DEPARTMENT OF ECONOMICS
PRESIDENCY UNIVERSITY

Ph.D. Coursework Syllabus

The PhD course for the Research Scholars would consist of four papers, each of which will be of 4 credits. Research Methodology in Economics would be compulsory and three papers would be optional

Semester I

Course	Type of Course	Type	Credits
ECON C1	Research Methodology in Economics	S	4
ECON E1A	Advanced Economic Theory	T	4
ECON E1B	Topics in Mathematical Economics	T	4
ECON E1C	Econometric Methods	T	4

Semester II

Course	Type of Course	Type	Credits
ECON E2A	Advanced Econometrics	T	4
ECON E2B	Topics in Development Economics	S	4
ECON E2C	Topics in Financial Economics	S	4

Notes:

1. In Semester 1, candidates must select Research Methodology (ECON C1) and any one paper from the Elective pool. In Semester II, they have to select two papers from the Elective pool.
2. Econometric Methods (ECON E1C) is a pre-requisite for Advanced Econometrics (ECON E2A).
3. T stands for Theory which will be evaluated by semester end examination. (Full Mark: 50); while S stands for Sessional paper which will be evaluated continuously (Full Mark: 50)

ECON C1: RESEARCH METHODOLOGY IN ECONOMICS

Module 1: Methodology of Economics

Approaches of Karl Popper, Milton Friedman and others; Concepts of falsifiability, positivism, etc.

References

1. Mark Blaug (1980) The methodology of Economics.
2. Daniel Hausman (1992) The inexact and separate science of Economics.

Module 2: Planning empirical Research in Economics

a) Steps in Empirical Research: Posing a question – Literature Review – Data collection – Econometric analysis – Writing a paper.
b) Causal Explanation in Economics
c) Ethics of research: Confidentiality and informed consent; Belmont Report and Helsinki Declaration

References

1. Wooldridge, J. M. (2016) Introductory Econometrics: A Modern Approach, South-Western College Publishers, Chapters 1, 19.
2. Stock, J.H. & M. W. Watson (2015) Introduction to Econometrics, Pearson, Edinburg: Chapter 1.
3. The Belmont Report (1978): Ethical principles and guidelines for the protection of human subjects of research.
4. Alvin Roth (2017) AEA Code of professional conduct.

Module 3: Data collection and organisation:

a) Data collection using questionnaires: Sampling, Questionnaire design, Entering data using CS Pro.
b) Qualitative methods: Ethnography, Unstructured Interviews, Participant observation, Focus groups.
c) Secondary sources of information: Introduction and working with data set
Examples: NSSO, Census, DLHS, NFHS, IHDS, India STAT, World Bank, IMF, RBI, BSE, NSE data, PROWESS, etc.

References

1. Goode, W.J. and Hatt, P.K. (1952) *Methods in Social Research*. Tata McGraw Hill.
2. Deaton, A. (1997) Analysis of Household Surveys: A Microeconometric Approach to Development Policy, The World Bank, Washington D.C.: Chapters 1 & 2.
3. William G. Cochran, Sampling Techniques, John Wiley, 2007.
4. Burgess, T. (2001) *A general introduction to the design of questionnaires for survey research*. Leeds University.
5. Denzin, N.K., Lincoln YS (eds.) (2000) *Handbook of Qualitative Research*. London: Sage Publications.

Module 4: Statistical Inference

a) Point and Interval Estimation
b) Framing the null and alternative hypothesis, p-values, Type-I and Type-II Errors, power of a test
c) Simple applications of tests for the Mean and Variance of a univariate normal population and two independent normal populations
d) Regression analysis

References

1. Wooldridge, J. M. (2016) Introductory Econometrics: A Modern Approach, South-Western College Publishers: Chapter 2.

2. Stock, J.H. & M. W. Watson (2015) Introduction to Econometrics, Pearson, Edinburg: Chapters 2-4.

Module 5: Analysis of data using software:

a) R: Basics of R, Data management, Graphics, Statistical and econometric analysis
b) STATA: Data management and analysis , Econometric analysis
c) SPSS: Data management and analysis, Multivariate analysis
d) EVIEWS: Data management and analysis, Econometric analysis

NOTE: R and any two software according to requirement

References

1. Adler, J. (2012) *R In A Nutshell*, O'Reilly Media Inc., 2ed.
2. Grolemund, G. (2014) *Hands-On Programming with R*, O'Reilly Media Inc.
3. Dalgaard, P. (2008) *Introductory Statistics with R*, Springer, 2ed.
4. Acton, C., Miller, R., Maltby, J. and Fullerton, D. (2009) *SPSS for Social Scientists*, Palgrave Macmillan.
5. Rabe-Hesketh, S. and Everitt, B.S. (2007) *A Handbook of statistical analysis using Stata*, 4/e. Chapman & Hall.
6. Vogelvang, B. (2005) *Econometrics: Theory and Practice with EVIEWS*. Financial Times Management.

