# INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: **January-June 2025**

## COURSE TITLE: Political Economy of Institutions and Development

INSTRUCTOR(S): **Prof. Bharti Nandwani**

**Course outline:** This course provides an introduction to some of the important questions asked in the field of Political Economy and focuses on empirical approaches to answering those questions. The course heavily relies on studies based in India though seminal papers looking at other contexts are also covered.

**Course evaluation:** Students will be evaluated based on two referee reports which will carry a weightage of 20%, assignments/class presentation with a weightage of 20%, a replication exercise and a final term with 30% weightage each.

**Texts:**
* *Resources with D in brackets will be covered in detail in lectures*.

[PT] Persson, Torsten, and Guido Enrico Tabellini. *Political economics: explaining economic policy*. MIT press, 2002. (D)

[Be] Besley, Timothy. "Principled agents? The political economy of good government." *OUP (2007)*

**Week 1-2-3:**

<u>Introduction</u>

[PT] Chapter 1 and 2

[Be] Chapter 1 and 2

<u>Electoral Competition</u>

[PT] Chapter 3

Osborne, Martin J., and Al Slivinski. "A model of political competition with citizen-candidates." *The Quarterly Journal of Economics* (1996): 65-96.

Political Agency

[PT] Chapter 4

Partisan Politicians

[PT] Chapter 5

Empirical Methods in Political Economy

**Week 4:**

Voting

Spenkuch, Jörg L. "Expressive vs. strategic voters: An empirical assessment." *Journal of Public Economics* 165 (2018): 73-81. (D)

Eggers, Andrew C., and Nick Vivyan. "Who votes more strategically?." *American Political Science Review* 114.2 (2020): 470-485. (D)

Choi, Jungug. "Strategic voting in India: Its extent and determinants in the 2004 general election." *Asian Survey* 49.4 (2009): 609-624.

Fujiwara, Thomas. "A regression discontinuity test of strategic voting and Duverger's law." *Quarterly Journal of Political Science* 6.3–4 (2011): 197-233. (D)

Diwakar, Rekha. "Voter turnout in the Indian states: An empirical analysis." *Journal of elections, public opinion and parties* 18.1 (2008): 75-100.

**Week 5:**

Downsian Convergence

Lee, David S., Enrico Moretti, and Matthew J. Butler. "Do voters affect or elect policies? Evidence from the US House." *The Quarterly Journal of Economics* 119.3 (2004): 807-859. (D)

Jones, Benjamin F., and Benjamin A. Olken. "Do leaders matter? National leadership and growth since World War II." *The Quarterly Journal of Economics* 120.3 (2005): 835-864. (D)

Chattopadhyay, Raghabendra, and Esther Duflo. "Women as policy makers: Evidence from a randomized policy experiment in India." *Econometrica* 72.5 (2004): 1409-1443. (D)

Pande, Rohini. "Can mandated political representation increase policy influence for disadvantaged minorities? Theory and evidence from India." *American Economic Review* 93.4 (2003): 1132-1151.

Besley, Timothy, et al. "The politics of public good provision: Evidence from Indian local governments." *Journal of the European Economic Association* 2.2-3 (2004): 416-426.

**Week 6:**

Accountability

Cole, Shawn, Andrew Healy, and Eric Werker. "Do voters demand responsive governments? Evidence from Indian disaster relief." *Journal of Development Economics* 97.2 (2012): 167-181. (D)

Besley, Timothy, and Anne Case. "Does electoral accountability affect economic policy choices? Evidence from gubernatorial term limits." *The Quarterly Journal of Economics* 110.3 (1995): 769-798.

Besley, Timothy, and Robin Burgess. "The political economy of government responsiveness: Theory and evidence from India." *The quarterly journal of economics* 117.4 (2002): 1415-1451.

**Week 7:**

Clientalism

Bardhan, Pranab, et al. "Political participation, clientelism and targeting of local government programs: analysis of survey results from rural West Bengal, India." *Boston: Department of Economics, Boston University* (2008).

Bardhan, Pranab, and Dilip Mookherjee. *Political clientelism and capture: Theory and evidence from West Bengal, India*. No. 2012/97. WIDER Working Paper, 2012. (D)

Bardhan, Pranab, and Dilip Mookherjee. "Determinants of redistributive politics: An empirical analysis of land reforms in West Bengal, India." *American Economic Review* 100.4 (2010): 1572-1600.

Anderson, Siwan, Patrick Francois, and Ashok Kotwal. "Clientelism in Indian villages." *American Economic Review* 105.6 (2015): 1780-1816. (D)

Bardhan, Pranab, et al. "Local democracy and clientelism: implications for political stability in rural West Bengal." *Economic and Political Weekly* 44.9 (2009): 46-58.

Khemani, Stuti. *Partisan politics and intergovernmental transfers in India*. The World Bank, 2003.

Das, Upasak. "Does political activism and affiliation affect allocation of benefits in the rural employment guarantee program: Evidence from West Bengal, India." *World Development* 67 (2015): 202-217.

**Week 8:**

Political connections

Aidt, Toke S., Miriam A. Golden, and Devesh Tiwari. "Incumbents and criminals in the indian national legislature." (2011).

Vaishnav, Milan, and Reedy Swanson. "Does good economics make for good politics? Evidence from Indian States." *India Review* 14.3 (2015): 279-311.

Faccio, Mara. "Politically connected firms." *American economic review* 96.1 (2006): 369-386. (D)

Khwaja, Asim Ijaz, and Atif Mian. "Do lenders favor politically connected firms? Rent provision in an emerging financial market." *The Quarterly Journal of Economics* 120.4 (2005): 1371-1411. (D)

Lehne, Jonathan, Jacob N. Shapiro, and Oliver Vanden Eynde. "Building connections: Political corruption and road construction in India." *Journal of Development Economics* 131 (2018): 62-78.

Prakash, Nishith, Marc Rockmore, and Yogesh Uppal. "Do criminally accused politicians affect economic outcomes? Evidence from India." *Journal of Development Economics* 141 (2019): 102370. (D)

Banerjee, Abhijit V., and Rohini Pande. "Parochial politics: Ethnic preferences and politician corruption." *Vol* (2007). (D)

**Week 9:**

Suffrage

Card, David, and Enrico Moretti. "Does voting technology affect election outcomes? Touch-screen voting and the 2004 presidential election." *The Review of Economics and Statistics* 89.4 (2007): 660-673.

Fujiwara, Thomas. "Voting technology, political responsiveness, and infant health: Evidence from Brazil." *Econometrica* 83.2 (2015): 423-464. (D)

Miller, Grant. "Women's suffrage, political responsiveness, and child survival in American history." *The Quarterly Journal of Economics* 123.3 (2008): 1287-1327. (D)

**Week 10:**

Identity

Bhavnani, Rikhil R. "Do electoral quotas work after they are withdrawn? Evidence from a natural experiment in India." *American Political Science Review* 103.1 (2009): 23-35. (D)

Beaman, Lori, et al. "Female leadership raises aspirations and educational attainment for girls: A policy experiment in India." *science* 335.6068 (2012): 582-586.

Dunning, Thad, and Janhavi Nilekani. "Ethnic quotas and political mobilization: caste, parties, and distribution in Indian village councils." *American political Science review* 107.1 (2013): 35-56.

**Week 11:**

Capture

Bardhan, Pranab K., and Dilip Mookherjee. "Capture and governance at local and national levels." *American economic review* 90.2 (2000): 135-139. (D)

Bardhan, Pranab, and Dilip Mookherjee. "Decentralizing antipoverty program delivery in developing countries." *Journal of public economics* 89.4 (2005): 675-704. (D)

Panda, Sitakanta. "Political connections and elite capture in a poverty alleviation programme in India." *The Journal of Development Studies* 51.1 (2015): 50-65.

Beath, Andrew, Fotini Christia, and Ruben Enikolopov. "Direct democracy and resource allocation: Experimental evidence from Afghanistan." *Journal of Development Economics* 124 (2017): 199-213. [NEW D]

**Week 12:**

Corruption

Muralidharan, Karthik, Paul Niehaus, and Sandip Sukhtankar. "Building state capacity: Evidence from biometric smartcards in India." *American Economic Review* 106.10 (2016): 2895-2929. (D)

Bertrand, Marianne, et al. "Obtaining a driver's license in India: an experimental approach to studying corruption." *The Quarterly Journal of Economics* 122.4 (2007): 1639-1676.

Niehaus, Paul, and Sandip Sukhtankar. "Corruption dynamics: The golden goose effect." *American Economic Journal: Economic Policy* 5.4 (2013): 230-69. (D)

Duflo, Esther, et al. "The value of regulatory discretion: Estimates from environmental inspections in India." *Econometrica* 86.6 (2018): 2123-2160.

**Week 13:**

Bureaucrats

Nath, Anusha. "Bureaucrats and Politicians: How Does Electoral Competition Affect Bureaucratic Performance?." *Institute for Economic Development (IED) Working Paper* 269 (2015): 00016. (D)

Bertrand, Marianne, et al. "The costs of bureaucratic rigidity: Evidence from the Indian Administrative Service." *Unpublished working paper. University of Chicago* (2016).

Iyer, Lakshmi, and Anandi Mani. "Traveling agents: political change and bureaucratic turnover in India." *Review of Economics and Statistics* 94.3 (2012): 723-739. (D)

Gulzar, Saad, and Benjamin J. Pasquale. "Politicians, bureaucrats, and development: Evidence from India." *American Political Science Review* 111.1 (2017): 162-183. (D)

**Week 14:**

Conflict

Miguel, Edward, Shanker Satyanath, and Ernest Sergenti. "Economic shocks and civil conflict: An instrumental variables approach." *Journal of political Economy* 112.4 (2004): 725-753. (D)

Mitra, Anirban, and Debraj Ray. "Implications of an economic theory of conflict: Hindu-Muslim violence in India." *Journal of Political Economy* 122.4 (2014): 719-765. (D)

Khanna, Gaurav, and Laura Zimmermann. "Guns and butter? Fighting violence with the promise of development." *Journal of Development Economics* 124 (2017): 120-141. (D)

Berman, Eli, Jacob N. Shapiro, and Joseph H. Felter. "Can hearts and minds be bought? The economics of counterinsurgency in Iraq." *Journal of Political Economy* 119.4 (2011): 766-819.

Crost, Benjamin, Joseph Felter, and Patrick Johnston. "Aid under fire: Development projects and civil conflict." *American Economic Review* 104.6 (2014): 1833-56.

