India: Has Liberalization Helped?* In Cornia, A. C. (ed.) *Inequality, Growth and Poverty in an Era of Liberalization and Globalization*. Helsinki: World Institute for Development Economic Research. Oxford University Press.
- Jha, Raghendra (2000) "Growth, Inequality and Poverty in India: Spatial and Temporal Characteristics." *Economic and Political Weekly*, Vol. 35, No. 11, 2000 HERE
- Joshi, V, and I M D Little (1999) *India: Macro Economics and Political Economy, 1964-1991*, Oxford University Press, New Delhi.
- Mathur, Ashok (1999) "Economic Reforms, Employment and 'Non-Employment': Theory, Evidence and Policy", *Keynote paper for Technical Session VI of 82nd Annual Conference of the Indian Economic Association*, December, 1999.
- Mathur, Ashok and Sunil Mishra (2007) - *Wages and Employment in the Indian Industrial Sector: Theory and Evidence*, *Indian Journal of Labour Economics*, Vol. 50, No. 1, pp83-110

- Mazumdar, Dipak, Sandip Sarkar, Balwant Singh Mehta (2017) Inequality in India-I, *Economic and Political Weekly*, Vol. 52, Issue No. 30, 29 Jul, 2017
- Mazumdar, Dipak, Sandip Sarkar, Balwant Singh Mehta (2017) Inequality in India-II, *Economic and Political Weekly*, Vol. 52, Issue No. 32, 12 Aug, 2017
- Misra and Puri – Indian Economics (Latest Edition)
- Morris, Sebastian – Growth and Transformation of Small Firms in India, OUP
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- Mukherjee, D. and Majumder, R (2011) “Occupational Pattern, Wage Rates & Earning Disparities in India: A Decomposition Analysis”, *Indian Economic Review*, Vol. 46, No. 1, June 2011
- NSSO Reports on *Quinquennial Surveys on Employment and Unemployment in India, Various Rounds and years*, [specially the Concepts & Definitions section], Government of India, New Delhi.
- Panagariya, Arvind and Megha Mukim (2014) A Comprehensive Analysis of Poverty in India, *Asian Development Review*, vol. 31, no. 1, pp. 1–52
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- Patnaik, Utsa (2006) ‘Poverty and Neo-Liberalism in India’, Rao Bahadur Kale Memorial Lecture delivered at Gokhale Institute of Politics and Economics, Pune, February 3, 2006
- Reserve Bank of India, Report on Currency and Finance (Annual)
- Sandesara, J C (1992) Industrial Policy and Planning, 1947-1991 Tendencies, Interpretations and issues, Sage Publications, New Delhi.
- Sen Abhijit and Himanshu (2004) Poverty and Inequality in India-I, *Economic and Political Weekly*, Vol. 39, Issue No. 38, 18 Sep, 2004
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- Sen, R.K. and B. Chatterjee (2001) Indian Economy Agenda for 21st Century (Essays in honour of Prof. P.R. Brahmananda), Deep & Deep Publications, New Delhi.
- Sharma, Alakh N (2007) Flexibility, Employment And Labour Market Reforms In India, *Working Paper No. 37, Institute of Human Development*, New Delhi HERE
- Thomas, Jaya Jose (2012) India’s Labour Market during the 2000s: Surveying the Changes, *Economic and Political Weekly*, December 22, 2012, Vol. XLVII, No. 51

Core Paper
INTERNATIONAL ECONOMICS (ECN 302)
Full Marks: 50
Lecture Hours: 70

- 1. Pure Theory of International Trade (10 Lectures)**
 - Generalization of the Ricardian Model of Trade with multi-commodity and multi-country cases.
 - Incomplete specialization -terms of trade and wage inequality in developing economies.
 - Specific Factors, intermediate inputs, public goods and non-traded goods in international trade: Jones' model.
 - Exchange models
- 2. Theory of Commercial Policy (10 Lectures)**
 - Domestic Distortions, Tariffs and The Theory of Optimum Subsidy
 - The political economy of protection; Trade Policy and the Less Developed Countries.
 - Trade Controls in Practice. Multilateral tariff reduction, the trend towards "managed trade."
- 3. Trade and Development (10 Lectures)**
 - Development in the open economy- Theory of immiserizing growth.
 - Foreign capital and welfare- the Brecher-Alejandro (1977).
 - Evolution of Trade Policies- emergence of trading blocs.
- 4. Intra-Industry Trade, Strategic Trade Theory and FDI (10 Lectures)**
 - Causes of emergence and Measurement of Intra-Industry Trade.
 - Trade under Imperfectly competitive market with Increasing returns, Pattern and gains; Intra-industry Trade; Returns to scale, product differentiation monopolistic competition and basis of trade. Implications for standard theorems on international trade.
 - Multinational Corporations. Cartels and the interests of producing and consuming countries, monopoly and policies of exporting and importing countries, industrial policy and market rivalry. Effects of trade policy liberalization on national welfare.
- 5. Trade Policies and Imperfect Competition (10 Lectures)**
 - Alternative forms of intervention and their consequences. Reciprocal Dumping and related trade policy; Monopolistic competition, Oligopoly in International Trade - Pattern of trade, Gains from trade.
 - Tariffs vs. Quotas-policy interventions under alternative market structure.

References

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- Jones, R.W. and Kenen (ed)-|Handbook of International Economics|, vol. I and vol. II, North Holland, 1984.

- Chacoliades, M. - Pure Theory of International Trade Jagdish Bhagwati - Writings on International Economics, ed by V.N. Balasubramanyam, Oxford University Press.
- Marjit, S. and R. Acharyya (2002) - International Trade, Wage Inequality and the Developing Economies -a general equilibrium approach, Springer-Verlag.
- Krugman, P - Rethinking International Trade. MIT Press, 1990 Grossman, G. (ed): Imperfect Competition and Trade Theory, MIT Press, 1994
- Bhagwati, Jagdish - Writings on International Economics, edited by V.N. Balasubramanyam, Oxford University Press.
- Findlay, R., Jones, R.W. and Kenen (ed) - Handbook of International Economics, vol. I and vol. II, North Holland, 1984. Amrita Narlikar (2005): The World Trade Organization-A very short introduction.
- Klasen, Andreas (2020). The Handbook of Global Trade Policy, John Wiley & Sons
- Lukauskas, Arvid, Robert M. Stern, and Gianni Zanini, 2013. Handbook of Trade Policy for Development. Oxford Scholarship publishing
- Kerr, William A. and James D. Gaisford (edited), 2007. Handbook on International Trade Policy. Edward Elgar Publishing

DEPARTMENTAL MAJOR ELECTIVE PAPERS (Optional Papers)
ADVANCED ECONOMETRICS (ECN 303A)
Full Marks: 50
Lecture Hours: 70

- 1. Introduction** (Number of Classes: 8)
 - Importance and Significance of the Time Series Econometrics
 - Basic Regression and Time Series Regression
 - Serial Correlation Theory: AR, MA, ARMA; Yule-Walker Equation; ACF, PACF and Correlogram Analysis
 - Diagnostic Tests of Stationarity/Non-stationarity: Bartlett Test, Box-Pearce Q Test, Ljung-Box Test
- 2. The Random Walk Model** (Number of Classes: 15)
 - Definition and Alternative Specifications RWM
 - TSP and DSP and their Fundamental Difference with respect to Shocks/Innovations
 - Basic Unit Root Theory: DF, ADF, DFGLS, PP, KPSS, ERS, and NP
 - Concepts and Importance of Integration and Co-integration and Tests of Cointegration.
 - Error Correction Model
- 3. Forecasting from an Equation** (Number of Classes: 10)
 - Computing and Framing Rule and Forecasting for AR, MA, ARMA and ARIMA
 - Box Jenkins Process (BJP)/ARIMA: Identification, Estimation and Diagnostic Testing and Forecasting
 - Test of Exogeneity – (i) Granger's Causality; (ii) Wu-Hausman Test
- 4. Multiple Equation Model** (Number of Classes: 20)
 - Vector Auto-regression and Error Correction
 - Vector Auto-regression (VAR)
 - Simple and Higher Order VAR Model.
 - Estimation of VAR Model - Testing the Order of VAR; Test of Granger's Causality; Forecasting and Variance Decomposition;
 - Impulse Response Function - Orthogonal Innovations; Variance Decomposition; Pareto Optimal Allocations
 - Vector Error Correction Model - Testing of Co-integration Rank: Johansen's Co-integration test; Estimation of Co-integrating Vectors; Estimation of a Vector Error Correction Model
- 5. ARCH and GARCH Model** (Number of Classes: 15)
 - ARCH Models
 - Meaning and Importance; Testing for ARCH: Correlogram Test, LM Test, Residual Test; Estimation under ARCH; Asymmetric ARCH Models; The Component ARCH Model
 - GARCH Models
 - Meaning and Importance; Testing for GARCH; Exponential GARCH model; Estimation under GARCH
 - TARCH Models
 - Meaning and Importance; Testing for GARCH; Estimation under TARCH

Suggested Readings

Walter Enders, Applied Time Series Econometrics.

