Mahatma Gandhi University, Kottayam

Programme Structure, Curriculum and Syllabus

Master of Arts in Econometrics
(2020 Admission Onwards)

Expert Committee for
MA Econometrics, 2020

MASTER OF ARTS
ECONOMETRICS

PROGRAM STRUCTURE, CURRICULUM AND SYLLABUS
(2020-21 Admissions Onwards)

(UNDER MAHATMA GANDHI UNIVERSITY PGCSS REGULATIONS 2019)

Expert Committee for
MA Econometrics, 2020

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MA Econometrics, 2020

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Contents

M.A. ECONOMETRICS DEGREE PROGRAM

**(Mahatma Gandhi University Regulations
PGCSS2019 from 2019-20 Academic Year)**

1. The Backdrop

It is with the approach of problem posing education, the learner attempts to critically engage with one's own objective social situation by drawing its connection with the larger social arrangement and structure prevailing in the society. The observation of Prof. Joan Robinson (1960) that the student engages in learning out of her humanitarian considerations and love for the nation reflects this aspect. In fact, such a process of learning where the learner critically and continuously interrogates the ever evolving economic relationships alone will lead the student to higher levels of understanding. Econometric analysis is vital to unearth and analyse the economic relationships towards that end.

Nobel laureate Ragnar Frisch (1933) while writing the first editorial of Econometrica rightly accentuated that "...econometrics is by no means the same as economic statistics....Nor should econometrics be taken as synonymous with the application of mathematics to economics. Experience has shown that.... statistics, economic theory, and mathematics, is a necessary, but not by itself a sufficient, condition for a real understanding of the quantitative relations in modern economic life. It is the unification of all three that is powerful. And it is this unification that constitutes econometrics". And what makes the unification so seamless is the ever growing curiosity and concern to comprehend and dissect economic relationships with a view to better explaining and interpreting the ever evolving socio-economic phenomenon as realistic as possible.

Keeping this view in mind, the curricular details of the programme are envisaged and the various courses are so designed to help the student to navigate effortlessly through the rough waters of quantitative representation unavoidable in such a post graduate programme. The mathematical and statistical methods are carefully integrated into the curriculum from the perspective of economic theory and the theoretical developments in economics are discussed in the light of competing schools of thought in economic theory.

2. The Curricular Objectives

The broader aim of any postgraduate programme in the larger disciplinary domain of Economics/Econometrics is to help the student to critically understand the economic aspects of social phenomena and with that knowledge to intervene in the socio economic process with a view to increasing the human welfare or expanding the freedom as articulated by Amartya Sen. Precisely, the learner after completing the post graduate programme in Econometrics has to analyse critically, interpret intuitively and explain like a professional economist with high level of econometric knowledge rather than an informed person of the disciplinary domain of economics. The learner may assimilate the theoretical knowledge and expertise required to evaluate and develop new econometric interpretations and report them professionally with the mastery of econometric insight with a view to analysing and interpreting the social phenomena.

References:

1) Frisch, R. (1933). Editorial. *Econometrica*, 1-4.
2) Robinson, J. (1960). Teaching Economics. *The Economic Weekly*, 173-175.

3. Programme Specific Outcomes

On successful completion of the programme, the students will be able to:

1) Analyse, interpret and explain the empirical economic phenomena like a professional economist with econometric knowledge.

2) Assimilate the theoretical knowledge and expertise required to evaluate and develop new econometric interpretations and report them professionally with the mastery of econometric insight thereby imparting disciplinary skills among the students.

3) Critically understand the economic aspects of social phenomena and with that understanding to intervene in the socio economic process with a view to increasing the human welfare or expanding the freedom as articulated by Amartya Sen.

4. Eligibility for Admissions

A Candidate who has passed B.A Economics or B.Sc., (Mathematics/Statistics) degree examination of Mahatma Gandhi University or an examination of some other University accepted by the syndicate as equivalent thereto shall be permitted to apply for the M.A. Econometrics in the affiliated colleges of the University. Students admitted under this programme are governed by the University Regulations in force.

Medium of Instruction and Assessment

English shall be the medium of instruction and examination.

Faculty Under Which the Degree is Awarded

Faculty of Social Science

Note on Compliance with the UGC Minimum Standards for the Conduct and Award of Post Graduate Degrees

The Programme Structure, Scheme and Syllabus of the M.A. Programme in Econometrics is in compliance with the UGC Minimum Standards for the Conduct and Award of Post Graduate Degrees.

5. Eligibility for the Award of Degree

A candidate shall be eligible for the award of the degree only is he/she undergone the prescribed course of study in the college affiliated to the University for a period of not less than two academic years passed the examination of all the courses with 'C' grade shall be the minimum requirement for the award of the degree.

6. The Program Structure

1) Students shall be admitted into the four semester postgraduate programme in Economics.
2) The programme has core courses and elective courses and the electives are to be opted in the fourth semester by the colleges concerned. There are two groups for the electives (Group A & B) with three courses each. The colleges may opt anyone of the elective groups fully for the fourth semester but courses cannot be chosen across groups.