**Week 15:**

Collective Action

Banerjee, Abhijit, and Rohini Somanathan. "The political economy of public goods: Some evidence from India." *Journal of development Economics* 82.2 (2007): 287-314. (D)

Chaudhary, Latika. "Determinants of primary schooling in British India." *The Journal of Economic History* 69.1 (2009): 269-302. (D)

Alesina, Alberto, Reza Baqir, and William Easterly. "Public goods and ethnic divisions." *The Quarterly Journal of Economics* 114.4 (1999): 1243-1284.

Miguel, Edward, and Mary Kay Gugerty. "Ethnic diversity, social sanctions, and public goods in Kenya." *Journal of public Economics* 89.11-12 (2005): 2325-2368.

**INDIRA GANDHI INSTIUTE OF DEVELOPMENT RESEARCH**

**SEMESTER:** January – May 2025

## Course Outline: Game Theory

Instructor: Dr. Shubhro
Email: Shubhro@igidr.ac.in
Phone: 6909-6543
Office Hours: By Appointment
TA: Japneet Kaur

**Course Objectives**

**The objective of this course will** be to provide a rigorous introduction to the tools and techniques used in noncooperative and cooperative games. While the course will be theoretical in emphasis, its coverage will be at the intermediate graduate level. We will spend some time discussing the intuition behind the various concepts while we define the same with formal, precise statements.

**Textbooks**

1. Game Theory for Applied Economists, Gibbons, Princeton.
2. Game Theory, Fudenberg and Tirole, MIT Press.
3. A Course in Game Theory, Osborne and Rubinstein, MIT Press.
4. Microeconomic Theory, Mas-Colell, Whinston and Green, Oxford University Press.

Additional readings will be assigned in class. There will be many of these.

**Course Outcomes**

Upon completion of the course, students will be able to
(I) comprehend academic papers published in renowned journals on advanced topics in Game Theory
(II) identify, construct, and solve game theoretical models that are of interest to pure or applied theorists
(III) use the underlying intuition driving the main results to guide their decisions in real-world scenarios related to consultancy, competition policy, etc.

**Grading**

40% will be on the final examination, 40% on a mid-sem examination, and the remaining 20% on assignments handed out in class.

As a general policy, there will be no make-up midterm exams. If you miss a midterm exam and have a valid excuse, your grade will be based on the remaining elements of the course. Students should plan to be on campus till the end of the semester. Travel plans do not constitute a valid excuse for missing an exam.

**Outline of Topics**

*Introduction*

*Additional Readings:*

[1] Aumann, Robert, “What Is Game Theory Trying to Accomplish?”, *Frontiers of Economics*, edited by K. Arrow and S, Honkapohja, Basil Blackwell, Oxford, 1985, 28-76.

[2] Rubinstein, Ariel, "Comments on the Interpretation of Game Theory", *Econometrica*, Volume 59, Issue 4 Jul., 1991, 909-924.

1. *Static Games of Complete Information*

1.1 Normal/Strategic form games and Nash Equilibrium

1.2 Pure and Mixed Strategies

1.3 Iterated Elimination of Strictly Dominated Strategies; Rationalizability

1.4 Existence of Nash Equilibrium

1.5 Correlated Equilibrium

1.6 Trembling-hand Perfection

1.7 Coalition-Proof Nash Equilibrium

2. *Dynamic Games of Complete Information*

2.1 Complete and Perfect Information

2.2 Game Trees/ Extensive form Representation

2.3 Backwards Induction

2.4 Complete and Imperfect Information

2.5 Subgame Perfection

2.6 Repeated Games

3. *Static Games of Incomplete Information*

3.1 Bayesian Nash Equilibrium

3.2 Mixed Strategies Revisited

3.3 Auctions; Optimal Auctions
3.4 Bargaining Models

3.5 Public Goods Contribution Games

3.6 Revelation Principle

4. *Dynamic Games of Incomplete Information*

4.1 Perfect Bayesian Equilibrium

4.2 Signaling Games

4.3 Job Market Signaling

4.4 Cheap-Talk Games

4.5 Sequential Bargaining under Asymmetric Information

4.6 Reputation in the Finitely Repeated Prisoner's Dilemma

4.7 Chain-Store Paradox

5. *Coalitional Games*

5.1 Core

5.2 Shapely Value

5.3 Nash Bargaining Solution

6. *Experimental Evidence*

6.1 ERC – A Theory of Equity, Reciprocity, and Competition, Bolton and Ockenfels, American Economic Review, 2000.

6.2 A Theory of Fairness, Competition, and Cooperation, Fehr and Schmidt, Quarterly Journal of Economics, 1999.

6.3 Auctions with Anticipated Regret: Theory and Experiment, Filiz and Ozhay, American Economic Review, 2007.

Expectations

I believe that learning is a team effort. Students are the most vital part of this effort. There is a lot that students can do to help create a good learning environment. This includes coming to lectures on time, handling in assignments on time, and participating actively in class discussions.

**INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH**

SEMESTER: **January-June 2025**

**COURSE TITLE: Introduction to Financial Economics and modeling risk**

INSTRUCTOR(S): **Prof. Sreyoshi Das**

**COURSE DESCRIPTION:** The course introduces operations research techniques, e.g., probability, statistics, and optimization, to finance and financial engineering. Students in this course will be able to identify time series dependency in asset returns, analyse trade-off between risk and return of a portfolio, analyse tail risk in portfolio, and apply canonical models of asset pricing like CAPM. The course uses R for statistical calculations, simulation, and optimization.

**COURSE OBJECTIVES:**

- Learn about OR concepts widely used in finance like probability distributions, optimization, statistical tests, time series etc.
- Analyze portfolio risk via different measures like variation, tail risk etc. This includes evaluating trade-offs between risk and return of a portfolio, estimating tail risk in asset returns, and evaluating canonical asset pricing models using stock returns.

**COURSE REQUIREMENTS:** Probability and statistics basics, linear regressions, familiarity with R

**COURSE CONTENTS:** Depends on course structure and duration

**EVALUATION:** Depends on course structure, duration, TA assistance

**INDIRA GANDHI INSTIUTE OF DEVELOPMENT RESEARCH**

SEMESTER: January-June 2025

COURSE TITLE: **Mathematical Finance.**

INSTRUCTOR: **Prof. Satya R. Chakravarty**

**COURSE DESCRIPTION:** This course on mathematical finance aims at giving the students some general ideas about: (I) Risk and Uncertainty; (II ) Theory of Stochastic Dominance; (III) Arbitrage Theory; (IV) Valuation of Cash Flows and Their Systematic Comparison; (V) Markets for Options; (VI) Brownian Motion; (VII) Itô's Lemma; (VIII) Black-Scholes-Merton Model; (IX) Binomial Model ; (X) Exotic Options; (XI)Risk-Neutral Valuation and Martingales; (XII) Portfolio Management: The Markowitz Model; (XIII) Portfolio Management: The Mean-Gini Approach.

**COURSE OBJECTIVES:** To give the students a broad overview of: returns on investments in risky prospects, ranking uncertain prospects with regard to rates of return, stock valuation, option pricing and hedging, portfolio management.

**COURSE OUTCOMES:**

**CO1:** Students taking this course will have employment opportunities like market research analyst, financial analyst, investment consultant and risk analyst in organizations such as mutual fund providers and financial consultancies.

**CO2:** The course will be a solid background for those who wish to do Ph.D. on theory of finance.

**CO3:** The course will be useful for those who wish to work on applied financial problems, particularly, with respect to choice of areas of applications and interpretations.

**COURSE REQUIREMENTS:** Microeconomics, B.Sc. level calculus, elementary linear algebra, elementary statistics (distribution and probability theory).

**COURSE CONTENTS:** (I) Risk and Uncertainty: (a) Arrow-Pratt measures of risk aversion,(b) Pratt's Theorem, (c) Arrow-Pratt measures and investment decisions, (d) certainty equivalent; (II ) Theory of Stochastic Dominance: first and second order stochastic dominances for ranking uncertain prospects; (III) Arbitrage Theory: (a) Conditions for non-arbitrage- a simple model,(b) Conditions for non-arbitrage-a general model, (c) First Fundamental Theorem of Mathematical Finance; (IV) Valuation of Cash Flows and Their Systematic Comparison:(a) net present values, (b)internal rate of return, (c) Their comparison in terms of Pareto dominance under non-arbitrage capital market transactions, (d)Sufficient conditions for uniqueness of internal rate of return; (V) Markets for Options: (a)Types of options, (b) Payoff functions for options, (c) Profit functions for options,(d) Hedging; (VI) Brownian Motion: Brownian motion and evolution of stock price; (VII)Itô's Lemma: The lemma , its proof and applications ; (VIII) Black-Scholes-Merton Model: (a) Black-Scholes-Merton partial differential equation, (b) Black-Scholes-Merton option pricing formula, (c) Greek letters and hedging; (IX) Binomial Model: (a) Basic analytics, (b) Binomial option pricing; (X) Exotic Options: A brief introduction and their usefulness; (XI)Risk-Neutral Valuation and Martingales :A Brief Analysis-(a)Simple binomial model , (b) A general model ; (XII)Portfolio Management: The Markowitz Model- (a)Basic analytics, (b) Portfolio composition (c) Capital asset pricing model; (XIII) Portfolio Management: The Mean-Gini Approach-(a) Gini evaluation function, (b) Efficient set.