Johnston and Dinardo, (1997), *Econometrics Methods*, 4th edition, McGraw Hill International Edition.

Granger and Newbold, (1986), *Forecasting Economic Time Series*, 2nd edition, Academic Press.

Amisano, Gianni and Carlo Giannini (1997). *Topics in Structural VAR Econometrics*, 2nd ed, Springer. Segerstrom, P. (1998).

Blanchard, Olivier and Danny Quah (1989). "The Dynamic Effects of Aggregate Demand and Aggregate Supply Disturbances," *American Economic Review*, 79, 655-673.

Greene, William H. (1997). *Econometric Analysis*, 3rd Edition, Prentice Hall.

Hamilton, James D. (1994a). *Time Series Analysis*, Princeton University Press.

Hamilton, James D. (1994b). "State Space Models", Chapter 50 in Robert F. Engle and

Daniel L. McFadden (eds.), *Handbook of Econometrics*, Volume 4, North-Holland.

Hodrick, R. J. and E. C. Prescott (1997). "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit, and Banking*, 29, 1-16.

Judge, George G., W. E. Griffiths, R. Carter Hill, Helmut Lütkepohl, and Tsoung-Chao Lee (1985). *The Theory and Practice of Econometrics*, 2nd edition, John Wiley & Sons.

Lütkepohl, Helmut (1991). *Introduction to Multiple Time Series Analysis*, Springer-Verlag.

DEPARTMENTAL MAJOR ELECTIVE PAPERS (Optional Papers)
AGRICULTURAL ECONOMICS – I (ECN 303B)
Full Marks: 50
Lecture Hours: 70

- 1. Features of Peasant Societies and Peasant Theories (10 Lectures)**
 - Features of Peasant Societies; Farm household models
- 2. Land Institutions and Land Markets: Efficiency and Equity Issues (15 Lectures)**
 - Efficiency of share cropping – Marshall and Cheung; Risk and Land contract
- 3. Agricultural Growth & Instability (10 lectures)**
 - Measures of Agricultural Growth Rate, Measuring Instability; Importance, Methodological issues in the Indian Context
- 4. Agricultural Diversification and Sustainability (10 lectures)**
 - Concept of Agricultural Diversification, Types of Diversification, Determining Factors, Implications; Sustainability in Agriculture- Concept, Approaches and Strategy
- 5. Output Market, State and Agriculture (15 lectures)**
 - Reform and Changing Agrarian Structure- Food Security Food Subsidies Agricultural Subsidies Implications of New Economic Policies for Agriculture

References:

- Ellis, Frank() Peasant Economics- *Farm households and agrarian development*, , Cambridge University Press
- A Bhaduri, A(1973): A study in agricultural backwardness in semi-feudalism', *Economic Journal*, Vol. 83
- Rudra, A(1982): *Myths and Realities*, Allied Publishers / *Political Economy of Indian Agriculture*.
- Braverman,A and Stiglitz, J.E(1981): 'Sharecropping and interlinking of agrarian markets' , *American Economic Review*, Vol. 72
- Kausik Basu: *Less Developed Economy*, OUP
- Peter Hazell& Steven Haggblade et al (1993), —Farm-Nonfarm Growth and Welfare of the Poorl, in Michael Lipton & Jacques van Der Gaag (eds.), *Including the Poor*, The World Bank, Washington, D.C.
- John Harriss (1991), —Agriculture/Non-agriculture Linkages and the Diversification of Rural Economic Activity: A South Indian Case Studyl, in Jan Breman & Sudipto Mundle (eds.), *Rural Transformation in Asia*, Oxford University Press, New Delhi. 44
- Benjamin Devis et al. (2002), *Promoting Farm/Non-farm Linkages for Rural Development*, Food & Agriculture Organisation, Rome
- Caroline Ashley and Diana Carney (1999), *Sustainable Livelihoods: Lessons from Early Experience*, DFID, London
- Diana Carney (2002), *Sustainable Livelihoods Approaches: Progress and Possibilities for Change*, DFID, London.

Socio-Economic Surveys of Three Villages in Andhra Pradesh: A Study of Agrarian Relations Edited by V. K. Ramachandran, Vikas Rawal and Madhura Swaminathan New Delhi: Tulika Books. 2010

P K Joshi et al. (2004), "Agriculture Diversification in South Asia: Patterns, Determinants and Policy Implication", *Economic & Political Weekly*, June 12.

Rogaly, B. ; Barabara Harriss White, S, Bose (ed): "Sonar Bangla- Agricultural Growth And Agrarian Change in West Bengal and Bangladesh", Sage Publication, 1999

V S Vyas (1996), "Diversification of Agriculture: Concept, Rationale and Approaches", *Indian Journal of Agricultural Economics*, Vol. 51, No. 4.

Basu, Kaushik (eds) - Agrarian Themes

Bhaduri, Amit - Unconventional Essays

DEPARTMENTAL MAJOR ELECTIVE PAPERS (Optional Papers)

Industrial Organisation (ECN 303C)

Full Marks: 50

Lecture Hours: 70

1. Structure, Conduct Performance paradigm (8 Lectures)
 -
2. Concentration, Merger and Entry Deterrence (10 Lectures)
 -
3. Monopoly: Durable goods monopoly (6 Lectures)
 -
4. Duopoly (4 Lectures)
 - Cournot competition with n sellers, Bertrand paradox.
5. Product Differentiation (12 Lectures)
 - Degree of differentiation, Cournot and Bertrand competition with differentiated products, location models, horizontal and vertical differentiation.
6. Advertising: (8 Lectures)
 - Dorfman –Steiner condition , Persuasive and informative advertising
7. Innovation and R&D (12 Lectures)
 - Process and product innovation, patents, optimal patent length. concept of technology diffusion
8. Price Regulation (10 Lectures)
 - Concept of price regulation; multi-product pricing, Auman – Shapley pricing, Ramsey pricing, concept of two part tariff

References:

Ken Binmore - Fun and Games

Kreps, D. - Game Theory: A Non Technical Introduction

Gibbons .- Game Theory

Fudenberg, D., and J. Tirole, - Game Theory

Oz Shy - Industrial Organization.

Mass-Colell, A., M. Whinston and J. Green (1995); Microeconomic Theory, Oxford University Press, New Delhi.

Tirole, J. (1988), Theory of Industrial Organization, MIT Press.

Major Elective
SPATIAL ECONOMETRICS (ECN 303D)
Full Marks: 50
Lecture Hours: 70

This course is intended as an introduction to spatial statistics and spatial econometric relationships. It aims to provide students with the background necessary to investigate geographically represented data.

- 1. Introduction (10 lectures)**
 - Objectives and scope of spatial economic analysis; Inter-disciplinary aspects of spatial economics; Concept of a space/region;
 - Economic behaviour related to space; Central Place Theory & Weber's Theory of Location
- 2. Spatial Statistics (12 lectures)**
 - Notions of Spatial Statistics; Motivating examples; Spatial Association; Spatial Dependence;
 - Measuring Spatial Association & Correlation – Moran's I, Kelejian Robinson test; Tests for Spatial Error and Spatial Lag;.
- 3. Cluster Analysis (12 lectures)**
 - Basic Concepts; Example of Clustering;
 - Clustering Methods; Partitioning Methods; Hierarchical Methods; Evaluation of Clustering;
 - Empirical Examples and Exercise
- 4. Modelling with Spatial Dependence-I (12 Lectures)**
 - Spatial Dependence & Spatial heterogeneity; Models for cross-sectional data;
 - Models for spatial panel data;
 - Empirical Examples and Exercise
- 5. Modelling with Spatial Dependence-II (12 Lectures)**
 - Spatio-Temporal Autoregressive Semiparametric Models for the analysis of regional economic data;
 - Empirical Examples and Exercise
- 6. Modelling with Spatial Dependence-III (12 Lectures)**
 - Spatially Lagged Dependent Variables and Spatially Lagged Model;
 - VAR & ECM in Spatial models
 - Empirical Examples and Exercise