Applications:

7. Subramaniam, S. & A. Deaton (1996) Demand for Food and Calories, Journal of Political Economy.
8. Anderson et al. (2002) Maternal Employment and Overweight Children. NBER Working Paper.
9. Sacerdote (2001) Peer effects with random assignment: Results for Dartmouth roommates.

Module 6: Experiments and Quasi-experiments:

a) History, Basics of Experimental Methods, Advantage and Limitation.
b) Potential Outcomes, Causal Effects, and Idealized Experiments
c) Threats to Validity of Experiments
d) Quasi-Experiments and their limitations
e) Experimental and Quasi-Experimental Estimates in Heterogeneous Populations
f) Randomized Control Trial
g) Select examples

References

1. Stock, J.H. & M. W. Watson (2015) Introduction to Econometrics, Pearson, Edinburg: Ch. 13.
2. Davis, D.D. and C.A. Holt (1993) Experimental Economics, Princeton University Press.
3. Angus Deaton (2010): "Instruments, Randomization, and Learning about Development" *Journal of Economic Literature* 48: 424–455
4. Abhijit V. Banerjee and Esther Duflo (2009): "The Experimental Approach to Development Economics", *Annual Review of Economics*, Vol. 1: 151-178.

5. Dani Rodrik (2008): "The New Development Economics: We Shall Experiment, But How Shall We Learn?"
6. Angus Deaton and Nancy Cartwright (2016): "Understanding and Misunderstanding Randomized Controlled Trials", NBER Working Paper W22595.
7. Dina Pomeranz (2017): Impact evaluation methods in public economics.

ECON E1A: ADVANCED ECONOMIC THEORY

Module 1: Game Theory

a) Game tree; strategies; subgame perfection; backward induction in finite games; commitment; bargaining; other applications
b) Repeated Games: Finitely repeated games and backward induction; infinitely repeated games; history dependent strategies; one-step deviation property; the repeated Prisoners' dilemma; idea of folk theorem.
c) Dynamic games with complete information
d) Static games with incomplete information: Strategies; Bayesian Nash equilibrium; auctions; other applications
e) Dynamic games with incomplete information: Strategies; beliefs and sequential equilibrium; applications
f) Bargaining: Bargaining as an extensive game, Axiomatic approach due to Nash, Relation between strategic and axiomatic approaches, illustrations.

References

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

Module 2: Mechanism Design

a) Introduction
b) Screening
c) Bayesian Mechanism Design
d) Dominant Strategy Mechanisms
e) Incentive Compatibility
f) Transferable Utility

References

1. Vijay Krishna, *Auction Theory*, Chapter 5, Academic Press, 2009.
2. Myerson, "Optimal Auction Design," Mathematics of Operations Research, vol. 6, no. 1, pp. 58-73, 1981
3. Tilman Borgers, *An Introduction to the Theory of Mechanism Design*, Oxford University Press

ECON E1B TOPICS IN MATHEMATICAL ECONOMICS

Module 1: Introduction to Mathematical Thought Process: Reading and Doing Proofs

a) Proofs and Logic
b) The fundamental proof techniques-The forward –backward method; Definitions and Mathematical terminology; Quantifiers; the Contradiction method, the Contrapositive Method and Induction
c) Introduction to other mathematical thinking process---Generalization, Creating Mathematical Definitions, Axiomatic Systems

Module 2: Advanced Set Theory

a) Sets and Functions
b) Metric Spaces

Module 3: Point Set Topology

a) Examples of Topological Spaces
b) Continuity and Compactness
c) Application: Existence of equilibrium

Module 4: Dynamic Optimization

a) Examples of Economic Problems involving Dynamic Optimization in Continuous and Discrete Time
b) Optimal Control Theory
c) Fixed Endpoint Problems
d) Various Endpoint Problems
e) Discounting Current Values and, Comparative Dynamics
f) Infinite Horizon Problems

References

1. Tom Apostol: Mathematical Analysis
2. H. L. Royden: Real Analysis
3. G. F. Simmons: Introduction to Topology and Modern Analysis
4. Efe A. Ok: Real Analysis with Economic Applications
5. A.C. Chiang (1999) Elements in Dynamic Optimization, Waveland Press.
6. Morton Kamien and Nancy Schwartz: Dynamic Optimization
7. K.G.Binmore: Logic, Sets and Numbers, Cambridge University Press
8. Daniel Solow: How to Read and Do Proofs: An Introduction to Mathematical Thought Processes, John Wiley & Sons, Inc.