**EVALUATION:** One written examination. Total score: 100. Duration 3 hours.

**REFERENCES: (1) P. Wilmott, S. Howison and J. Dewynne: The Mathematics of Financial Derivatives: A Student Introduction, Cambridge University Press, Cambridge, 1995, 2005.**

**(2) J. Baz and G. Chacko: Financial Derivatives: Pricing, Applications and Mathematics, Cambridge University Press, Cambridge, 2004.**

**(3) T. Bjork: Arbitrage Theory in Continuous Time, Oxford University Press, New York, 2009.**

**(4) R.U. Seydel: Tools for Computational Finance, Springer, New York, 2012.**

**(5) R. Roman: Introduction to Mathematical Finance: From Risk Management to Option Pricing, Springer, New York, 2004.**

**(6) S.R. Chakravarty : An Outline of Financial Economics, Anthem Press, New York, 2014,**

**(6) S.R. Chakravarty and P. Sarkar : An Introduction to Algorithmic Finance, Algorithmic Trading and Blockchain, Emerald Publishing, Bingley, UK, 2020.**

**Note: As per NAAC requirements, kindly focus on employability, entrepreneurship and skill development.**

# INDIRA GANDHI INSTIUTE OF DEVELOPMENT RESEARCH

SEMESTER: January-June 2025

COURSE TITLE: **Corporate Credit and Risk Appraisal & Management**

INSTRUCTOR: Prof. **Saratkumar Malik**

## 1. Course Objectives

| |
|---|
| Course will help learn student's various definition and concepts of lending, Principles of lending; RBI Norms and lending policy documents; type of borrowers & type of credit facilities. Credit Appraisal Process, Credit Rating, Risk Management ,Assessment of Working Capital and Term loan; Due diligence of credit proposal in a typical Indian Banking scenario |

## 2. Course Outcome (CO)

| **Sr. No** | At the end of the course students will be able to : |
|---|---|
| CO1 | Understand basic concepts of Corporate Banking and Lending Products in a Bank |
| CO2 | Understand Principles of lending, RBI Norms, Lending policy documents, Type of borrowers and Type of credit facilities a Bank offers |
| CO3 | Critically analyse financial statements, understand the importance of rating, due diligence and fraud |
| CO4 | Use diferent methods of calculating working capital, loan appriasal (future business performance assessment) and sanction (Back Office) |
| CO5 | Risks associated with different types of Lending: Banking, Stock markets, External borrwings, Overseas funds, Business risks etc |

## 3. Course Outcome and Program Outcome mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| CO1 | M | | | | |
| CO2 | | M | | M | |
| CO3 | H | H | | H | |
| CO4 | | H | H | H | |

**H- Highly correlated, M- Moderately correlated, L- Slight correlation**

PO1- Apply knowledge of management theories and practices to solve business problems
PO2-Foster Analytical and Critical Thinking abilities for data based decision making
PO3-Ability to develop Value based Leadership ability
PO4-Ability to understand, analyse and communicate global, economic, legal and ethical aspects of business
PO5- Ability to lead themselves and others in the achievement of organisational goals, contributing effectively to a team environment

## 4. Course Modules (Syllabus)

| Module | Topic | Sessions |
|---|---|---|
| I | Introduction | 1 |
| II | Definition and concepts, Principle of lending etc.; RBI Norms and lending policy documents; Type of borrowers and & Type of credit facilities; | 2-4 (3 sessions) |
| III | **Credit Appraisal Process:** Validation of proposal- documents check list; Assessment of Credit risk; Purpose of loan; Estimate of cost of production and profitability; Sources of repayment; Collateral-security coverage ratio; Loan covenants<br><br>**Credit Rating :** Importance of credit rating; Deciding pricing of loan product through credit rating; Methodology of credit rating- Internal and external ratings | 5-11 (7 sessions) |
| IV | **Assessment of Working Capital and Term loan:** Analysis of financial statements- Balance sheet and P & L; Analysis of financial statements- ratio analysis; Project appraisal process - Project cost and means of finance.<br><br>Managerial, Technical, Market, Financial and other aspects of appraisal; Assessment of Term loan – Use of Capital budgeting, Break even analysis, DSCR, DER etc.,<br><br>Working capital assessment – concepts and various methods; Working capital assessment – Turnover method; Working capital assessment- MPBF Method; Working capital assessment- Cash | 12-16 (5 sessions) |

| | | |
|---|---|---|
| | budget method; Due diligence of credit proposal - examination of credential of loan proponent pre sanction and post sanction | |
| V | **Due diligence of credit proposal:** Non-fund-based credit facilities: Letter of Credits (LC) and its working mechanisms, Letter of Guarantees, Other concepts in Corporate Credits: Securitization concepts, Concept of CDS, Factoring, Forfaiting, Consortium Finance, Closure/Summing Up | 17-20<br>(4 sessions) |
| | **Total** | 20 Sessions |

**5. Pre requisites /co requisites (if any) from students**

| Sr. No | Details |
|---|---|
| 1 | The students are expected to be able to read and interpret financial statements, be through with financial management concepts and are aware of Banking services in general |

**6. Detailed Assessment Plan (***briefly describe each component and how the students are going to be evaluated)*

| Sr. No | Components with details | Individual/Group | Marks | Intended COs to be assessed |
|---|---|---|---|---|
| 1 | Class Participation | Individual | 10 | CO1, CO2, CO3, CO4 |
| 2 | Quiz/Class Test (two) | Individual | 20 | CO1, CO2, CO 3, CO 4 |
| 3 | Group Project Assignments & Presentation | Group | 20 | CO3, CO4 |
| 4 | End Term Examination | Individual | 50 | CO1, CO2, CO3 & CO4 |
| | **Total Marks** | | **100** | |

**7. Session Plan (Each session of 90 minutes)**

| Session No* | Topics/Unit | Pedagogy | Expected Learning outcome | Resources (Books/Chapters/Case etc | CO Attended |
|---|---|---|---|---|---|
| 1 | **Introduction**<br>(Group | Course Facilitator | Expectation Setting | Class Room Session -<br>Text Book: Bankers' handbook on Credit | |

| | | | | | |
|---|---|---|---|---|---|
| | Intimation, Project Allocation, Project Submission and Presentation Date) | | | Management, TaxMann Publication, IIBF | |
| 2 | Definition and concepts, Principle of lending | Class Discussion | Basics of Banking | Class Room Session – Online<br>Module A – Page 5-12 | CO 1 |
| 3 | RBI Norms and lending policy documents | Class Discussion<br>Attempt the Quiz | Basics of Banking | Class Room Session<br>Module A – Page 15-28 | CO 2 |
| 4 | Type of borrowers and & Type of credit facilities; | Class Discussion | Learning Credit & Corporate Banking | Class Room Session<br>Module A – Page 37-62 | CO 2 |
| 5 | **Credit Appraisal Process**<br>Validation of proposal-documents check list; | Class Discussion | Students will go through the understanding of Credit Appraisal Process in Banking | Class Room Session<br>Module A – Page 95-108 | CO 2, 3 |
| 6 | Assessment of Credit risk; Purpose of loan; | Class Discussion | Learning Credit & Corporate Banking | Class Room Session<br>Module A – Page 107 and Module E– Pages 655-741 | CO 3 |
| 7 | Estimate of cost of production and profitability; Sources of repayment; | Class Discussion/ Case Study | Learning Credit & Corporate Banking | Class Room Session<br>Module A – Page 104-104 | CO 3 |

| | | | | | |
|---|---|---|---|---|---|
| 8 | Collateral-security coverage ratio; Loan covenants | Class Discussion | Learning Credit & Corporate Banking | Class Room Session<br>Module A — Page 107-107 | CO 3 |
| 9 | **Review of sessions** | Class Discussion | Practical Learning & Case Studies | Class Room Session | CO 3 |
| 10 | **Credit Rating**<br>Importance of credit rating; Deciding pricing of loan product through credit rating; | Class Discussion | Learning Credit & Corporate Banking | Class Room Session CO 3<br>Module A – Page 121-127 | CO 3 |
| 11 | **Quiz / Class Test** | Class Discussion<br>Attempt the Quiz | Level Out Session (Time to be back on track) | Class Room Session<br>Level Out Session | CO 1, 2 |
| 12 | Methodology of credit rating- Internal and external ratings | Class Discussion | Learning Credit & Corporate Banking | Class Room Session<br>Module A – Page 121-127 | CO 3 |
| 13 | due diligence and fraud **Second: Guest Session** | Class Discussion | Practical Learning – Lending | Class Room Session – Online | CO 3 |
| 14 | **Assessment of Working Capital and Term loan**<br>Analysis of financial statements- Balance sheet and P & L; Analysis of financial statements- | Class Discussion | Learning Credit & Corporate Banking – Assessment Quantum of Loan | Class Room Session<br>Module B – Page 163-229 | CO 4 |

| | | | | | |
|---|---|---|---|---|---|
| | ratio analysis; Project appraisal process - Project cost and means of finance | | | | |
| 15 | Managerial, Technical, Market, Financial and other aspects of appraisal | Class Discussion | Learning Credit & Corporate Banking | Class Room Session – Online<br>Module B – Page 235-269 | CO 4 |
| 16 | Assessment of Term loan – Use of Capital budgeting, Break even analysis, DSCR, DER etc., | Class Discussion | Learning Credit & Corporate Banking – Quantum of Term Loan | Class Room Session –<br>Module B – Page 245-253 | CO 4 |
| 17 | Working capital assessment – concepts and various methods; Working capital assessment – Turnover method; Working capital assessment- MPBF Method; Working capital assessment- Cash budget method; Due diligence of credit proposal - examination | Class Discussion | Learning Credit & Corporate Banking | Class Room Session<br>Module C – Page 289-320 | CO 4 |

| | | | | | |
|---|---|---|---|---|---|
| | of credential of loan proponent pre sanction and post sanction | | | | |
| 18 | Due diligence of credit proposal<br><br>Non-fund-based credit facilities: Letter of Credits (LC) and its working mechanisms, Letter of Guarantees, Other concepts in Corporate Credits: Securitization concepts, Concept of CDS, Factoring, Forfaiting, Consortium Finance | Class Discussion | Practical Learning | Class Room Session<br><br>Module C – Page 371-405 | CO 4 |
| 19 | Student Presentations and Doubt clearing session | Class Discussions and student Presentation | Class cum Practical Learning | Class Room Session<br><br>Module C – Page 371-405 | CO 3,4 |
| 20 | Student Presentations and Doubt clearing session | Class Discussions and student Presentation | Class cum Practical Learning | Class Room Session | CO 3,4 |
| **(Closure of Internal Evaluations)** | | | | | |
| Self Read (Inititive by Students): Export Finance, Priority Sector Lendng, Governmnet Sponsered Schemes, NABARD Schemes, Retail Loans, Monitoring, Supervision, Follow-Up, Management of Impaired Assets,Types of Charges and Fair Practices Code on Lender's Liability | | | | | |

**8. Student Prep Activities (Total: 15 hours)**

| Sr. No | Details<br><br>(Reading Material, Assignment, Case Project, Videos etc) |
|---|---|
| 1 | a. PETER PARILLO (Adapted from Case no.6 – FRAUD CASEBOOK: Lessons from the Bad Side of Business – Joseph Wells)<br><br>b. Case Study of Seoul National Bank on Credit Risk Analysis and Others<br>c. Case Study of Richa Food Limited |
| 2 | Website of Reserve Bank Of India: www.rbi.org |
| 3 | Websites of various Financial Institutions and banks |
| 4 | Recommended YouTube videos on Credit Appraisal |
| 5 | Current Banking News and Analysis – News Papers |