References

- Anselin L. (2003), Spatial Externalities, Spatial Multipliers and Spatial Econometrics. *International Regional Science Review*, 26, 153-166
- Anselin, L., Bera, A., Florax, R.J., Yoon, M. 1996. "Simple Diagnostic Tests for Spatial Dependence." *Regional Science and Urban Economics*, 26: 77-104.
- Anselin, L. 1995. "Local Indicators of Spatial Association – LISA." *Geographical Analysis* 27: 93-115.
- Anselin, L. 2006. Spatial Econometrics. In T.C. Mills & K. Patterson, eds., *Palgrave Handbook of Econometrics: Volume 1, Econometrics Theory*. Basingstoke: Palgrave, pp. 901-941.
- Basile R., Minguez R. and Durban M. (2017), Spatio-Temporal Autoregressive Semiparametric Models for the analysis of regional economic data, mimeo
- Basile R., Minguez, J.M. (2017), "Advances in spatial econometrics: parametric vs. semiparametric spatial autoregressive models", in Commendatore Pasquale, and Kubin Ingrid (Eds.), Springer
- Basile, R., M. Durbán, R. Mínguez, J. M. Montero, and J. Mur (2014), Modeling regional economic dynamics: Spatial dependence, spatial heterogeneity and nonlinearities, *Journal of Economic Dynamics and Control*, 48, 229 – 245
- Beck, N., Gleditsch, K., Beardsley, K. 2006. "Space is More than Geography: Using Spatial Econometrics in the Study of Political Economy." *International Studies Quarterly* 50: 27-44.
- Beckman, M.J (1968), *Location theory*, Randem House, New York.
- Brahmananda, P.R. and Panchmukhi, (2001), *Development Experience in the Indian Economy*, Bookwell, New Delhi.
- Dean, R.D et. al. (eds.) (1970), *Spatial Economic Theory*, Free Press, New York.
- Doreian, P. 1981. "Estimating Linear Models with Spatially Distributed Data." *Sociological Methodology* Vol. 12: 359-388.
- Elhorst, P. (2014), *Spatial Econometrics: From Cross-sectional Data to Spatial Panels*. Springer, London
- Franzese, R., Hays, J. 2008. Empirical Models of Spatial Interdependence. In J. Box-Steffensmeier, H. Brady, D. Collier, eds., *Oxford Handbook of Political Methodology*, Oxford UP, pp. 570-604.
- Le Sage J, Pace K (2009), *Introduction to Spatial Econometrics*. Boca Raton: Taylor and Francis
- Losch (1970), *The Economics of Location*, Yale University Press, New Haven
- Richardson (1960), *Elements of Regional Economics*, Penguin Books, London.
- Tinbergen, J. (1969). *The Elements of Space in Development Planning*, North Holland, Amsterdam
- Walter, I (1968), *Methods of Regional Analysis*, MIT Press, Cam
- Ward, M.D. and K.S. Gleditsch. 2008. *Spatial Regression Models*. Thousand Oaks, CA: Sage

DEPARTMENTAL MAJOR ELECTIVE PAPERS (Optional Papers)
APPLIED ECONOMETRICS – I (ECN 304A)
Full Marks: 50
Lecture Hours: 70

- 1. Introduction to chaos theory (9 Lectures)**
 - Chaos and econometrics - randomness and chaos - a simple logistic model – Transient chaos - Period Doubling and Chaos - 2 Dimensional chaos - Strange attractors - Application to Economics - Habit persistent Models - Chaos in Ricardian growth Model - Chaos in a model of rational expectation with unemployment
- 2. Panel data Analysis (9 Lectures)**
 - Pooling of data - finding out panel effect, fixed effect model- testing and estimation- LSDV models- DID models, Random effect models-Hausmann test- Hybrid models- Fixed vs panel debate
- 3. Applied Econometrics: Demand analysis (9 Lectures)**
 - Double Logarithmic Demand Functions - The Double Log Form- Rotterdam Model - Absolute Price and Relative Price Rotterdam Formulations - Almost Ideal Demand System - Full and Linear Approximate AIDS Models - Demand for Differentiated Products - Discrete Choice - Logit Models
- 4. Applied Econometrics: Production Function Estimation (9 Lectures)**
 - Econometrics of Production function - Modelling Firms' Behaviour - Problems of Identification and Solution
 - Estimating Translog Production function - OLS and SURE
 - Estimating CD Function - Estimation using MP Relations - Reduced Form Method - Factor Share Method - Instrumental Variable Technique
 - Estimate of CES Production Function - By Kmenta's Approximation - By Kmenta's ILS Method
 - VES Production Function: Sato and Hoffman, Lu and Fletcher, David Soskice.
- 5. Multiple Discrete Choice Models (9 Lectures)**
 - Ordered Probit / Logit; Sequential Probit / Logit; Methods of estimation; Multinomial Logit (MNL); the Independence of Irrelevant Alternatives (IIA) assumption; Multinomial Probit models; Measuring Goodness of Fit; Testing assumptions; Application of Multinomial Logit Models
- 6. Truncated and Censored Models (9 Lectures)**
 - Sample selection bias; the truncated regression model; marginal effects; the Tobit model; interpretation of Tobit model coefficients; testing for normality; limitations of the Tobit model; Selectivity and Heckman Filter model; two-step and full-information estimation methods; interpretation of model coefficients; diagnostic testing

References

Bridge, J.L. – Applied Econometrics
Intrilligator - Econometrics with Economic Applications

Rao & Miller – Applied Econometrics
 Wallis, K. – Topics in Applied Econometrics
 Review of Economics and Statistics (1968) for VES Production Function
 Barry K. Goodwin, A Ford Ramsey, J Chovsta- Applied econometrics with SAS-Modelling
 Demand, Supply and Risk
 Gujarati - Basic Econometrics, Tata McGraw Hill;
 Heckman, J. (1990). Varieties of Selection Bias, American Economic Review, May,
 Heckman, J. J. (1976). The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimation for such models. Annals of Economic and Social Measurement, 5 (4), 475-492.
 Heckman, J. J. (1978). Dummy endogenous variables in a simultaneous equation system. Econometrica, 46 (6), 931-959.
 Heckman, J. J. (1979). Sample selection bias as a specification error. Econometrica, 47 (1), 153-161.
 Lee, B., & Marsh, L. C. (2000). Sample selection bias correction for missing response observations. Oxford Bulletin of Economics and Statistics, 62 (2), 305-323.
 Maddala, G.S. (1983). Limited-Dependent and Qualitative Variables in Econometrics CUP
 McFadden, D. L. (1973). Conditional Logit Analysis of Qualitative Choice Behavior. Frontiers in Econometrics, Academic Press.
 Stock, James H. and Mark W. Watson (2007), Introduction to Econometrics, 2/E, Pearson

DEPARTMENTAL MAJOR ELECTIVE PAPERS (Optional Papers)
AGRICULTURAL ECONOMICS – II (ECN 304B)

Full Marks: 50

Lecture Hours: 70

- 1. Agricultural Labour Market (20 lectures)**
 - A model of two-tiered agricultural labour market –Eswaran Kotwal’s model of agrarian class formation-Problem of surplus labour-issues in agrarian power
- 2. Rural Credit Markets and Interlinkage (20 lectures)**
 - Nature of Rural Credit Market-Forms of Rural Credit The Lender’s Risk Hypothesis-Monopolistic Market - Market Fragmentation Bhaduri’s Model of Semi-feudalism. Potential risk and the emergence of Interlinkage – Partial equilibrium in an interlinked market - Interlinkage and Intertemporal Earnings Approach - Moral Hazard and Interlinkage - Concept of power and triad
- 3. Agrarian Experience in International Perspective of Select Countries (20 lectures)**
 - Agrarian Experience of select Countries, Trade Liberalisation and Agriculture, GATT, WTO and recent international issues
- 4. Agrarian Village Studies (10 lectures)**
 - Village studies in India; Field experience through survey and Project preparation

References:

1. Boyce – Agrarian Impasse in Bengal (O.U.P.).
2. KBasu-One Kind of Power Indian Journal of Agricultural Economics, 1980
3. Eswaran and Kotwal- A theory of two tiered labour market (AER 1971)
4. Eswaran and Kotwal-Access to credit and agrarian class formation (AER 1971)
5. K. Basu – Less Developed Economy.
6. Debraj Ray – Development Economics
7. Barbara Harriss-White -Rural Commercial Capital -Agricultural Markets in West Bengal
8. Agricultural Markets From Theory To Practice: Field Experience In Developing Countries by Barbara Harriss-White
9. *Paths of capitalist Agrarian transition in the past and in the contemporary world/* Terence J. Byres
10. *Agrarian Studies: Essays on Agrarian Relations in Less-Developed Countries* Edited by V.K. Ramachandran and Madhura Swaminathan, New Delhi: Tulika Books. 2002
11. *Indian agriculture in the world economy/* Utsa Pattnaik
12. Kausik Basu: *Analytical Development Economy*, OUP
13. V.K. Ramchandran and Madhura Swaminathan, Socio Economic Surveys of three villages in Andhra Pradesh
14. V.K. Ramchandran and Madhura Swaminathan, Socio Economic Surveys of three villages in Trip_ A study of Agrarian Relations

DEPARTMENTAL MAJOR ELECTIVE PAPERS (Optional Papers)
BEHAVIOURAL ECONOMICS (ECN 304C)
Full Marks: 50
Lecture Hours: 70

- 1. Introduction** (8 Lectures)
 - Themes in psychology and economics
 - Illustration through examples
- 2. Reference-Dependent Preferences** (8 Lectures)
 - Kahneman/Tversky classic experiments;
 - Prospect theory;
 - Market implications: labor supply, marketing, industrial organization
- 3. Choice Over Time** (10 Lectures)
 - Samuelson's exponential-discounting;
 - Self-control and hyperbolic discounting;
 - Harmful substances and government policy;
 - Anxiety, optimism & anticipation;
 - Misperception of utility.
- 4. Bounded Rationality** (8 Lectures)
 - Heuristics and biases;
 - Views of bounded rationality
- 5. Behavioral Game Theory** (10 Lectures)
 - Game theory & behavioral game theory;
 - Irrational players and equilibrium
- 6. Social Preferences** (8 Lectures)
 - Classic experiments;
 - "Distributional" and "intention" models;
 - Labor markets: wage setting and unemployment
- 7. Firms' Reactions to Behavioral Consumers** (10 Lectures)
 - The pricing of credit cards and mortgages.
 - Shrouded attributes
 - Principles for intervention
- 8. Behavioral Finance** (8 Lectures)
 - Arbitrage and limits thereof
 - Market efficiency and economic efficiency
 - Small investors

References:

Nick Wilkinson and Matthias Klaes, *An Introduction to Behavioral Economics*.
Daniel Kahneman, *Thinking Fast and Slow*.