3) The programme evaluation would consist of seminar presentations, assignments, term paper, internship report, written examinations, project report and viva-voce.

4) The student has to submit a term paper by the end of second semester by incorporating the analytical tools learnt in the Econometrics courses of the semesters concerned, with the analytical output generated out of the suggested software packages. The evaluation will be on the basis of the term paper submitted by the student.

5) The programme envisage the detailed discussion of analytical methods by using the databases of maintained by NSSO, MOPSI, CSO and RBI with the help of open source software packages of Gretl or R.

6) The teaching hours for courses on Econometrics will be comprised of four lecture hours and one data lab and discussion hour in every week with Gretl or R.

7) There will an internship programme having two credit with a duration of one month after the second semester examination and the internship report may be submitted to the University for evaluation.

8) The internship programme is envisaged with the objective to give first hand practical experience with databases on Indian Economy and Kerala Economy at centres such as RBI, Planning Board, KILA, GIFT, CDS, CSES, SEBI.

9) There may be one teaching hour every week for preparing the students towards the term paper and internship report which are to be to be submitted by the end of the second semester and third semester respectively.

10) The student shall submit one assignment as an internal component for every course.

11) Every student may deliver one seminar lecture as an internal component for every course.

12) Every student shall undergo two class tests as an internal component for every course.

13) Total credits for the programme are eighty (80). No course shall have more than four (4) credits.

14) There shall be a Project with a report to be undertaken by all students starting from the third semester and the report may be submitted before the end of the fourth semester.

15) The Project shall be completed by working outside the regular teaching hours. Project shall be carried out under the supervision of a teacher in the department concerned. A candidate may, however, in certain cases be permitted to work on the project in an industrial / research organization on the recommendation of the Supervisor. There shall be an internal assessment and external assessment for the project.

16) The external evaluation of the courses may be on the basis of evaluation instruments prepared on the basis of select references.

17) The external evaluation of the dissertation work is followed by the presentation of work including dissertation and viva-voce.

18) Comprehensive viva voce shall be conducted at the end of the programme. This shall cover questions from all courses in the programme.

19) The weight for the Internal Evaluation of Theory Project/Comprehensive viva-voce is 5 and the External evaluation of Project /Comprehensive viva-voce is 15 and its maximum Weighted Grade Point (WGP) is 25 and 75 respectively. The Internal External ratio is 1:3.

20) There shall be no separate minimum grade point for internal evaluation.

21) The minimum requirement of aggregate attendance during a semester for appearing the end semester examination shall be 75%.

22) The programme shall include a study tour for students, which can be done during any semester. The tour shall be to research institutions/ industrial sites, extending for a maximum of five working days, excluding journey time

7. The Semester-Wise Course Details

Corse Code	Title of the Course	Type of Course	Hours/week	Credits
FIRST SEMESTER				
EM010101	Micro Economic Theory-1	Core	5	4
EM010102	Macro Economic Theory-1	Core	5	4
EM010103	Statistical Methods for Econometric Analysis	Core	5	4
EM010104	Mathematical Methods for Econometric Analysis-1	Core	5	4
EM010105	Basic Econometrics	Core	5	4
SECOND SEMESTER				
EM010201	Micro Economic Theory-2	Core	5	4
EM010202	Macro Economic Theory-2	Core	5	4
EM010203	Indian Economy and Fiscal Federalism	Core	5	4
EM010204	Mathematical Methods for Econometric Analysis-2	Core	5	4
EM010205	Univariate Time Series Econometrics	Core	5	4
EM010206	Term Paper on Econometric Methods	Core	1	2
THIRD SEMESTER				
EM010301	International Finance and Economics	Core	5	3
EM010302	Economics of Growth and Development	Core	5	3
EM010303	Public Finance and Public Choice	Core	5	3
EM010304	Multivariate Time Series Econometrics	Core	5	4
EM010305	Econometrics of Limited Dependent Variable Models and Non Linear Regression	Core	5	4
EM010306	Internship Report on Econometric Issues	Core	1	2
FOURTH SEMESTER				
EM010401	Environmental and Ecological Economics	Core	5	3
EM010402	Kerala Economy with Database	Core	5	3
	Electives (Three Courses from either Group-A or B)			9
EM010403	Project/Dissertation	Core		2
EM010404	Comprehensive Viva -Voce	Core		2
Total Credit				**80**

Electives (Total Credits: 3 * 3 = 9)			
Group: A		**Group: B**	
EM 800401	Financial Econometrics	EM 810401	Microeconometrics
EM 800402	Panel Data Econometrics	EM 810402	Macroeconometrics
EM 800403	Experimental Design and Cliometrics	EM 810403	Econometrics of Policy Evaluation

8. Pattern of Questions

The question paper for final assessment will be of three hours' duration and will consist of three parts. The question shall be prepared in such a way that the answers can be awarded A+, A, B, C, D, E grades. There shall be no separate minimum grade point for internal evaluation of Theory, Project, and Comprehensive viva-voce.

A question paper may contain short answer type/annotation, short essay type questions/problems and long essay type questions.