**9. Books, Reading Materials, Other Resources (Databases/journals/periodicals) prescribed**

| Sr. No | Details |
|---|---|
| 1 | Text Book: Bankers' handbook on Credit Management published TaxMann Publication Pvt Ltd. on behalf of Indian Institute of Banking and Finance- Edition July 2014/Latest Edition |
| 2 | Additional Reference Books: Module B Credit Management of Cooperative Banking Operations by Shri T.M.C Vadudevan, Shri Shyam Ji Mehrotra and Shri D M Chandgadkar published by MACMILLAN on behalf of Indian Institute of Banking and Finance – Edition 2007/Latest Edition |
| 4 | Additional Reference Books: Project appraisal and financing by Dr. Ambrish Gupta, PHI Learning Pvt Ltd. Delhi edition 2017/Latest Edition |
| 5 | Credit Appraisal, Risk Analysis & Decision Making - Dr. D.D. Mukherjee – 10th Edition/Latest Edition, Snow white |

| | |
|---|---|
| **Prepared by:** | Dr. Sarat Kumar Malik |
| | |

**INDIRA GANDHI INSTIUTE OF DEVELOPMENT RESEARCH**

**SEMESTER: January-May 2025.**

**COURSE TITLE: Time Series Analysis -2 INSTRUCTOR: R. Krishnan.**

**TEACHING ASSISTANT: One.**

**COURSE DESCRIPTION: This course is a sequel to Timeseries analysis -1, taught during August-December 2024. The sequel provides a detailed introduction to the theoretical and practical aspects of multivariate time series, using current methodology and software.**

**COURSE OBJECTIVES: The course has twin objectives: first one is to extend knowledge on how to model, estimate and predict multiple time series. Specifically, students are taught how the multiple stationary and nonstationary time series interact amongst each other and how to model such an interaction. Second one is to familiarise students with the various aspects of important multivariate time series techniques that will enable them to model real world macroeconomic issues and problems.**

**COURSE OUTCOMES:**

**CO1: At the end of the course, students must be able to test existing theoretical propositions or formulate new propositions and test the same, by applying the modelling techniques learnt during the course.**

**CO2: Students should be able to apply the ideas to real time series data and interpret the outcomes of their analyses.**

**CO3: With this sequel course, along with the TSA-1, students will have acquired graduate-level quantitative skills to undertake fruitful research in applied macroeconomics.**

**COURSE REQUIREMENTS: MUST have credited the core course, Econometrics II offered by the institute and the prequel optional course, TSA-1, offered by the institute.**

**COURSE CONTENTS: Please refer to Annexure 1.**

**EVALUATION: Two examinations, a midsemester and a final one based on the entire syllabus and an empirical assignment of student's choice.**

**REFERENCES: Please refer to Annexure 2.**

## Annexure 1

## Course Outline

### (I) Covariance Stationary Vector processes (VAR)

Vector Autoregressive Processes (VAR) -- Assumptions and Properties -- Estimation and Hypothesis Testing – Restricted and Unrestricted – Meaning and testing for Granger causality -- Impulse Response analysis – Standard Errors for Impulse Responses – Variance decomposition – Generalized impulse response analysis – Applications.

### (II) Structural VAR (SVAR)

Structural vector autoregression (SVAR) -- Meaning – Issues, identification schemes and estimation – Implications – Applications.

### (III) Cointegration

Cointegration -- An introduction – Engle-Granger two step estimation – Granger Representation Theorem (GRT) -- Vector Error Correction Models -- VECMs (Soren Johansen) -- Issues involved in system estimation – Hypotheses testing – Issues involved in identification – Identifying long run and short run structures – Identifying permanent and temporary shocks -- Applications.

### (IV) VAR – More topics

Weak Exogeneity – VAR, cointegration and issues in causality testing -- Partial versus full systems–Identification and estimation–VAR with I(1) exogenous variables – Applications Regression with Integrated Processes – Structural Error Correction Models – Issues and Applications.

### (V) Volatility modeling

Multivariate extensions of ARCH/GARCH models (BEKK models, Conditional and dynamic MGARCH models, Cholesky MGARCH models) – Factor ARCH models – Applications.

## Annexure 2

### Select Books


Box, G.E.P. and G.M.Jenkins, (1994), Time Series Analysis: Forecasting and Control, Prentice Hall International, Inc., New Jersey.

Hamilton, J.D. (1994), Time series Analysis, Princeton University Press, Princeton, New Jersey.

Maddala, G.S. and In-Moo Kim (1999), Unit Roots, Cointegration, and Structural Change, Cambridge University Press, Cambridge.

Bannerjee, A. et.al., (1993), Cointegration, Error Correction and the econometric Analysis of Non-Stationary Data, Oxford University Press, Oxford.

S.Johansen (1995) Likelihood- Based Inference in Cointegrated Vector autoregressive Models, Oxford University Press.

G.C.Reinsel (1993) Elements of Multivariate Time Series Analysis, Springer-Verlag, .

G. Amisano and C.Giannini (1997) Topics in Structural VAR Econometrics, Springer, (Second Edition).

N.Ericsson and J.S. Irons(1994) Testing Exogeneity, Oxford University Press,

H.Lutkhepohl (2005) New introduction to Multiple Time Series Analysis, Springer-Verlag.

D.F.Hendry Dynamic Econometrics, Oxford University Press, 1995.


### Select Papers

R.Engle *et.al* Exogeneity, Econometrica, 51,1983, 277-304

E.Leamer Vector autoregressions for causal inference,

Carnegie-Rochester Conference Series on Public Policy,
22, 1985,255-304.

T.Cooley and S.Leroy, Atheoretical macroeconometrics – A critique

Journal of Monetary Economics, 16,1985, 283-308.

C.W.J. Granger Some recent developments in a concept causality,

Journal of Econometrics, 39, 1988,199-211.

J.W.Keating Structural approaches to vector autoregressions, Federal Reserve

Bank of St.Louis, 1992, 37-57.

H.Pesaran and Y.Shin Generalized impulse responses in linear multivariate models

Economics Letters, 58, 1998, 17-29.

S.Johansen Statistical analysis of cointegration vectors, Journal of Economic Dynamics

And Control, 12, 1988, 231-254.

S.Johansen Cointegration in partial systems and the efficiency of single-equation analysis,

Journal of Econometrics, 52, 1992, 389-402.

S.Johansen anfd A.R.Swensen Testing exact rational expectations in cointegrated vector

autorgressive models, Journal of Econometrics, 93, 1999

73-91.

S.Johansen and K.Juselius Identification of the long-run and the short-run structure: An

application to the IS-LM model, Journal of Econometrics, 63, 1994, 7-36.

S.Johansen Testing structural hypothesis in a multivariate cointegration analysis, Journal of Econometrics, 53, 1992,211-244.

P.C.B. Phillips Fully Modified Least Squares and Vector autoregression, Econometrica, 63, 1995, 1023-1078.

T. Hiro and P.C.B. Phillips Vector autoregression and causality: A theoretical overview and simulation study, Econometric Reviews; 13,1994, 259-85.

T. Hiro and P.C.B. Phillips Vector autoregression and causality, Econometrica, 61,1993, 1367-93.

J.M.Urbain Partial versus full estimation modelling of cointegrated systems – An empirical illustration, Journal of Econometrics, 69, 1995, 177-210.

H.P. Boswijk Efficient inference on cointegration parameters in structural error correction models, Journal of Econometrics, 69,1995, 133-158.

S.Hylleberg and G.Mizon Cointegration and error correction mechanisms, Economic Journal, 99, 1989, 113-125.

R.F.Engle and F.K.Kroner Multivariate simultaneous generalized ARCH, Econometric Theory, 11,1995,122-150.

R.F. Engle, V.K.Ng and M.Rothschild Asset pricing with a FACTOR-ARCH covariance Structure:Empirical estimates for treasury bills, Journal of Econometrics, 45,1990,213-237.

**SEMESTER: January – June 2025**

**COURSE TITLE: Special Topics in Oligopoly Theory**

**INSTRUCTOR: Prof. Rupayan Pal**

**Office Hours of the Instructor: Open Door Policy & TBA timings**

**TEACHING ASSISTANT:** TBA

**COURSE DESCRIPTION:** This course will cover some selected topics of Oligopoly Theory. Usefulness of insights drawn from oligopoly theory in analysing various issues, including transnational pollution, corruption, lobbying, and resource exploitation will be specially emphasized. The focus of this course will be on reading research papers and discussing those in-depth, not just to gain a fair understanding of the state of the art in below mentioned topics, but also to gain a fair understanding of *decision making in strategic environments* in general. It would also highlight some of the unanswered/un-researched questions. Concepts developed in this course will be very useful to analyse a wide range of issues of economics, business and public policy.

**COURSE OBJECTIVES:** Students will (i) read and analyze original research articles published in leading journals, (ii) gain thorough understanding of issues pertaining to oligopolistic market structure and their implications, (iii) gain in-depth understanding of workings of partial equilibrium models dealing with strategic interactions (static and repeated) among economic agents under complete information and under asymmetric information, (iv) acquire skill to apply tools and insights drawn from oligopoly theory to analyze other issues.

**COURSE OUTCOMES:**

**CO1** Students will be able to develop relevant micro-theoretic models (partial equilibrium framework) to analyse issues involving strategic interactions among agents.

**CO2** Students will have an appreciation of the usefulness of theory models and limitations of existing models. They will be able to identify workable research problems of importance.

**CO3** Students will be able to write theory research papers and make effective seminar presentations. Students will acquire the ability to use theoretical economic analysis to criticise the implementation of competition law and to propose improvements.

**COURSE REQUIREMENTS: (**Prerequisites) Microeconomics I & II. [Students are encouraged to take course(s) on Game Theory, though it is not a prerequisite, if they have not done so before.]

**COURSE CONTENTS:**

1 Preliminaries: Cournot, Bertrand, Stackelberg – Strategic Substitutes, Strategic Complements

2 Timings of Move, Rationing, Endogenous Choice of Strategic Variables

SEMESTER: **January-June 2025**

COURSE TITLE**: Education and Development**

INSTRUCTOR(S): **Prof. Jandhyala B G Tilak**

## COURSE DESCRIPTION:

The course provides a comprehensive understanding of the theoretical and empirical concepts relating to education, issues on how education is related to development, the educational challenges India and other developing societies face, and how public policy responds to these challenges.