Ariel Rubinstein, *Modelling Bounded Rationality*, MIT press 1998
David Just, *Introduction to Behavioral Economics*.
Colin Camerer, George Loewenstein and Matthew Rabin, *Advances in Behavioral Economics*.
John Kagel and Alvin Roth, *The Handbook of Experimental Economics*.
Richard Thaler, *The Winner's Curse*.
Richard Thaler and Cass Sunstein, *Nudge: Improving Decisions about Health, Wealth and Happiness*.
Dan Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions*.
Richard H Thaler, *Misbehaving: The Making of Behavioural Economics*.
Steven D Levitt and Stephen J Dubner, *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*, Kindle Edition.

Major Elective
DATA ANALYSIS FOR SOCIAL SCIENCES (ECN 304D)
Full Marks: 50
Lecture Hours (including Lab) : 70

This course's main objective is to let students learn how to collect raw social science data, explore it, and present the results in a useful way. In this course students will learn to do these steps with the statistical language R and other interfaces. This is a lab-based applied paper. Candidates will be allowed to use computing devices during examination

- 1. Introduction** (10 lectures / lab hours)
 - Objectives and scope of data analysis;
 - Introduction to Data, R, and R-Studio;
 - Working with datasets – importing, exporting, merging, subsetting
 - Reliability and validity of data
- 2. Basic Data Analysis** (10 lectures / lab hours)
 - Descriptive Statistics;
 - Data Visualisation using bars and plots;
 - Overview of Statistical Inference;
 - Measures of central tendency and dispersion
- 3. Introduction to Linear Regression** (10 lectures / lab hours)
 - Simple Linear Regression;
 - Multiple Linear Regression;
- 4. Regression with Qualitative Variables** (12 lectures / lab hours)
 - Qualitative independent variables – Coding and using;
 - Qualitative dependent variables – models and methods – representing the results
- 5. Special Techniques** (12 Lectures / lab hours)
 - Exploratory Factor Analysis
 - Data Reduction – Principal Component Analysis
 - Cluster Analysis
 - Count Data Models
 - Using Mapping tools
- 6. Basic concepts of Big Data** (12 Lectures / lab hours)
 - Scalable machine learning
 - Big data related techniques - Mining stream data; Social networks
- 7. Project & Presentation** (04 Lectures / lab hours)
 - How to create a Project Report
 - Essentials of a good presentation

References

- Using R for Data Analysis in Social Sciences: A Research Project-oriented Approach; Quan Li, Oxford University Press, 2018; ISBN 0190656212, 9780190656218
- R for Data Science: Import, Tidy, Transform, Visualize, and Model Data; Hadley Wickham, Garrett Grolemund; "O'Reilly Media, Inc.", 2016; ISBN: 1491910364, 9781491910368
- R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics; JD Long, Paul Teetor; 2nd Edition; "O'Reilly Media, Inc.", 2019; ISBN 1492040630, 9781492040637
- R & Social Science: Getting Started with Applied Use of R in the Social Sciences, Michael Clark, University of Notre Dame, e-book
- Using R for Data Analysis and Graphics: Introduction, Code and Commentary, J H Maindonald, e-book
- Blogs, Websites, Handouts, Practicals

Fourth Semester
Compulsory Course
COMMUNITY ENGAGEMENT COURSE (ECN 400)

(30 hours of involvement with at least 50 percent field work)

This paper is a compulsory 2-credit course that aims to familiarize PG students of Economics about the socio-economic condition of the country and let them spend some time for social causes. It aims to enhance the understanding of the students about social reality, social policies and programmes of Union, State and Local governments, and provide them a ground-level experience of socioeconomic conditions in the hinterland of the university. Under this paper the students will form groups among them and will be monitored, guided, and accompanied by faculty member(s).

Students have to participate in the Community Engagement programmes/ activities of the department for the year concerned and follow it up with a written Report & Presentation and Viva-Voce. The main objectives are to develop an appreciation of rural culture, lifestyle and wisdoms among students, to learn about the states of various agricultural and rural development programmes, to understand causes for rural distress and poverty, and explore solutions for the same and to apply class room knowledge of courses to field realities. Evaluation pattern would be as follows:

- **Report writing: 10 marks**
- **Viva-voce: 10 marks (in the presence of external expert(s) from other Departments of the Home University)**
- **Presentation (internal Assessment): 5 marks**

Activities planned would include but not limited to:

1. Meeting with local administration to decide on time and place for outreach activities
2. Deciding about the social programs and schemes that needs to be highlighted during the relevant year in the selected region/place (in consultation with local administration)*
3. Deciding about the specific government policy on which impact assessment study is to be made (in consultation with local administration)
4. Create publicity material for governmental schemes
5. Spend at least 15 hours for field work in the selected region/place to spread awareness about selected programme
6. This site visit shall have three components – (a)Baseline Survey regarding initial awareness of selected scheme among the selected households; (b) End of programme Survey regarding post-programme awareness of selected scheme among the selected households; and, (c) Socio-economic survey among the households regarding impact assessment of specific government policies as decided in consultation with local administration
7. Writing a Report about the Outreach Programme which shall be curated and collated by the departmental faculty and submitted to the local administration
8. Presentation on the Experience and Outcome of the Outreach Programme

[* - Some of the programmes/schemes that can be selected (but not limited to) are – Sanitation Campaign/Swachh Bharat campaign, Immunisation & Safe Motherhood Campaign, Kanyashree/Beti Padhao Beti Bachao, Developing Financial Literacy, Entrepreneurship & MSME, Agricultural Extension Activities, Food & Nutrition programme, etc. Different programmes will be selected in different years according to departmental resource position and in tune with socio-economic relevance]

Core Paper
ECONOMICS OF GROWTH AND PLANNING (ECN 401)
Full Marks: 50
Lecture Hours: 70

Group A: Technicalities of Growth (25 marks)

- 1. Introduction (1 lectures)**
 - Stylized Facts of Economic Growth and Development: A Quick Look at the Facts and Fictions.
 - The Objectives/Agenda
- 2. The Neoclassical Growth Model (7 lectures)**
 - Preferences, Technology and Demographics - Characterization of Equilibrium - Definition of Equilibrium - The Consumer Problem - Equilibrium Prices - Optimal Growth - Steady-State Equilibrium - Transitional Dynamics - Technological Change and the Canonical Neoclassical Model - The Role of Policy - Variants of the Neoclassical Model
- 3. Growth with Overlapping Generations (4 lectures)**
 - Problems of Infinity - Overlapping Generations and Over Accumulation - Demographics, Preferences and Technology - Consumption Decisions - Equilibrium
 - More Specific Utility Functions - Pareto Optimality - Role of Social Security in Capital Accumulation - Fully Funded Social Security - Unfunded Social Security
- 4. Endogenous Growth (7 lectures)**
 - First-Generation Models of Endogenous Growth - AK Model Revisited - Demographics, Preferences and Technology – Equilibrium - Transitional Dynamics - The Role of Policy - The Extended AK Model - Growth with Externalities
 - Preferences and Technology – Equilibrium - Pareto Optimal Allocations - Multiple Equilibria and the Process of Development - Multiple Equilibria From Aggregate Demand - Preferences and Technology - Equilibrium
 - Human Capital Accumulation with Imperfect Capital Markets - A Simple Case With No Borrowing - The Galor and Zeira Model - Learning-by-Doing, Structural Change and Non-Balanced Growth - Demographics, Preferences and Technology - Equilibrium
- 5. Endogenous Technological Change (7 lectures)**
 - Expanding Variety Models - The Lab-Equipment Model of Growth with Product Varieties - Demographics, Preferences and Technology - Digression on Continuous Time Value Functions - Characterization of Equilibrium - Definition of Equilibrium - Steady State - Transitional Dynamics - Pareto Optimal Allocations - Policy in the Endogenous Technology Model - Growth with Knowledge Spillovers - The Role of Competition Policy - Growth without Scale Effects - Models of Quality Competition - Baseline Model - Pareto Optimality - Directed Technical Change - Basics and Definitions – Definitions - Basic Model – Implications - Equilibrium Technology Bias: Some More General Results - Endogenous Labor-Augmenting Technological Change - Demographics, Preferences and Technology - Consumer and Firm Decisions - Asymptotic and Balanced Growth Path

Suggested Readings for Topics 1 to 5

Philippe Aghion and Peter Howitt (1998), *Endogenous Growth Theory* Cambridge: MIT Press.