ECON E1C: ECONOMETRIC METHODS

Module 1: Multiple Regression Analysis

a) Review of Multiple regression analysis
b) Model Evaluation and Diagnostic Tests
c) Endogeneity and Instrumental Variable method
d) Impact evaluation (Regression based, Score Matching)

References

1. Wooldridge, J. M. (2016) Introductory Econometrics: A Modern Approach, South-Western College Publishers: Chapters 3-9.
2. Cameron A. C. and P. K. Trivedi (2009) Microeconometrics using Stata.: Methods and Applications, Stata Press, College Station, Texas: Chapter 6.
3. Stock, J.H. & M. W. Watson (2015) Introduction to Econometrics, Pearson, Edinburg: Ch. 12.
4. Stock, James H. and Motohiro Yogo (2005), "Testing for Weak Instruments in Linear IV Regression." Ch. 5 in J.H. Stock and D.W.K. Andrews (eds), Identification and Inference for Econometric Models: Essays in Honor of Thomas J. Rothenberg, Cambridge University Press.

Module 2: Limited Dependent Variable Models

a) Binary Choice Models - Linear Probability Model, Probit and Logit Models, Censored and Truncated Regression Models
b) Multinomial Response Models – Ordered and Sequential Response Models, Nested logit
c) Selection and Hurdle Models

References

1. Cameron A. C. and P. K. Trivedi (2009) Microeconometrics using Stata: Methods and Applications, Stata Press, College Station, Texas: Chapter 6.
2. J.M. Woolridge (2002) Econometric Analysis of Cross-section and Panel Data, MIT Press, Cambridge, Mass.: Chapter 17.
3. Long, J. S. And J. Freese (2014) Regression Model for Categorical Dependent Variables using Stata. Stata Press, College Station, Texas, 3/e: Chapters 5-8.
4. Greene, W.H. (2017) Econometric Analysis, Prentice Hall.

Module 3: Time Series Analysis

a) Stochastic Time Series and Stationarity: Box-Jenkins Methodology of Stationary Time Series Analysis; Time Series with Trend - Deterministic and Stochastic Trend; Tests of Unit Root
b) Modelling Volatility: ARCH and GARCH Model
c) VAR Analysis: Estimation and Identification - Granger Causality - Cointegration and Error Correction Models

References

1. Enders, W.: Applied Econometrics Time Series, John Wiley and Sons
2. Stock, J.H. & M. W. Watson (2015) Introduction to Econometrics, Pearson, Edinburg: Chapters 14-16.

Module 4: Static Panel Data Analysis

a) Static panel data models

References

1. Wooldridge, J. M. (2016) Introductory Econometrics: A Modern Approach, South-Western College Publishers: Chapters 13, 14.
2. Stock, J.H. & M. W. Watson (2015) Introduction to Econometrics, Pearson, Edinburg: Chapter 10.
3. Woolridge, J.M. (2002) Econometric Analysis of Cross Section and Panel Data, The MIT Press: Chapter 10.

Module 5: Multivariate data analysis

a) Principal Component Analysis and Factor Analysis, Discriminant Function Analysis, Cluster analysis.

References

1. Meyers, Gamst and Guarino (2006) Applied Multivariate Research: Design and Interpretation, Sage Publications
2. Hair, Black, Babin, Anderson and Tatham (2006) Multivariate Data Analysis, Pearson Education

ECON E2A: ADVANCED ECONOMETRICS

Taking ECON E1C: Econometric Methods is a precondition for taking this paper

Module 1: Advanced Panel Data Analysis

a) Endogeneity in Panel data models
b) Dynamic panel data model: Endogenity, Anderson-Hsiao, Arrelano-Bond model
c) Panel co-integration*

References:

1. Hsiao, C.: Analysis of Panel Data, Cambridge University Press
2. Arrelano, M.: Panel Data Econometrics, OUP
3. Maddala, G. S. & Kim, In-Moo : Unit Roots, Cointegration, and Structural Change, Cambridge University Press
4. Stata Manual: xtivreg and xtabond

Module 2: Advanced Non-linear models

a) Panel binary dependent variable models
b) Control function: IV in non-linear models

References:

1. Arrelano, M. (2007) Binary models with endogeneous explanatory variables. http://www.cemfi.es/~arellano/binary-endogeneity.pdf.
2. Tchetgen (2015) A note on the control function approach with an instrumental variable and a binary outcome, *Epidemiological Method*, 31: 107-112.
3. Stata Manual: ivprobit