## COURSE OBJECTIVES:

1. To introduce conceptual, methodological and empirical aspects, including certain measurement aspects related to education and development
2. To introduce students to national and global developments in education
3. To introduce students to contemporary educational policy issues in India in a global environment.

## COURSE OUTCOMES:

On successful completion of the course, students will be expected to

- **CO1** have a good understanding of the relationship between education and Development
- **CO2** have a good understanding of various contemporary issues relating to education in India in a global context,
- **CO3** be able to critically reflect on and analyse various aspects of educational development both from research and policy angles

## COURSE PRE-REQUIREMENTS:

Nil. or

Interest in education related issues

## COURSE CONTENTS:

I. Introduction

What is education? Features of Education: Education as a public good, merit good, basic need, human right, and human development; Types of education: formal, non-formal, informal, homeschooling, public education, private education; types of private institutions – elite and low budget schools, public-private partnership; Levels of education;

Education and development linkages and controversies

II. Concepts and Indicators of education and their measurement

- Stock and flow indicators: literacy, enrolment ratios, dropout, transmission rates, education attainment, mean years of schooling, internal efficiency and external efficiency; Education in the measurement of human capital
- Education Statistics

III. Human capital theory

Concepts of investment, human capital; Human capital theory and alternative theories and hypotheses; Rate of return to education - Growth accounting equations;; Manpower planning; Social Demand for education

IV. Financing of Education

Public financing: general and earmarked taxes - Private financing: fees and loans - Household financing - International aid

V. Education Policy and development in India

i) Education Policy in India (until 2020): Constitutional Provisions for education - National Education Policy 1968, 1986, 2020 - Recommendations of Education Commissions and committees; Changing Policy issues

ii) Education Development in India

Elementary education, secondary, vocational and technical education, higher education Growth, inequalities and quality; Private education: Centre-State relations in education, including central schemes in education

iii) Looking into the Future: National Education Policy 2020: School Education - Higher Education and Research

VI. Globalisation

Internationalisation of education - GATS and education - Rankings – global and national - World-class universities

**EVALUATION:**

- A term paper and presentation or a home assignment (around 15-20 April)
- Semester-end written examination

## REFERENCES:


1. W.W. McMahon (ed.): Education and Development (Routledge 2012)
2. G Psacharopoulos: Economics of Education: Research and Studies (Pergamon, 1987)
3. G. Psacharopoulos & M Woodhall: Education and Development. (OUP, 1985)
4. Mark Blaug: Introduction to Economics of Education (London: Allen Lane the Penguin 1970)

5. Martin Carny: Political Economy of Education (Cambridge Univ. Press, 2024)
6. S. Chattopadhyay: Education and Economics -- Disciplinary Evolution and Policy Discourse. Oxford University Press, 2012
7. Jandhyala B G Tilak: Higher Education, Public Good and Markets (Routledge, 2018)
8. S. Marginson *et al* (Eds.): *Assessing the Contributions of Higher Education: Knowledge for a Disordered World.* Edward Elgar, 2023
9. Jandhyala B G Tilak (ed.): Education, Society and Development: National and International Perspectives (Ashish 2013)
10. P.G. Altbach & J. Salmi. The Road to Academic Excellence: The Making of World-Class Research Universities. (World Bank 2011).

*On Indian Education:*

11. J P Naik: Education Commission and After (Allied 1982)
12. R V V Ayyar: History of Education Policy Making in India 1947-2016 (Oxford 2018)
13. R Govinda: Primary Education in India: From Compulsion to Fundamental Right (Routeldge, 2023)
14. N V Varghse et al, (eds.) Quality and Inclusion in Education: The Persisting Challenges, (Routledge 2023)
15. Jandhyala B G Tilak (ed.): Education in India: Policy and Practice (Sage 2021)
16. Jandhyala B G Tilak (ed): Higher Education in India (Orient BlackSwan 2013)
17. Jandhyala B G Tilak: Education and Development in India (Palgrave Macmillan 2018)
18. Jandhyala B G Tilak: Education and Development (Academic Foundation, 2018)
19. Jandhyala B G Tilak: Dilemmas in Reforming Higher Education in India (Orient BlackSwan 2018)
20. Jandhyala B G Tilak: Economics of Inequality in Education (Sage 1987)
21. Education Commission: Education and National Development. Report of the Education Commission 1964-66. (NCERT, 1971)
22. Draft National Education Policy 2019 and National Education Policy 2020. Government of India
23. National Education Policy 202. Government of India

SEMESTER: **January – June 2025**

COURSE TITLE: **Topics in Applied Econometrics (6806)**

INSTRUCTOR: **Prof Disha Gupta**

TEACHING ASSISTANT: Shraddha Yadav

**COURSE OBJECTIVES:** The objective of this course is to introduce the students to applied econometric methods and research designs that are useful in conducting empirical microeconomic research. Since most applied economic research examines questions with direct policy implications, this course will focus on methods for estimating causal effects. The course will cover research designs and applications through several examples and published journal articles.

**COURSE OUTCOMES:**
**CO1** The students will be able to apply basic tools and research designs for estimating causal effects in microeconomic research.

**CO2** They will learn the practical application of these methods using classic literature and more recent paper in applied research.

**CO3** They will be able to critically think and apply these research methods in their own research.

**COURSE REQUIREMENTS:** Students are expected to be well-versed in graduate-level mathematics for economists, statistics, and econometrics. It would be helpful if students have already credited Econometrics I (5301). Note that this course will not cover basic econometrics and statistics.

**COURSE CONTENTS:**
The teaching will cover various econometric techniques for undertaking causal analyses and their applications. Specifically, the following topics would be discussed in this course:
Potential Outcomes Framework
Randomized Control Trials
Instrumental Variables
Panel Data (Fixed Effects Estimation)
Difference-in-differences
Regression Discontinuity Design

**EVALUATION:**
The weightage of several components of the evaluation for this course are as follows, 1. Paper Presentations and class participation (35%)
2. Write-up on critical review of the paper (15%)
3. Quizzes (10%)
4. Final Exam (40%)
Paper presentations will be scheduled at the beginning of the semester so that students get sufficient time to work in groups and prepare for the presentation. Students are required to select papers of their choice from the given list on a first-cum-first-served basis.

There will be no retake of the quizzes. Retake of final exam is only possible in rare case of a medical emergency where the student should inform me within one week of the exam.

**REFERENCES:**

**Suggested Textbooks:**

1. Angrist, J. D., & Pischke, J.-S. (2008). Mostly harmless econometrics. Princeton University Press.
2. Cunningham, S. (2021). Causal Inference: The Mixtape. Yale University Press.
3. Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data. MIT press.

Papers:

Barrett, C. B., Islam, A., Mohammad Malek, A., Pakrashi, D., & Ruthbah, U. (2022). Experimental evidence on adoption and impact of the system of rice intensification. American Journal of Agricultural Economics, 104(1), 4-32.

Bessone, P., Rao, G., Schilbach, F., Schofield, H., & Toma, M. (2021). The economic consequences of increasing sleep among the urban poor. The Quarterly Journal of Economics, 136(3), 1887-1941.

Bleemer, Z., & Mehta, A. (2022). Will studying economics make you rich? A regression discontinuity analysis of the returns to college major. American Economic Journal: Applied Economics, 14(2), 1-22.

Blimpo, M. P., & Pugatch, T. (2021). Entrepreneurship education and teacher training in Rwanda. Journal of Development Economics, 149, 102583.

Chari, A. V., Heath, R., Maertens, A., & Fatima, F. (2017). The causal effect of mater- nal age at marriage on child wellbeing: Evidence from India. Journal of Development Economics, 127, 42-55.

Goldin, J., Lurie, I. Z., & McCubbin, J. (2021). Health insurance and mortality: Experimental evidence from taxpayer outreach. The Quarterly Journal of Economics, 136(1), 1-49.

Imelda, I. (2020). Cooking that kills: Cleaner energy access, indoor air pollution, and health. Journal of Development Economics, 147(C).

Kandilov, A. M., & Kandilov, I. T. (2022). The impact of the Affordable Care Act Medicaid expansions on agricultural workers' health insurance coverage, medical care utilization, and labor supply. American Journal of Agricultural Economics, 104(3), 1026-1049.

Mettetal, E. (2019). Irrigation dams, water and infant mortality: Evidence from South Africa. Journal of Development Economics, 138, 17-40.

Miller, N., Tack, J., & Bergtold, J. (2021). The impacts of warming temperatures on US Sorghum yields and the potential for adaptation. American Journal of Agricultural Economics, 103(5), 1742-1758.

Prakash, N., Rockmore, M., & Uppal, Y. (2019). Do criminally accused politicians affect economic outcomes? Evidence from India. Journal of Development Economics, 141, 102370.

Riley, E. (2018). Mobile money and risk sharing against village shocks. Journal of Development Economics, 135, 43-58.

Sekhri, S. (2022). Agricultural trade and depletion of groundwater. Journal of Devel- opment Economics, 156, 102800.

Note: The list of papers is tentative and is subject to change.

SEMESTER: **January-June 2025**

COURSE TITLE: **Fiscal Policy**

INSTRUCTOR(S): **Prof. Rajendra Vaidya**

TEACHING ASSISTANT: **one**

**COURSE DESCRIPTION:** The course is divided into two distinct but related parts. The first part would discuss how government activities have a profound influence on the well-being of citizens. The course would start with a discussion of the principles that guide our thinking on the question of which activities the government should participate in. The course would not go into the details of tax policies but instead focus on a detailed discussion on government expenditures. This then, leads to the question of the optimal size of the government. The next issue the course would discuss is debt sustainability in both a closed and open economy context.
In the second part this general discussion would be followed by an attempt to understand the working of fiscal policy and its potential contribution to the stabilization of output especially in the context of developing countries. It has recently been empirically established that most developing countries follow a pro-cyclical fiscal policy (in contrast most developed nations follow a counter cyclical fiscal policy) which clearly goes against the prescription suggested by standard Keynesian Macroeconomic models. The course would try and uncover the reasons for this rather surprising outcome. The course would end with a discussion on Fiscal policy in India with the perspective developed earlier in the course.