- Barbier, E. B. (1999). Endogenous Growth and Natural Resource Scarcity. *Environmental and Resource Economics* (14), pp. 51-74. (1998), *Endogenous Growth Theory* Cambridge: MIT Press.
- Blankenau, W. and N. Simpson (2004). Public education expenditures and growth. *Journal of Development Economics* 73, pp. 583-605.
- Bravo-Ortega, C. and J. De Gregorio (2005). The Relative Richness of the Poor? Natural Resources, Human Capital, and Economic Growth. World Bank Policy Research Working Paper No. 3484.
- Bretschger, L. and S. Smulders (2006). Sustainable Resource Use and Economic Dynamics, *Environmental and Resource Economics* 36 (1), pp. 1-13.
- Barro, Robert J. and Xavier Sala-i- Martin (1995), *"Economic Growth"*, McGraw-Hill, Inc., Singapore

6. Solow-Romer Model

(6 lectures)

- Background and description – General - Research sector - Manufacture of capital goods - Production of final output - Market structures, prices and wages – Consumption - The dynamic system - Condensation of the model equations - The steady-state - Phase-space of the Solow-Romer system - Dynamic response to economic shocks - Increase in the savings rate(s) - Increase in the productivity of researchers - Increase in the savings rate(s) - Rise in the profit share of income

Suggested Readings

Philippe Aghion and Peter Howitt (1998), *Endogenous Growth Theory* Cambridge: MIT Press.
Dynamic Analysis of a 'Solow-Romer' Model of Endogenous Economic Growth Gordon Schmidt,
Centre of Policy Studies, Monash University

7. Trade and Growth

(6 lectures)

- Interdependence and Growth in the Open Economy - Human Capital and Technology (Nelson-Phelps) - Trade and Technology Diffusion - The Basic Krugman Model - Understanding the Effects of Trade - Trade, Specialization and the World Income Distribution – The Model – Equilibrium – Implications - Growth with Factor Price Equalization

Suggested Readings

Sebastian Edwards (1997), "Openness, Productivity, and Growth: What Do We Really Know?" NBER
Jeffrey Frankel and David Romer (1996), "Trade and Growth: An Empirical Investigation," NBER.
Philippe Aghion and Peter Howitt (1998), *Endogenous Growth Theory* (Cambridge: MIT Press)

8. Some Special and Advanced Issues

(2 lectures)

- Level and Growth Effects of Human Capital - Growth and the Initial per Capita Human Capital Level - Defining convergence; The Convergence Hypotheses and Tests of the Convergence – Hypothesis - Human Capital in an Aggregate Production Function - Human Capital, Resource Constraints and Intergenerational Fairness - Growth, Fairness and Social Discounting

Suggested Readings

- Rebelo, S. (1991). Long-Run Policy Analysis and Long-Run Growth. *Journal of Political Economy*, 99 (3), 500-521.
- Romer, P. (1986). Increasing Returns and Long-Run Growth. *Journal of Political Economy*, 94 (5), 1002-10037, 16.
- Romer, P. (1990). Endogenous Technological Change. *Journal of Political Economy* 98, (5), part 2, S71-106.
- Seegerstrom, P. (1998). Endogenous Growth without Scale Effects. *American Economic Review*, 88 (5), 1290-1310.
- Barro, Robert, "Economic Growth in a Cross Section of Countries," *Quarterly Journal of Economics*, May 1991.
- Baumol, William, and Edward Wolff, "productivity growth, Convergence, and Welfare: A Reply," *American Economic Review*, December 1988.
- Benhabib, Jess, and Boyan Jovanovic, "Growth Accounting and Externalities," *American Economic Review*, March 1991.
- Barro, R. J. and X. Sala-i-Martin. 1996. Convergence. *Journal of Political Economy*, 100, 223-251.
- Romer, P. M. 1986. Increasing returns and long run growth. *Journal of Political Economy* 94, 1002-1037.

Group B: Patterns of Growth (25 marks)

- 1. History and Economic Growth (5 lectures)**
 - History and economic growth- Evolution of human society through ages- Parameters of human evolution- Quantification of economic history- Growth Econometrics- Mobility matrix and relative growth
- 2. Economics of a hunter-gatherer society (6 lectures)**
 - Economics of a hunter-gatherer society- dynamics, growth and steady state- Implications drawn from anthropology and sociology
- 3. Neolithic Revolution (7 lectures)**
 - Neolithic Revolution – causes, effects and long run effect- society of egalitarian farmers
- 4. Classical land based society (6 lectures)**
 - Classical land based society- Ricardian model - Barkai- formulation by Lucas- comparison with earlier societies- Malthusian equilibrium and the take-off
- 5. Capital Controversy (2 lectures)**
 - Capital Controversy – the logic of surrogate production function, Robinson, Solow and Samuelson
- 6. Capital as a factor of production (2 lectures)**
 - Capital as a factor of production- Inconsistencies of the Solow model- Way out of the controversy
- 7. Experiences of planned economy (2 lectures)**
 - Experiences of planned economy - Harrod-Domar Model- Soviet Growth Performances
- 8. Human Capital and growth (7 lectures)**

- Human Capital and growth - Definition and uses of human capital-Investment in human capital- idea as a economic variable - monopolistic competition and creation of new knowledge

9. Future of growth

(3 lectures)

- Future of growth-long run predictions-end of growth? – Findings of Piketty

References

Lucas, Robert E., Jr. (2002) Lectures on Economic Growth, HUP

Romer: Macroeconomics

Blanchard and Fischer: Lectures in Macroeconomics

Barro: Growth in a crossection of countries

Charles I Jones: Introduction to Growth Theory

Core Paper
PUBLIC ECONOMICS (ECN 402)
Full Marks: 50
Lecture Hours: 70

- 1. Foundations (8 Lectures)**
 - Role of Government – Allocation, Distribution and Stabilization functions.
 - Public Budget – Kinds of Budget; Zero Based Budgeting; Concepts of Budget Deficit; Budget in India, Understanding of Public Policy related to Budget Expenditure
- 2. Taxation & Public Expenditure (10 Lectures)**
 - Incidence of Taxation; Theory of Optimum Taxation; Income Tax and Commodity Tax; Elasticity & Buoyancy; Taxable Capacity; Tax Evasion; Efficiency Loss of Taxation
- 3. Public Debt (8 Lectures)**
 - Public Debt as consequence of Development Policy; Budget Deficit and Public Debt; Government Debt Management; Types of Public Debt – Internal and External; Public Debt as Deferred Taxation; Burden of Public Debt
- 4. Public Goods and Public Policy (12 Lectures)**
 - Concept of Public and Private Goods, Pure Public Goods, Public Goods provided by Private Company/Agents; Policy Design
 - Local, Regional and Global Public Goods – concept, understanding and policy design
 - Private, Public and Merit Goods; Non-Exclusion Principle
- 5. Public Policy analysis tools (8 Lectures)**
 - Policy analysis: principles, methods, scale and applications - Cost-Benefit analysis,
 - PPP model analysis
- 6. Financial and Fiscal Policy (8 Lectures)**
 - Financial and Fiscal Policy as part of Macro Policy: Objectives and Components, nature and instruments; their Effectiveness in Developing Countries
- 7. Social and Public Policy (8 Lectures)**
 - Social Welfare – Social Security, Aging and Pension, Health Insurance policy – public and private expenditure, PPP model
- 8. Fiscal Federalism (8 Lectures)**

- Fundamental Issue of Fiscal Federalism; Why have a Federal Structure – Stigler; Oates – Decentralisation Theorem; Theory of Clubs; Dynamics of Jurisdiction Formation; Optimal Federalism and Redistribution; Role of Grants-in-Aid.
- Fiscal Federalism in India