Module 3: Simultaneous Equation Systems

a) Scope of SEM
b) Identification problem
c) Estimation problem

References

1. Woolridge, J.M. (2002) Econometric Analysis of Cross Section and Panel Data, The MIT Press. Chapter 9.

Module 4: Non-parametric methods

a) Kernel density estimation
b) Kernel regression
c) Semi-parametric regression

References

1. Deaton, A. (1997) Analysis of Household Surveys: A Microeconometric Approach to Development Policy, The World Bank, Washington D.C.: Chapter 3.
2. Hansen, B. (2012) Econometrics, University of Wisconsin: Chapters 11 & 21.
3. Li, Qi and J.S. Racine (2006) Non-parametric Econometrics: Theory and Practice. Princeton University Press, Princeton, Chapters 1-2.
4. Cameron A. C. and P. K. Trivedi (2005) Microeconometrics: Methods and Applications. Cambridge University press, Cambridge. Chapter 9.

ECON E2B: TOPICS IN DEVELOPMENT ECONOMICS

The syllabus consists of different modules on advanced topics in development economics out of which, any 2-4 modules will be offered in any particular semester, depending upon the availability of the resource person(s) and the interest of the enrolled research scholars. If required, additional modules may be introduced.

Module 1: International Trade and Development
Module 2: Poverty and inequality
Module 3: Urbanisation and development
Module 4: Rural development
Module 5: Labour and migration
Module 6: Environment and development
Module 7: Health and education
Module 8: Gender, community and development
Module 9: Governance and the political economy of development

References

1. Bardhan, P.K. and C. Udry (1999) Development Microeconomics, Oxford University Press.
2. Banerjee, A. and E. Dufflo (2012) Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty, Public Affairs.
3. Ravallion, Martin (2016) The Economics of Poverty: History, Measurement & Policy, Oxford University Press.
4. Morduch, J. and B. A. de Aghion (2005) The Economics of Microfinance, The MIT Press.
5. Baland, J-M & J-P Platteau (1996) Halting Degradation of Natural Resources, Oxford University Press.
6. Constant, Amelie F. and Klaus F. Zimmermann (2013) International Handbook on the Economics of Migration, Edward Elgar.
7. Johnes, Geraint and Jill Johnes (2004) International Handbook on the Economics of Education, Edward Elgar.
8. Weingast, Barry R. and Donald Wittman (2011) The Oxford Handbook of Political Economy, Oxford University Press.
9. Oliver Morissey (2017) *Handbook of Trade and Development*, Edward Elgar.
10. Christopher Bliss, "Trade and Development", in Chenery and Srinivasan (ed) *Handbook of Development Economics*, Vol 2, Edward Elgar: 1187-1240.
11. Ronald Findlay (1973) *International Trade and Development Theory*. Columbia University Press, New York.
12. Paul Krugman (1991) "Increasing returns and economic geography", *Journal of Political Economy*, 99(3): 483-499.

ECON E2C: TOPICS IN FINANCIAL ECONOMICS

The course delivers the concepts and models underlying the modern analysis and pricing of financial assets, particularly derivatives that would help the student to develop foundation for understanding financial markets and derivatives in general. Students would learn, simultaneously, the methods to handle financial data to solve problems related to the field. About 4-5 modules will be covered.

Module 1: Overview of Financial Markets, stylized facts – non-normality, fat tails, volatility clustering, long memory and chaos.

Module 2: Modelling the behaviour of asset prices: Markov property, continuous time stochastic process, Ito's lemma, log normal properties, jump diffusion model, stochastic volatility models, Martingales and measures.

Module 3: Hedging strategies with financial markets: forward, futures and options, arbitrage and risk neutral pricing, the Greeks and hedging schemes, Exotic Options and hedging issues, Real Options.

Module 4: Trading strategies in financial markets: cross section and time series momentum trading strategies

Module 5: Interest rate derivative, credit derivatives, Insurance, weather and energy derivatives; derivative mishaps
Software to be used: Eviews, Stata

Module 6: Role of Financial Intermediaries

Module 7: Macro-economic consequences of Financial Imperfections

References:

1. Hull, J. C. (2014), Options, Futures and other derivatives, Pearson, 9th Ed.
2. Hull, J. C. and White, A. (2006), Hull-White on Derivatives: A compilation of articles, Risk Books
3. Janakiraman, S. (2011), Derivatives and Risk Management, Pearson, 1st Ed.
4. Wagne, N.(ed) (2008), Credit Risk: Models, Derivatives, and Management, Chapman and Hall /CRC Financial Mathematics Series, 1st ed.
5. Wu, L. (2009), Interest Rate Modelling: Theory and Practice, Chapman and Hall /CRC Financial Mathematics Series, 1st ed.
6. Freixas, Xavier (2008) Microeconomics of Banking, MIT Press, 2e.

Other references would be provided as and when necessary.