**COURSE OBJECTIVES:** The primary objective is to develop a general understanding of how governments affect the economy. The focus would primarily be on two aspects. Firstly, how do governments attempt to influence the general well-being of the population and how this can be achieved in a sustainable way? Secondly, what are the prerequisites that are likely to ensure that government actions that attempt to mitigate welfare losses that arise due to business cycles are successful?

**COURSE OUTCOMES:**
**CO1:** Students would be expected to gain an understanding of fiscal policy in a broad international context.
**CO2.** As a large number of papers taught would involve cross country regressions, students would learn to interpret such regressions correctly.

**COURSE REQUIREMENTS:**
Course requirements include (i) a mid-term and a final exam, and (ii) a term paper with/without class presentation. This depends on time available and the number of students registering for the course. The course grade will be computed on the basis of the following weights
assigned to the different requirements:
Mid –Term Exam: 30 per cent
Final Exam: 50 per cent
Term paper with presentation: 20 per cent
 Minimum attendance of 85 per cent as per Institute rules.
 Mobile phones to be kept away during class time.
 No late submissions of term paper except for documented medical reasons and

emergencies.
 Academic dishonesty in any form, including plagiarism to be subject to disciplinary action as per Institute rules.
 Class participation to be considered for borderline grades

**COURSE CONTENTS:**

***Introduction:***

Stiglitz J.E.(1988) Economics of the Public Sector, W.W. Norton & Company New York Chapter 1.

Barlevy B. (2004) "The costs of business cycles and the benefits of stabilization: A survey" NBER working paper no 10926.

***Role and Size of the Government***

Stiglitz J.E.(1996) "The Role of Government in Economic Development" in Bruno N. and Pleskovic B. (eds) Annual World bank Conference on Development Economics 1996, The World bank, Washington D.C. pp 11-24.

Gwartney J, Lawson R and Holcombe R. (1998) "The size and functions of government and economic growth" Joint Economic Committee, Washington D.C.

Barro R.J. (1991) "Economic Growth in a Cross Section of Countries" The Quarterly Journal of Economics, 106(2) pp 407-443

***Fiscal Sustainability***

Ley, Eduardo (2009) "Fiscal (and external) sustainability" Munich Personal RePEc Archive, The World Bank

***Fiscal Policy and Stabilization***

Buchanan J.M. and R.E. Wagner( 1978) "Political Biases of Keynesian Economics" in Buchanan J.M and R.E Wagner (eds) Fiscal Responsibility in Constitutional Democracy, Martinus Nijhoff Social Sciences Division, Boston.

Hercovitz Z. and M. Strawzynscky (2004) "Cyclical Ratcheting in Government Spending: Evidence from the OECD" The Review of Economics and Statistics, 86(1) pp 253-361.

Philip R. Lane (2003) "The cyclical behaviour of fiscal policy: evidence from the OECD" Journal of Public Economics 87 (2003) 2661– 2675

***Is Fiscal Policy Pro-cyclical in Developing Countries***

Gavin M. and R. Perotti (1997) "Fiscal Policy in Latin America" NBER Macroeconomics Annual, 12, pp 11-70.

Kaminsky G.M., Reinhart C.M. and C.A. Vegh (2004) "When it rains, it pours: Pro-cyclical capital flows and macroeconomic policies" NBER Macroeconomics Annual,19, pp 11-53.

Carlos A. Vegh and Guillermo Vuletin (2015) "How Is Tax Policy Conducted Over the Business Cycle?" American Economic Journal: Economic Policy , August 2015, Vol. 7, No. 3, pp. 327-370

***The solution to Pro-cyclicality***

Jeffrey A. Frankel (2011) "A solution to Fiscal Pro-cyclicality : The Structural Budget Institutions Pioneered by Chile" CID working Paper no. 216.

Jeffrey A. Frankela, Carlos A. Vegh and Guillermo Vuletin (2013) "On graduation from fiscal pro-cyclicality" Journal of Development Economics, 100(1), pp 32-47.

Evaluation: Midterm Examination: 30 marks, Final Examination: 50 marks, Term Paper 20 marks

# Role of Finance in Macroeconomics

**Rajeswari Sengupta**

**January-May 2025**

## 1 Logistics

**Class timings:** Tuesday, Thursday: 2:30-4:00pm Email: rajeswari@igidr.ac.in

## 2 Course Objectives

Finance is the brain of the economy and the engine of growth. Every mod¬ern market-economy needs a well-functioning financial system. The study of macroeconomics is hence incomplete without an understanding of how the financial system works, how it impacts various facets of the economy and how it in turn gets influenced by economic forces.

Although macroeconomics is a very broad field, there are two main ar¬eas of study: the determinants of long-run economic growth, and the causes and consequences of short-run business cycle fluctuations. Finance intersects with macroeconomics in both these areas in a highly critical manner. The objective of this course is to give the students a comprehensive idea about the intersection points between these two fields of study.

The course curriculum is a combination of empirical research papers, ar¬ticles, and lecture notes presented with the help of slideshows in each class. While in most cases the references are drawn from a vast literature focused on developed economies (simply because comparable literature is at a nascent

stage of development in emerging economies), throughout the course, the narrative will be heavily influenced by examples from the Indian economy.

The approach will be application-oriented, and data-driven.

### 2.1 Setting expectations

What can students expect from the course?

In addition to learning about how different elements of the financial sys¬tem operate and interact with the economy at large, the students will be introduced to different strands of literature, and get a detailed understand¬ing of macro-financial issues in the Indian context.

Which students should take the course?

Students who are inherently curious about the world around them, who are not afraid of reading papers and asking questions, who are comfortable with participating in debates and discussions, who are interested in macro-finance in general and the Indian economy in particular, are best suited for this course. There will be an explicit emphasis on discussing current affairs in the realm of macro-finance from the very start.

3 Assessment

· Class participation: 15%

· Class quiz (verbal) based on assigned readings: 20%

· Class tests (surprise, written): 25%

· Class presentations (40%):

– For MSc students: based on assigned readings (throughout the course) and pre-determined topics (mid and end-term): 40%

– For PhD students: based on assigned readings (throughout the course) and an empirical project (mid and end-term)

4 Course Outline, Readings and Lecture plan

This is an initial list; readings will be edited as we go along and lecture plan might also change subject to the progress made.

4.1 Economic Growth and Finance

Lectures in the first few classes will introduce the concept of finance in macroeconomics, and talk about why study finance, and where does finance feature (or not) in traditional growth models. This will be followed by a de¬tailed

exposition on the role of financial intermediation in economic growth, issues in financial intermediation, as well as the broad categories of financial intermediaries.

Reading List:

1. Thorsten Beck, Ross Levine, Norman Loayza (2000) "Finance and the sources of growth", Journal of Financial Economics, Volume 58, Issues 1–2.

2. Jess Benhabib and Mark M. Spiegel (2000) "The Role of Financial Development in Growth and Investment", Journal of Economic Growth, Vol. 5, No. 4, pp. 341-360.

3. Robert G. King and Ross Levine (1993) "Finance and Growth: Schum-peter Might be Right", The Quarterly Journal of Economics, Vol. 108, No. 3, pp. 717-737.

4. Ross Levine (1997) "Financial Development and Economic Growth: Views and Agenda", Journal of Economic Literature, Jun., 1997, Vol. 35, No. 2.

5. Ross Levine and Sara Zervos (1998) "Stock Markets, Banks, and Eco-nomic Growth", The American Economic Review, Jun., 1998, Vol. 88, No. 3.

6. Raghuram G. Rajan and Luigi Zingales (1998) "Financial Dependence and Growth", The American Economic Review, Vol. 88, No. 3, pp. 559-586.

7. Ross Levine (2002) "Bank-Based or Market-Based Financial Systems: Which Is Better?" Journal of Financial Intermediation, Volume 11, Issue 4, 2002, Pages 398-428.

8. Solomon Tadesse (2002) "Financial Architecture and Economic Performance: International Evidence", Journal of Financial Intermediation, Volume 11, Issue 4, Pages 429-454.

9. Raj Aggarwal, and John W. Goodell (2009) "Markets and institutions in financial intermediation: National characteristics as determinants", Journal of Banking and Finance, Volume 33, Issue 10, Pages 1770-1780.

4.2 Financial Intermediaries

Lectures in this portion of the course will focus on various financial intermediaries especially banks, non-banking financial companies or NBFCs, bond market, equity market, and mutual funds. We will discuss the functions performed by these intermediaries, their respective structures, and also their regulation. Some

of the topics that will be covered include bank balance sheets, liquidity vs solvency, debt vs equity, leverage, bank capital and as¬set classification, maturity transformation, various risks such as credit risk, liquidity risk, maturity risk etc, pricing of loans, financial stability or sys¬temic risk concerns, yield curve, term premium, bond pricing, credit spreads, derivatives, clearing and settlement etc. Emphasis will be placed on under¬standing these intermediaries in the context of the Indian economy.

For this portion of the course, lecture notes will be of paramount impor¬tance. Relevant articles will be sent closer to specific lectures.

Reference book:

”Financial Markets and Institutions”, by Frederic S. Mishkin and Stanley Eakins, Pearson (10th edition).

Copies available in the library.

Reading List: India literature

1. R. Sengupta and H. Vardhan (2021), “A Study of Nonbanking Financial Companies in India”, ADB South Asia Working Paper Series.

2. Sanjay Banerji, Krishna Gangopadhyay, Ila Patnaik and Ajay Shah (2012), “New Thinking on Corporate Bond Market in India”, NIPFP Working Paper 106.

3. Ila Patnaik and Radhika Pandey (2019), “Savings and capital formation in India”, NIPFP Working Paper 271.

4. R. Sengupta and H. Vardhan (2022), “India’s credit landscape in a post-pandemic world” IGIDR Working Paper 2022-019, Indira Gandhi Institute of Development Research, Mumbai, India.

5. Harsh Vardhan and Anjali Sharma (2020) ”Why are banks buying more bonds?” MoneyControl (https://www.moneycontrol.com/news/opinion/why-banks-are-buying-more-bonds-6139661.html)

6. Harsh Vardhan (2023) ”A flat yield curve does not bode well for bank margins”, MoneyControl (https://www.moneycontrol.com/news/opinion/a-flat-yield-curve-does-not-bode-well-for-bank-margins-10445871.html)

7. R Sengupts and H Vardhan (2020) ”The Indian corporate bond mar¬ket: From the ILFS default to the pandemic”, The Leap Blog (https://blog.theleapjournal.org/2020/08/the-indian-corporate-bond-market-from.htmlgsc.tab=0)

8. Harsh Vardhan (2022) ”How ”Orderly” is the Evolution of the Indian Yield Curve?” The Leap Blog (https://blog.theleapjournal.org/2022/06/how-orderly-is-evolution-of-indian.htmlgsc.tab=0)

4.3 Stabilisation of Fluctuations and Finance

When economies face short-run fluctuations, they adopt stabilisation policies primarily in the form of Monetary policy and Fiscal policy. These policies cannot work without the financial sector which plays a crucial role in stabil¬ising business cycles.