References

1. Joseph E. Stiglitz, *Economics of the Public Sector*, W.W. Norton & Company, 3rd edition, 2000.
2. R.A. Musgrave and P.B. Musgrave, *Public Finance in Theory & Practice*, McGraw Hill Publications, 5th edition, 1989.
3. John Cullis and Philip Jones, *Public Finance and Public Choice*, Oxford University Press, 1st edition, 1998.
4. Harvey Rosen, *Public Finance*, McGraw Hill Publications, 7th edition, 2005.
5. Mahesh Purohit, *Value Added Tax: Experiences of India and Other Countries*, 2007.
6. Kaushik Basu and A. Maertens (ed.), *The Oxford Companion to Economics in India*, Oxford University Press, 2007.
7. M.M. Sury, *Government Budgeting in India*, 1990.
8. M. Govinda Rao, *Changing Contours of Federal Fiscal Arrangements in India*, Amaresh Bagchi (ed.), *Readings in Public Finance*, Oxford University Press, 2005.
9. G. Myles. *Public Economics*, Cambridge University Press, 1995.
10. Mirrlees Review: *Tax by Design*, Oxford University Press, 2009.
11. T. Persson and G. Tabellini. *Political Economics*, MIT Press, 2000.
12. Papers from various journals and various volumes of *Handbook of Public Economics*

Major Elective
ADVANCED FINANCIAL ECONOMICS (ECN 403A)
Full Marks: 50
Lecture Hours: 70

- 1. International Financial Issues (10 Lectures)**
 - An Overview of International Liquidity; Models of Financial Crisis & Debt Crisis.
- 2. Foreign Exchange Risk Management (10 Lectures)**
 - Meaning and Types of Foreign Exchange Exposure –Translation Exposure, Transaction Exposure, Economic Exposure, Operating Exposure ; Management of Foreign Exchange Exposure –Internal Techniques, Netting, Marketing, Leading and Lagging, Pricing Policy, Asset and Liability Management and External Techniques.
- 3. Mutual Funds and Performance Evaluation (10 Lectures)**
 - Closed-End and Open-End Funds, Mutual Fund Objectives, Calculating Fund Returns, Risk-Adjusted Performance –Comparison of Performance Measures (Sharpe, Treynor, Jensen, Fama).
- 4. Financial Derivatives –An Overview (5 Lectures)**
 - Meaning; Types; Uses; Historical Background of their Development; Features; Market Players; Trading Mechanism.
- 5. Futures (10 Lectures)**
 - Terminology; Futures Pay-off; Margin Accounting System; Pricing –without Dividend and with Dividend ; Strategies –Static and Dynamic Hedging ; Speculation in Futures Market.
 - Indian Commodity Futures market – Pricing & Trading.
- 6. Options (15 Lectures)**
 - Terminology; Option Pay-off; Pricing and Put-Call Parity; Option Strategies –Strangle, Straddle, Spreads, Butterfly. Option Pricing: replicating portfolio, Binomial tree, Black-Scholes formula, Greeks and Volatility.
- 7. Swaps (5 Lectures)**
 - Interest Rate Swaps –Meaning & Valuation; Currency Swaps –Meaning & Valuation.
 -
- 8. Introduction to Behavioural Finance (5 Lectures)**
 -

References:

Ross, Westerfield and Jordan: Fundamentals of Corporate Finance, Tata McGraw Hill.
Elton and Gruber: Modern Portfolio Theory and Investment Analysis, John Wiley & Sons.
Bodie, Kane, Marcus and Mohanty: Investments, Tata McGraw Hill.
Fuller and Farrel (Jr.): Modern Investments and Security Analysis, McGraw Hill Book Company.
R.M. Kishore: Financial Management, Taxmann Allied Services.
Fischer and Jordan: Security Analysis and Portfolio Management, Prentice-Hall of India Pvt.Ltd.
A. Damodaran : Valuation, John Wiley and Sons

- M.Avellaneda: Quantitative Analysis in Financial Markets, Vol. I, Vol. II and Vol. III, World Scientific.
- Olivier de La Grandville: Bond Pricing and Portfolio Analysis, Prentice-Hall of India Private Limited.
- A.O. Krueger: Exchange Rate Determination, Cambridge University Press, 1983.
- B. Tew: Evolution of International Monetary System, Wiley: New York, 1995.
- P.R. Joshi: Global Capital Markets, Tata-McGraw Hill: New Delhi, 1996.
- David F. DeRosa: Managing Foreign Exchange Risk, Probus : Chicago, 1991.
- V. Sharan: International Financial Management, Prentice-Hall of India: New Delhi, 2003.
- Giancarlo Gandolfo: International Finance and Open-Economy Macroeconomics.Springer, 2002.
- J.C. Hull: Options, Futures & Other Derivatives, Prentice-Hall of India: New Delhi, 2002.
- R. W. Kolb: Futures, Options and Swap. Blackwell, 2003.
- K. Cuthbertson and D. Nitzsche: Financial Engineering –Derivatives and Risk Management, John Wiley and Sons Ltd. New York, 2001.
- J. Cvitanic and F. Zapatero: Introduction to the Economics and Mathematics of Financial Markets; Prentice Hall of India:New Delhi, 2005.
- J.Y. Campbell, A.W. Lo and A.C. Mackinlay: The Econometrics of Financial Markets, Princeton University Press: New Jersey, 1997.
- R. W. Kolb: Futures, Options and Swap. Blackwell, 2003.

Major Elective
RESOURCE ECONOMICS & SUSTAINABLE DEVELOPMENT (ECN 403B)
Full Marks: 50
Lecture Hours: 75

- 1. Dynamic model of fishery (10 Lectures)**
 - Derivation of optimal stock in a dynamic framework,
 - Derivation of catch locus , Mathematical derivation(through use of control theory) and geometric exposition, Derivation of optimum steady state level of stock and yield; Dynamic open access model of fishery.
- 2. Commons and Anticommons (10 Lectures)**
 - Tragedy of commons Unmanaged CPR , Managed CPR, private property regime; trust and credibility, conditions for credible promises; problem of anticommons – basic concept
- 3. Optimum extraction of exhaustible resources (12 Lectures)**
 - General model of optimal depletion optimal depletion under exploration and externality, exhaustible resource depletion under competition, monopoly and oligopoly
- 4. Uncertainty, irreversibility and option value (8 Lectures)**
 - Meaning & Concept;
- 5. Natural resource scarcity (8 Lectures)**
 - Malthusian and Ricardian scarcity, physical measures and economic measures, resource scarcity mitigation , recycling and substitution.
- 6. Environmental Accounting (14 Lectures)**
 - Basic Theory. A Dynamic Optimization Model on National Income, Hawtrick's rule and sustainable income. Environmentally adjusted national product and sustainable resource management-illustrations with various types of non-renewable and renewable resources., accounting of ecosystem services.
- 7. Land and Water Management Issues (8 Lectures)**
 - Concepts and Issues.
 -

References:

1. N. Hanley, J. Shogren and B. White: Environmental Economics in Theory and Practice, Macmillan.
2. J.M. Conrad : Resource Economics, Cambridge University Press.
3. Phillip Neter : Natural Resource Economics.
4. Anthony Fisher : Environmental and Resource Economics, Edward Elgar
5. K-G Maler , Sara Aniyar and Asa Jansson (2008) Accounting for ecosystem services as a way to understand the requirements of sustainable development, www.pnas.org/cgi/doi10.1073/pnas.0708856105
6. Roger Perman, Yue Ma, James Mcgilvray and Michael Common :Natural Resource and environmental Economics, Pearson

Major Elective

LAW AND ECONOMICS (ECN 403C)

Full Marks: 50

Lecture Hours: 50

- 1. Introduction:** (5 Lectures)
 - Introduction
 - Law as an instrument of policy
 - How law can enable coordination and cooperation among economic agents
- 2. Property rights** (5 lectures)
 - Intellectual Property Rights – Other property rights
 - Their relevance for economic outcomes
- 3. Efficient Outcomes** (6 lectures)
 - Inducing efficient outcomes: Coase, Pigou and others
- 4. Contracts** (8 lectures)
 - Need for ‘Contracts’
 - The problem of ‘credibility’
 - Remedies for breach of contract
- 5. Torts** (13 lectures)
 - The Economics of Torts
 - Regulation and Competition with specific reference to Indian law
- 6. Lawless Economics** (13 lectures)
 - What happens if Law is absent?
 - Analysis of economic interactions in the case of significant breach of law

Suggested Readings:

- Cooter, Robert and Thomas Ulen, Law and Economics, 6th Edition, Berkeley Law Books (Available at <https://scholarship.law.berkeley.edu/books/2/>)
- Dixit, Avinash (2007), Lawlessness and Economics: Alternative Modes of Governance, Princeton University Press
- Trebilcock Michael and Mariana Mota Prado - Advanced Introduction to Law and Development, Edward Elgar, 2014