Lectures in this part of the course will first dwell on explaining how these policies work, particularly from the perspective of the Indian economy and then move on to discussing important topics such as monetary policy

transmission through financial institutions and markets, central bank bal¬ance sheet, fiscal dominance of monetary policy, deficit financing etc.

Reading List:

1. Bernanke, Ben S., and Frederic S. Mishkin (1997) “Inflation Target¬ing: A New Framework for Monetary Policy?” Journal of Economic Perspectives, 11: 97-116.

2. Marvin Goodfriend (2007), “How the World Achieved Consensus on Monetary Policy”, Journal of Economic Perspectives, pp 47-68.

3. Ben S. Bernanke (2005), “What Have We Learned Since October 1979?” Federal Reserve Bank of St Louis Review, pp. 277-282.

4. Kenneth N. Kuttner and Patricia C. Mosser(2002), “The Monetary Transmission Mechanism: Some Answers and Further Questions”, New York Fed.

5. Jean Boivin, Michael T. Kiley, and Frederic S. Mishkin (2010) “How Has the Monetary Transmission Mechanism Evolved Over Time?” Edi-tor(s):

Benjamin M. Friedman, Michael Woodford, Handbook of Mon¬etary Economics, Elsevier, Volume 3, Pages 369-422.

6. Ben S. Bernanke and Mark Gertler (1995), “Inside the Black Box: The Credit Channel of Monetary Policy Transmission”, Journal of Eco¬nomic Perspectives, Volume 9, Number 4, Pages 27–48.

7. Mishkin, S. Frederic (1995), “Symposium on the monetary transmission mechanism”, Journal of Economic Perspectives, pp 3-10.

8. Bernanke, B. S. and A. S. Blinder (1992): “The Federal funds rate and the channels of monetary transmission”. American Economic Review, 82, pp. 901-21.

9. Thorsten Beck, Andrea Colciago, and Damjan Pfajfar (2014), “The role of financial intermediaries in monetary policy transmission”, Journal of Economic Dynamics and Control, Volume 43.

10. Alan S. Blinder, Michael Ehrmann, Marcel Fratzscher, Jakob de Haan and David-Jan Jansen (2008), “Central Bank Communication and Mon¬etary Policy: A Survey of Theory and Evidence”, Journal of Economic Literature, Vol. 46, No. 4, pp. 910-945.

11. Emanuele Baldacci and Manmohan S. Kumar (2010), “Fiscal Deficits, Public Debt, and Sovereign Bond Yields”, IMF Working Paper, WP/10/184.

12. Michael Kumhof and Evan Tanner (2005), “Government Debt: A Key Role in Financial Intermediation”, IMF Working Paper, WP/05/57.

Reading List: India literature

1. Ila Patnaik, Radhika Pandey and Rajeswari Sengupta (2024), “The journey of inflation targeting in India”, IGIDR Working Papers 2024¬022, Indira Gandhi Institute of Development Research, Mumbai, India.

2. Ila Patnaik and Radhika Pandey (2020), “Moving to Inflation Target¬ing”, NIPFP Working paper 316, August 2020.

3. Pami Dua, (2020), ”Monetary policy framework in India”, Indian Eco-nomic Review.

4. Viral Acharya (2020), “Fiscal Dominance - A Theory of Everything in India”, Indian Public Policy Review 2020, 1(2): 1-15

5. Ahmed, Faisal, Binici, Mahir and Turunen, Jarkko (2022), “Monetary Policy Communication and Financial Markets in India”, IMF Working Paper No. 2022/209

6. Prachi Mishra, Peter J Montiel and Rajeswari Sengupta (2016), “Mon¬etary Transmission in Developing Countries: Evidence from India”, IMF Working Papers 2016/167, International Monetary Fund.

7. Aneesha Chitgupi, Ajay Shah, Manish K. Singh, Susan Thomas, Harsh Vardhan (2024) “Who lends to the Indian state?” XKDR Forum Work¬ing Paper 34, August 2024.

## 4.4 Credit, Business Cycles and Financial Crises

In this segment we will study the inter-linkages between credit cycles and business cycles. The financial sector can amplify business cycles and create episodes of credit booms, stock market booms, housing market booms etc., which are invariably followed by episodes of busts that have serious reper-cussions for the real economy in the form of output collapse and job losses.

The discussion will also draw examples from a few crises episodes both in the US and in India, episodes where financial crisis led to real economic damage. An important topic in this context is the trade-off between price stability and financial stability.

Reading List:

1. Stijn Claessens, M. Ayhan Kose and Marco E. Terrones (2011), “How Do Business and Financial Cycles Interact?” IMF Working Paper, WP/11/88.

2. Claudio Borio (2012), “The financial cycle and macroeconomics: What have we learnt?” BIS Working Papers No 395.

3. Oscar Jorda, Moritz Schularick, and Alan M. Taylor (2013), “When Credit Bites Back”, Journal of Money, Credit and Banking 45 (s2): 3–28.

4. Moritz Schularick and Alan M. Taylor (2012), “Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870¬2008”, American Economic Review 102 (2): 1029– 1061.

5. Tyler Muir and Arvind Krishnamurthy (2017) “How Credit Cycles across a Financial Crisis”, NBER working paper, no. 23850.

Reading List: India literature

1. Economic Survey (2017), “The Festering Twin Balance Sheet Prob¬lem”, Office of the CEA, Government of India.

2. R. Sengupta and H. Vardhan (2022) “India’s credit landscape in a post-pandemic world”, Indira Gandhi Institute of Development Research, Mumbai Working Papers 2022-019.

3. R. Sengupta and H. Vardhan (2021) “A Study of Nonbanking Financial Companies in India”, ADB South Asia Working Paper Series.

4. Viral V Acharya and Raghuram Rajan (2020) “Indian Banks: A Time to Reform?”, mimeo.

5. R. Sengupta and H. Vardhan (2020), “The Indian corporate bond mar¬ket: From the IL&FS default to the pandemic”, The Leap Blog, August 2020.

6. Ila Patnaik, Shalini Mittal and Radhika Pandey (2019), “Examining the trade-off between price and financial stability in India”, NIPFP Working Paper 248.

4.5 Open Economy Macro and Finance

In this last part of the course the focus will shift to the interaction between finance and macro in an open economy context, not so much from an inter-national trade angle but almost entirely from a capital account perspective because that is where finance plays a critical role. One new financial market now gets added: the FX market. The lectures will shed light on the func¬tioning and architecture of the FX market, capital flows and capital controls, exchange rate dynamics and regimes, currency management by the central bank, and currency crises.

Once again, examples will be drawn heavily from the Indian economy. (Time permitting, some episodes of currency crises maybe discussed such as Latin

America and SE Asia in the 1990s). We will try to end this seg¬ment with a discussion of the global financial imbalances in the run-up to the Global Financial Crisis of 2008.

Reading List:

1. Guillermo A. Calvo and Frederic S. Mishkin, (2003), "The Mirage of Exchange Rate Regimes for Emerging Market Countries", Journal of Economic Perspectives (pp 99-109 and 112-113).

2. Ben Bernanke (2005) "Inflation in Latin America: A New Era?" Federal Reserve Board.

3. Olivier Blanchard and Gian Maria Milesi-Ferretti (2009), "Global Im-balances: In Midstream?" IMF Staff Position Note, SPN/09/29.

4. Krugman and Obstfeld, International Economics, Chapter 13.

5. Maurice Obstfeld and Kenneth Rogoff (2010) "Global Imbalances and the Financial Crisis: Products of Common Causes", in Asia and the Global Financial Crisis, ed. Reuven Glick and Mark M. Spiegel. Asia Economic Policy Conference. San Francisco, CA: Federal Reserve Bank of San Francisco 2010.

6. Martin Feldstein (2008) "Resolving the Global Imbalance: The Dollar and the U.S. Saving Rate", Journal of Economic Perspective, Vol 22, No. 3.

Reading List: India literature

1. Patnaik, Ila and Sengupta, Rajeswari (2022), "Analyzing India's Ex¬change Rate Regime," India Policy Forum, National Council of Applied Economic Research, vol. 18(1), pages 53-85.

2. Ila Patnaik, Radhika Pandey and Rajeswari Sengupta (2024), "The journey of inflation targeting in India", IGIDR Working Papers 2024¬022, Indira Gandhi Institute of Development Research, Mumbai, India.

3. Rajeswari Sengupta and Abhijit Sen Gupta (2019), "Alternate instru¬ments to manage the capital flow conundrum: A study of selected Asian economies," Pacific Economic Review, Wiley Blackwell, vol. 24(2), pages 241-268, May.

4. Ila Patnaik and Ajay Shah (2008), ”Managing Capital Flows: The Case of India”, ADB Institute Discussion Paper No. 98.

5. Michael Hutchison, Rajeswari Sengupta and Nirvikar Singh (2012), “India’s Trilemma: Financial Liberalisation, Exchange Rates and Mone¬tary Policy,” The World Economy, Wiley Blackwell, vol. 35(1), pages 3-18, January.

6. Ila Patnaik and Ajay Shah (2012), “Asia confronts the impossible trin¬ity”, Chapter 7 in Monetary and currency policy management in Asia: Implications of the global financial crisis, edited by Masahiro Kawai,

Peter J. Morgan and Shinji Takagi, Edward Elgar Publishing, February 2012.

7. Ila Patnaik, Sarat Malik, Radhika Pandey and Prateek (2013), “Foreign investment in the Indian Government bond market”, NIPFP Working Paper 126.

8. Shekhar Hari Kumar and Ila Patnaik (2018), “Internationalisation of the Rupee”, NIPFP Working Paper 222.

9. Radhika Pandey, Rajeswari Sengupta, Aatmin Shah and Bhargavi Za-veri, (2020), “Evolution of capital controls on foreign institutional in¬vestment in India” IGIDR Working Paper.