Major Elective
RURAL DEVELOPMENT (ECN 403D)
Full Marks: 50
Lecture Hours: 70

- 1. Rural Development - Background & Concept (15 Lectures)**
 - Concepts and Connotations of Rural Development, Definition and Scope of Rural Development, Causes of Rural Backwardness; Need for Rural Development, Historical Evolution of the Concept of Rural Development in Indian Context.
 - Changing focus of Rural Development Policies over the decades – Political Economy of Rural Poverty Eradication
- 2. Rural Development Policies in India (15 Lectures)**
 - Approaches to Rural Development in India: Gandhian Model of Rural Development, Broad Front Approach, Sectoral Approach, Participatory Approach, Area Approach, Target Group Approach and Integrated Approach, Decentralized Planning, Panchayat Raj Institutions: Evolution, Structure & Functions, 73rd Amendment, Role of PRIs in Rural Development.
 - Contours & Success of selected Rural Development Programs in India - IRDP, SGSY, EGS, MGNREGA, NRHM, ICDS, PURA, DIRECT BENEFIT TRANSFER, etc
- 3. Institutions & Rural Development (15 Lectures)**
 - Role of Co-operative Institutions: Concept and Principles, Types and Working of Rural Credit Cooperatives, Marketing Cooperatives, Dairy Cooperatives, Sugar Cooperatives, Weavers' Cooperatives.
 - Infrastructure & Rural Development – Role of infrastructure in augmenting Income; Infrastructure, Rural Poverty & Inequality; Infrastructure expansion and Agriculture – Ellet Model; Indian Scenario
- 4. Community Based Interventions for Rural Development (15 Lectures)**
 - Micro Finance & Sustainable Community Banking - Empowerment of Poor and Marginalized; Self Help Group promotion: Concepts, Elements, Stages, Savings Operations of SHGs, Credit Operations of SHGs, Problems faced by Intervening Agencies.
 - Experiences in context of India: Integrated Watershed Management Programme, Ralegaon Shiddhi Model, Forest Committees, Role of CBOs in Sustainable Rural Development
- 5. Climate Change and Rural Economy (10 Lectures)**
 - Impact of Climate Change on Crop Productivity; Impact on Rural Livelihood; Indian Experience.

References:

- Battacharya S.N. Rural Industrialization in India
Bepion Behari Rural Industrialization in India
Rao R.V. Rural Industrialization in India
Bagli V Khadi and Village Industries in the Indian Economy
Das Kumar B: Rural Development through Decentralization
Jain S.C. : Rural Development
James Copestake NGO Sponsoring of Group Lending in Rural India: Theory and a Case Study
Khanna B.S.: Rural Development in South Asia:Policies, Programmes and Orgnizations
Kripalani J.B. Gandhian Thought
Vasant Desai Organization and Management of Small Scale Industries
Misra& Sharma: Problems and Prospects of Rural Development
N.I.R.D. Rural Development in India Some Facets
Nanavati & Anjalina The Indian Rural Problems
Raja Sekhar D Savings and Credit Systems of the Poor; Some NGO Experiences, NOVIB and HIVOS
Robert Chambers: Rural Development Putting the Last First
Sharma &Malhotra Integrated Rural Development
Singh Katar: Rural Development: Principles, Policies and Management.
Socio-Economic Surveys of Three Villages in Andhra Pradesh: A Study of Agrarian Relations
Edited by V. K. Ramachandran, Vikas Rawal and Madhura Swaminathan
New Delhi: Tulika Books. 2010. ISBN
Sreenivas M. N. Social Change in Modern India
Sreenivas M. N. & S. Seshaihs Dimensions of Social Change in India
Susan Johnson and Ben Rogally : Micro Finance
V. S. Parthasarathi
Vasant Desai Problems and Prospects of Small Scale Industries in India
Vasant Desai:A Study of Rural Economy
Venkata Reddy K: Rural Development In India Poverty and Development
Wilbert E. Moore Social Change
Yasant Desai A Study of Rural Economy
Yunus M: Rural Agricultural Credit Operations in Bangladesh

van der Ploeg, J et al (2008) 'Towards a new theoretical framework for understanding regional rural development'
Ellis, Frank and Stephen Biggs (2001) 'Evolving Themes in Rural Development 1950s-2000s, Development Policy Review, Vol 19 (4), pp437-448
Mayfield, James B. () A Chronology of Rural Development Theory and Practice (1950s-2000s)
Wignaraja, Ponna (1985) 'Towards a new Praxis of Rural Development', Annals of Public and Cooperative Economics, Vol 56, Issue 1-2, pp121-43
de Janvry, Alain (1975) 'The Political Economy of Rural Development in Latin America: An Interpretation', American Journal of Agricultural Economics, Vol 57 (3), August 1975, pp490-99,

- de Janvry, Alain & Sadoulet, Elisabeth (1989) 'The Political Feasibility of Rural Poverty Reduction', CUDARE Working Papers 198495, University of California, Berkeley, Department of Agricultural and Resource Economics.
- de Janvry, Alain & Sadoulet, Elisabeth (2003) 'Achieving Success in Rural Development: Toward Implementation of an Integral Approach', 2003 Annual Meeting, August 16-22, 2003, Durban, South Africa: Plenary Sessions 245924, International Association of Agricultural Economists.
- Majumder, R. (2008) - Infrastructure and Development in India: Interlinkages and Policy Issues, Rawat
- Estache and Garsous, 2012: The Impact of Infrastructure on Growth in Developing Countries, , IFC Economics Notes;
- Rodrigue, J-P et al. (2018) The Geography of Transport Systems
- Nuno Limao and Anthony Venables (1999) Infrastructure, Geographical Disadvantage, and Transport Costs, , World Bank Policy Research Working Paper 2257, 1999;
- Majumder, R. (2013) Poverty and Inequality in India: The Role of Infrastructure, Asian Economic Review, Vol 55, No 3, 2013;
- Kurukulasuriya, Pradeep; Rosenthal, Shane. 2013. Climate Change and Agriculture : A Review of Impacts and Adaptations, Environment department papers No. 91. Climate change series. Washington DC ; World Bank. (Page 1-26)
- Dev, Mahendra. (2011). Climate change, rural livelihoods and agriculture (focus on food security) in Asia-Pacific region.; IGIDR WP 2011-014

Major Elective
APPLIED ECONOMETRICS-II (ECN 404A)
Full Marks: 50
Lecture Hours: 75

- 1. An Introduction to Stochastic Processes (15 Lectures)**
 - Introduction - Definition and broad classification of Stochastic Processes
 - Markov Chains
 - Gambler's ruin (martingales, branching processes)
 - Random walk
 - Continuous parameter processes
 - Poisson processes
 - Normal processes
- 2. Advanced topics in Panel data (15 Lectures)**
 - GMM estimation of panel models; Moment conditions and identification; One and two-step GMM; Tests of overidentifying restrictions; Redundant and weak instruments;
 - Time Series and Panel Data Analysis Examples;
 - Random and Mixed effects panel GMM; Dynamic Panel Models; Arellano Bond estimator.
- 3. Measures of Income Inequality (15 Lectures)**
 - Positive and Normative measures
 - Positive Measures - The range; Mean absolute difference and deviation; Variance and coefficient of variation; Gini measure-various forms of Gini coefficient, geometrical interpretation, Gini measures for Pareto distribution and Log normal distribution; Entropy Measure
 - Normative Measures - Dalton's Measure; Atkinson's measure; Sen's measure
- 4. Fuzzy sets and Social Science (15 Lectures)**
 - Fuzzy sets and study of diversity - using fuzzy sets to constitute Cases and Population - Using Fuzzy sets to study Sufficient conditions- Casual complexity; Applying Fuzzy set methods - Fuzzy sets and the dialogue between theory and evidence
- 5. Methods of data classification: Principal Component analysis (10 Lectures)**
 - Introduction – Factor Analysis - Principal Component Analysis as a special case of Factor Analysis –Eigen Vector – Eigen Values – Rotation methods - Examples
- 6. Introduction to Financial Econometrics (15 Lectures)**

References

- Topic 1:** Goon, Gupta and Dasgupta: An outline of Statistical theory
Topic 2: Maddala: Econometric Analysis
Baltagi: Panel Data Analysis
Topic 3: Amartya Sen - "On Economic Inequality"
Topic 4: Charles C. Ragin: Fuzzy Set Social Science
Topic 5: Damodar N Gujarati – Basic Econometrics

Major Elective
ECONOMICS OF CLIMATE CHANGE & ENERGY (ECN 404B)
Full Marks: 50
Lecture Hours: 70