4.6 Miscellaneous

(Time permitting) Recent developments in the financial sector in India such as the emergence of alternative invesment funds (AIFs) in the private credit space, payments systems, securitisation etc.

INDIRA GANDHI INSTIUTE OF DEVELOPMENT RESEARCH
STOCHASTIC CALCULUS AND FINANCE

| | |
|---|---|
| Course number | N/A |
| Course Title/Name | Stochastic Calculus and Finance |
| Course Level: | PG (i.e., PhD, MSc) |
| Semester | Jan to June 2025 |
| Credits: | 2 Credits<br>TWELVE (12) session course (each session 1.5 hrs, i.e., total of EIGHTEEN (18) hrs) |
| Proposing Department | N/A |
| Other Department which may be interested | N/A |
| Instructor | Raghu Nandan Sengupta<br>IME Dept, IIT Kanpur, INDIA, Email: raghus@iitk.ac.in |
| Prerequisites | • Basic of (i) Probability & Statistics and (ii) Stochastic Processes or equivalent subjects<br>• Basic (i) Accounting & Finance or (ii) Financial Management or equivalent subjects |

**Course Description/Syllabus**

**Part 1**

Introduction of Stochastic Process; Ideas of State and Space (Discrete and Continuous); Random Walk, Markov Chain, Markov Process; Martingales, Branching Process; Binomial and Multinomial Pricing; Wiener Process; Stochastic Integrals; Stochastic Differential Equations and Itô's Lemma; Black-Schole's Model and its Derivation.

**Part 2**

Markowitz MV Model, CAPM, APT, Market Line, Measures of Risks, Derivatives, Forwards, Futures, Options, Swaps, Risk Neutral Pricing, Concepts of Hedging, Different ideas of Risk, KMV model, Credit Metrics, Introduction of Portfolio Analysis and Investment concepts, etc.

**Objective**

Application of the fundamental ideas of *Statistics* and *Stochastic Processes* in Finance are quite in-depth. Concepts from Statistics like Distributions, Sampling Distributions, Bayes Theorem, Conditional Distributions, EVD are heavily used in Finance. On the other hand, theories from Stochastic Processes like Random Walk, Markov Chain, Markov Process; Martingales, Binomial and Multinomial Pricing, Stochastic Integrals; Stochastic Differential Equations are also very popular and ubiquitous in the domain of finance. Students in this course will first pick up the core theory of the relevant topics from *Statistics* and *Stochastic Processes* and apply them in Investment Analysis, Risk Analysis, Derivatives, Risk Neutral Pricing, etc. They would also learn the fundamentals of Wiener

Process, Stochastic Integrals, Stochastic Differential Equations, Itô's Lemma, Black-Schole's Model. This course will benefit students in their masters and doctoral programs and intending to work as researchers, teachers, financial data scientists, investment analysts, investment bankers, econometricians, etc.

**Outcome/Key learning take away**

- Will help students master the rich repertoire of tools for scientifically/rationally understanding quantitative finance.
- Will facilitate students with both the basic and advanced theoretical background in statistics and stochastic process which is needed in finance.
- Will equip learners with the requisite skills in utilizing different techniques through practical applications.
- Will help student with the use of a variety of statical and stochastic processes be it in investment banking, data analytics, financial budgeting, etc.

**Requirement/Pre-requisites (Will be handled as required with extra sessions for students as required)**

01) Probability and Statistics: Axioms of probability; Conditional probability; Discrete and continuous random variables; Functions of random variables; Moments of random variables; Generating functions; Limit theorems; Jointly distributed random variables; Sufficiency and completeness; Descriptive and inferential Statistics; Sampling theory and sampling distributions, Method for statistical inference; Theory of point estimation and estimation of parameters; Theory of interval estimation; Theory of hypotheses testing; Analysis of variance; Brief Introduction of Multivariate Analysis; Linear and multiple linear regression

02) Operations Research: Introduction Mathematical Modeling, Linear programming - Formulation, solution procedures, Duality, Sensitivity, Applications, Network methods - Max Flow, Min cost, Shortest path, Dynamic programming - Sequential decisions, Principle of optimality Applications Integer programming - Formulation, Nonlinear Programming - Applications and solution methods

INDIRA GANDHI INSTIUTE OF DEVELOPMENT RESEARCH
STOCHASTIC CALCULUS AND FINANCE

**Contents/lan of classes (considering TWELVE (12) session course (each session 1.5 hrs, i.e., total of EIGHTEEN (18) hrs))**

| S No. | Coverage of Topics | Session # |
|---|---|---|
| 01 | Introduction of Stochastic Process; Ideas of State and Space (Discrete and Continuous); Random Walk, Markov Chain, Markov Process | 01 |
| 02 | -Do- | 02 |
| 03 | Martingales, Branching Process; Binomial and Multinomial Pricing | 03 |
| 04 | Wiener Process; Stochastic Integrals; Stochastic Differential Equations | 04 |
| 05 | Itô's Lemma; Black-Schole's Model and its Derivation | 05 |
| 06 | -Do- | 06 |
| 07 | Introduction of Portfolio Analysis and Investment concepts, Markowitz MV Model, CAPM, APT, Market Line | 07 |
| 08 | Measures of Risks, Derivatives, Forwards, Futures, Options, Swaps | 08 |
| 09 | -Do- | 09 |
| 10 | Risk Neutral Pricing, Concepts of Hedging, Different ideas of Risk | 10 |
| 11 | KMV model, Credit Metrics | 11 |
| 12 | -Do- | 12 |

**Evaluation Methodology**

| S No. | Evaluation Methods | Evaluation Criteria |
|---|---|---|
| 01 | Quizzes | 30% |
| 02 | Project/Assignments | 30% |
| 03 | End Semester examination | 40% |
| Total | | 100% |

**References/Text books**

**Part 1**


1) Ross, S. M., Introduction to Probability Models, Harcourt Indian Private Ltd., 2000, ISBN (10): 0-12-598475-8.
2) Ross, S. M. (1996), Stochastic Processes, John Wiley & Sons. ISBN: 0471120626.
3) Feller, W., An Introduction to Probability Theory and its Applications (Volume I), John Wiley & Sons, 2000, ISBN (10): 9971-51-315-3.
4) Feller, W., An Introduction to Probability Theory and its Applications (Volume II), John Wiley & Sons, 2000, ISBN (10): 9971-51-298-X.

5) Shreve. S, Stochastic Calculus for Finance: I (The Binomial Asset Pricing Model), Springer, 2005, ISBN: 978-0387249681
6) Shreve. S, Stochastic Calculus for Finance: II (Continuous-Time Models), Springer, 2004, ISBN: 978-1441923110

**Part 2**

1) Modern Portfolio Theory and Investment Analysis; Edwin J. Elton and Martin J. Gruber, John Wiley & Sons.
2) Options, Futures and Other Derivatives; John C. Hull, Pearson Education Asia.
3) Risk Management and Financial Institutions; John C. Hull, Pearson Education, 2007.

**Extra References**

**Part 1**

1) Bhattacharya, R. N. and Waymire, E. C. (1990), Stochastic Processes with Applications, Wiley Interscience. ISBN: 0471842729.
2) Cox, D. R. and Miller, H. D. (1970), The Theory of Stochastic Processes, Methuen & Co. Ltd. ISBN: 0412151707.
3) Feller, W. (1968), An Introduction to Probability Theory and its Applications, Volume 1 & II, John Wiley. ISBN: 9780471257080 & 9780471257097.
4) Karlin, K. and Taylor, H. M. (1975), A First Course in Stochastic Processes, Academic Press. ISBN: 0-12-398552-8.
5) Karlin, K. and Taylor, H. M. (1981), A Second Course in Stochastic Processes, Academic Press. ISBN: 0-12-398650-8.

**Part 2**

1) Security Analysis and Portfolio Management; Donald E. Fischer and Ronald J. Jordan, Prentice Hall of India.
2) Investments; William F. Sharpe, Gordon J. Alexander and Jeffery V. Bailey, Prentice Hall of India.

3) Investment Analysis and Portfolio Management; Prasanna Chandra, Tata McGraw Hill.
4) Investment Science; David G. Luenberger, Oxford University Press.
5) The Fundamental of Risk Measurement, Chris Marrison, Tata McGraw Hill, 2005
6) Quantitative Risk Management: Concepts, Techniques, and Tools; A. J. McNeil, R. Frey and P. Embrechts, Princeton University Press.
7) Risk Management: A Modern Perspective; Michael K. Ong (Edited), Academic Press, Elsevier.
8) Managing Credit Risk: The Next Great Financial Challenge; John B. Caouette, Edward I. Altman and Paul Narayanan, John Wiley & Sons, Inc.
9) Risk Aversion and Portfolio Choice; Donald J. Hester and James Tobin (Edited), Cowles Foundation for Research in Economics at Yale University (Monograph 19).
10) Advanced Credit Risk Analysis; Didier Cossin and Hugues Pirotte, John Wiley & Sons, Limited.
11) Risk Management in Banking; Joel Bessis, John Wiley & Sons, Limited.
12) Handbook of Management under Uncertainty; Jaime Gil-Aluja (Edited), Kluwer Academic Publishers.
13) Derivatives and Internal Models; Hans-Peter Deutsch, Palgrave Publishers.
14) Credit Risk Measurement: New Approaches at Value at Risk and other paradigms, Anthony Saunders and Linda Allen, John Wiley & Sons, Inc.
15) Algorithms for Worst-case Design and Applications to Risk Management; Berc Rustem and Melendres Howe, Princeton University Press.
16) Global Risk Management: Financial, Operational, and Insurance Strategies (International Finance Review Volume 3); J. Jay Choi and Michael R. Powers (Edited), JAI An imprint of Elsevier Science.
17) Applied Risk Analysis: Moving Beyond Uncertainty in Business; Jonathan Munn, John Wiley & Sons, Inc.
18) Measuring and Controlling Interest Rates and Credit Risk; Frank J. Fabozzi, Steven V. Mann and Moorad Choudhury, John Wiley & Sons, Inc.

19) Credit Risk: Pricing Measurement and Management; Darrell Duffie and Kenneth J. Singleton, New Age International Publishers, India.
20) Credit Risk Modeling: Theory and Applications; David Lando, New Age International Publishers, India.
21) Mathematical Techniques in Finance: Tools for Incomplete Markets; Ales Cerny, New Age International Publishers, India.

Signature: 

Date: 05-Mar-2025