- 1. Climate Change (8 lectures)**
 - What is Climate Change – Weather & Climate – Markers of Climate Change – Temperature & Precipitation – Extreme Events
 - Triggers of Climate Change – Natural Factors & Anthropogenic Factors – Greenhouse effect - Land Use and Land Cover changes – Agriculture – Industry - Transport
- 2. Climate Change – Global Issues (8 lectures)**
 - Trade, Development and Environment – The Capital Flight Hypothesis,
 - The Pollution Haven Hypothesis – Ecological Dumping
 - International/ Interregional Cooperation – The Issue of Trans-boundary pollution.
- 3. Climate Change & Energy (16 lectures)**
 - Energy Types by Sources & Use – Energy GDP Linkage – Impact of Energy Price Changes – Energy Intensity & Energy Efficiency – Decoupling Theory
 - Energy use and Carbon Emission – Energy Composition & Energy balance Tables – Reference Energy System (RES) – Energy Demand Estimation Methods – Rebound Effect
- 4. Climate Change Impact Assessment (16 Lectures)**
 - Climate Vulnerability – Sectoral Assessment – Concept of Economic Loss
 - Assessment Methods - Environmental Valuation and Cost-benefit Analysis - Revealed preference Approach (Household Production Function, Travel cost, Hedonic Price, Statistical value of life);
 - Assessment Methods - Stated Preference Approach (Contingent Valuation Method)
 - Impact Assessment: Case Studies
- 5. Climate Change Policies (15 Lectures)**
 - Economics of global climate change policies
 - Climate Vulnerability & Resilience
 - Mitigation & Adaptation
 -
- 6. Climate Change & India (7 Lectures)**
 - Environmental Policies in India
 - Economics of Energy Demand in India

References

- Banerjee (2001): Economic Valuation of Environmental Benefits/ Costs in Bhattacharyya (ed.) *Environmental Economics: Indian Perspective*, OUP.
- Baumol & Oates (1988): *Theory of Environmental Policy* (2/e), Chs 3,4,11 12.
- Bazaraa, M S and J. J. Jarvis: *Linear Programming and Network Flows*, John Wiley and Sons, N. Y., 1990.
- Bhattacharyya, R.N. (2001)(ed.) *Environmental Economics: Indian Perspective*, OUP.

- Chakraborty (2001): Global Environmental Issues and Initiatives in Bhattacharyya (ed.) op.cit.
- Chattopadhyay (2006): Dirtier Trade for India? The Story of Globalization in *Arthaniti*
- Chichilinsky (1994): North-South Trade and the Global Environment, *AER*.
- Forest Reinhardt and Patia McGrath. 2002. "Global Climate Change After Marrakech (A)", *Harvard Business School Case* 9-702-075.
- Gerking & Stanley (1986): An Economic Analysis of Air Pollution and Health: The Case of St. Louis. *REStat*.
- Harrington & Portney (1987): Valuing the Benefits of Health and Safety Regulations, *J. of Urban Economics*.
- IEA: World Energy Outlook: International Energy Organization, Paris, 2002.
- Maler, K.G. (2000): International Environmental Problems in Kolstad (ed): *Environmental Economics*, OUP
- Markandya & Murty (2001): Measuring Non-user Benefit from Cleaning ganges in *Cleaning up the Ganges: a Cost-benefit Analysis of the Ganga Action Plan*, OUP.
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- Weyant, John P. (ed.), *Energy and Environmental Policy Modeling*, Kluwer Academic Publishers, Boston, 1999.
- Journals:** Energy Economics; Energy Journal, India Development Report – Recent Issues; IPCC Reports;
- Lecture Notes and Hand-outs

Major Elective
Economics of Social Capital (ECN 404C)
Full Marks: 50
Lecture Hours: 70

Course Objective: The paper will focus on the emergence of social capital and its implications in understanding society & economy.

- 1. Introduction (7 Lectures)**
 - Emergence of Social Capital: Bourdieu's theory of capital (economic, cultural and social capital) and Coleman's Rational Choice Approach to Social Capital (Kinds of social capital).
- 2. Civic Perspective on Social Capital (12 lectures)**
 - Civic Perspective on Social Capital: Robert D. Putnam's concept of social capital – Elements of social capital – Characteristics of social capital – Bridging vs. bonding social capital – Critique of Putnam's concept.
- 3. The network approach to social capital (12 lectures)**
 - The network approach to social capital: The concept of Ronald S. Burt – network structure and functions – network types – homogeneity and heterogeneity in networks – strong and weak ties – Social Network and learning & technology adoption –
- 4. The resource perspective (12 lectures)**
 - The resource perspective: Nan Lin's concept of social capital - Institutions, network and capital building in societal transformation.
- 5. Social Capital & Development Theory (12 lectures)**
 - Social Capital approach to development: role of social capital in economic and cultural development - Critical evaluation of social capital.
- 6. Social Capital & Development Empirics (15 lectures)**
 - Measurement of Social Capital: The World Bank Method - Importance of Social Capital in Micro-finance - Relationship between Social Capital and Subjective Well-Being – Social Entrepreneurship & Economic Development

Suggested References:

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- Francis Fukuyama. 1996. Trust: The Social Virtues and the creation of prosperity, New York Press.
- John Harris. 2002. De-politicizing development: The World Bank and Social Capital, Wimbeldon Publishing Company, London.
- William R. Easterly. 2001. The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics, Cambridge, MA: MIT Press.
- James C. Scott. 1998. Seeing Like A State: How Certain Schemes to Improve the Human Conditions have Failed, New Haven: Yale University Press.
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- Robert, P 1995. "Bowling Alone: America's Declining Social Capital" *Journal of Democracy* pp 65-78

Major Elective
GAME THEORY & INFORMATION (ECN 404D)
Full Marks: 50
Lecture Hours: 70

1. **Economics and Game Theory** (10 Lectures)
 - Situations of Strategic interdependence in interpersonal interactions: Economic examples: Basic elements in a game , Concept of zero sum game- maxmin – minmax solution,; Broad outline of Applications: Economics, Political Science, Biology-Ecology, Social Philosophy; Classes of Games.
2. **Static Games of Complete Information** (15 Lectures)
 - Normal (Strategic) form representation of non-zero sum games: Iterated elimination of strictly dominated strategies- concept of Nash equilibrium- Examples of pure Strategy equilibria: Non-existence of pure strategy equilibria; IERSDS, rationalizability and correlated equilibrium Prisoners' Dilemma- Multiple Nash Equilibria; Cournot model of duopoly – final offer arbitration, the problem of the commons- mixed strategies , Trembling hand perfect equilibrium.
3. **Dynamic form representation of complete information games** (15 Lectures)
 - Extensive Form Games; multistage Games; Extensive Form, Multistage Games with observed actions - Commitments; Strategies and Equilibria in Extensive Form games concept of backward induction - Stackelberg game - wages and employment in a unionised firm. Two stage game of complete but imperfect information – concept of sub-game; concept of information set; Sub game perfect Nash equilibrium - three period bargaining game - two stage repeated games; Repeated games with observed actions Infinitely repeated games – concept of trigger strategy- folk theorem
4. **Static game of incomplete information** (15 Lectures)
 - Cournot competition under asymmetric information.- normal form representation of static Bayesian games, concept of static Bayesian Nash equilibrium- battle of the sexes game in the framework of static game with incomplete information.
5. **Dynamic game with incomplete information** (15 Lectures)
 - Concept of sequential Rationality, concept of perfect Bayesian equilibrium.

References

Ken Binmore - Fun and Games
Kreps, D. - Game Theory: A Non technical
Introduction Gibbons : - Game Theory
Fudenberg, D., and J. Tirole, -
Game Theory Oz Shy -
Industrial Organization.

CORE PAPER
COMPUTER APPLICATIONS AND PROJECT (ECN 405)

Full Marks: 50

This paper is basically a Project paper, which aims to enhance the academic understanding of the students and provide them a ground-level experience of socioeconomic conditions in the hinterland of the University. It will also equip the students with computational capabilities and provide training on Computer Applications in Social Sciences. The paper will consist of training on Computer Applications in the laboratory, a Socio-economic Survey, writing of a Survey Report and Viva-voce. This paper also contains the Social Outreach component of the syllabus where the reports of the students are shared with local administration. The distribution of marks/credits shall be as follows:

| | | |
|---|----------------|-----------------|
| Assignments on Computer Applications – | 10marks | 1 credit |
| Practical on Computer Applications – | 10marks | 1 credit |
| Socio-economic Survey & Report Writing – | 10marks | 1 credit |
| Presentation of Report (Social Outreach component) – | 10marks | 1 credit |
| Viva-Voce – | 10marks | 1 credit |

The paper will be evaluated internally except the viva-voce part which will have a panel of examiners including external member(s).

The part on Computer Applications shall consist of the following:

9. MS Office Applications – Word, Excel, Power Point and their Open source alternatives
10. Computer Application Packages
 - (A) Database handling with FOXPRO, MS-ACCESS
 - (B) Econometric Software - SPSS, EVIEWS, STATA, LIMDEP, STATISTICA, SHAZAM, R (Any Three)
11. Economic Applications
 - (A) Linear Estimations
 - (B) Maximum Likelihood Estimation
 - (C) Qualitative Variables
 - (D) Time series analysis – AR, MA, ARMA. and ARIMA.
 - (E) Principal Component Analysis
 - (F) Forecasting and Simulations
 - (G) Pictorial Presentations
12. Report Writing and Presentations