Weight: Different types of questions shall be given different weights to quantify their range as follows:

Sl. No.	Type of Questions	Weight	Number of questions to be answered
1	Short Answer type questions	1	8 out of 10
2	Short essay/ problem solving type questions	2	6 out of 8
3	Long Essay/Problem Solving type questions	5	2 out of 4
All questions shall be set in such a way that the answers can be awarded A+, A, B, C, D, E grade.			

9. Direct Grading System

Direct Grading System based on a 7 – point scale is used to evaluate the performance (External and Internal Examination of students). For all courses (theory & practical) / semester/overall programme, Letter grades and GPA/SGPA/CGPA are given on the following scale

Range	Grade	Indicator
4.50 to 5.00	A+	Outstanding
4.00 to 4.49	A	Excellent
3.50 to 3.99	B+	Very good
3.00 to 3.49	B	Good (Average)
2.50 to 2.99	C+	Fair
2.00 to 2.49	C	Marginal
up to 1.99	D	Deficient (Fail)

No separate minimum is required for Internal evaluation for a pass, but a minimum C grade is required for a pass in an external evaluation. However, a minimum C grade is required for pass in a course.

10.   Evaluation: Grade Details

Both internal and external (to be done by the teacher)

Grade	Grade Points
A+	5
A	4
B	3
C	2
D	1
E	0

11.   Evaluation: External

Maximum weight for external evaluation is 30. Therefore, Maximum Weighted Grade Point (WGP) is 150. Weight: Different types of questions shall be given different weights to quantify their range as follows:

Sl. No.	Type of Questions	Weight	Number of questions to be answered
1	Short Answer type questions	1	8 out of 10
2	Short essay/ problem solving type questions	2	6 out of 8
3	Long Essay type questions	5	2 out of 4

12.   Internal Evaluation: Components and Weightage

Sl. No.	Components	Weightage
1	Assignment	1
2	Seminar	2
3	Best Two Test Papers	1 each (2)
	Total	5

13.   Objectives and Guidelines for the Term Paper

The main objective of term paper presentation is to equip the students to analyse the research problems in economics using appropriate tools of econometrics. The questions for the term paper are to be selected by the expert committee of teachers and must be assigned to each student randomly. The selected research problems for term paper evaluations should have the feasibility to use the tools of econometrics. One faculty should be assigned as a mentor for each student. The student should make the open presentation before faculty and students. After incorporating comments, then the student should submit term paper for external evaluation. There should be at least two external evaluators for each term papers and the final mark of external evaluation must be calculated though taking the average of marks given by the external evaluators.

Formal requirements: The paper must be typed on a computer and comply with the following requirements:

a) Font: Times New Roman, font size 12 and a line spacing of 1.5.

b) Word count: The minimum length of the term paper is 2000 words while the maximum is 4000 words. Footnotes should be included in the word count of the main text. Not included in this count: the front page (with name and title etc.), summary, table of contents and references (bibliography).

The paper should follow the following recommended structure:

A) Introduction

B) Review of Literature

C) Research Problem / Research Questions

D) Data and Methodology

E) Analysis

F) Summary of Findings and Conclusion

g) References

14. Term Paper Evaluation (Internal)

Sl. No.	Components	Weightage
1	Problem Definition	4
2	Use of Econometric Methodology	8
3	Analysis and Argumentation	8
4	Integration of the analytical results with the findings of the study	5
	Total	**25**

15. Term Paper Evaluation (External)

Sl. No.	Components	Weightage
1	Problem Definition	10
2	Use of Econometric Methodology	25
3	Analysis and Argumentation	25
4	Integration of the analytical results with the findings of the study	15
	Total	**75**

16. Objectives of the Internship Course and Report

The main objective of the internship course is to help students to apply the theoretical knowledge in an empirical setting or in a working environment. It attempts to accentuate upon what is widely considered as "critical reflection", the process of deriving meaning from experience through questioning what is being experienced or observed. It is worth noting the fact that experience without reflection is just experience devoid of any significance. The point is to provide students an environment with which they think about what they are learning and what they are doing eventually leading to the integration of what has been learnt inside the classroom and what has been taking place outside.

17.   Guidelines for the Internship Report

The internship programme is envisaged to give first hand practical experience with databases on Indian Economy and Kerala Economy at centres such as RBI, Planning Board, KILA, GIFT, CDS, CSES, SEBI. The duration of the course is   one month to be undertaken   between the second and third semesters. The student has to submit a report on the internship for evaluation and here may be one teaching hour every week for the preparation of the internship report which is to be submitted at the end of the third semester. The internship problem has to be analysed with the suggested econometric software packages.

There should be at least two external evaluators for internship report and the final mark of external evaluation must be calculated though taking the average of marks given by the external evaluators.

Formal requirements: The report must be typed on a computer and comply with the following requirements:

a) Font: Times New Roman, font size 12 and a line spacing of 1.5.

b) Word count: The minimum length of the internship report is 30 pages (A4 Size) excluding the references, end notes, appendices and the title pages.

The paper should follow the following recommended structure:

A) Introduction

B) Review of Literature

C) Internship Problem / Internship Questions

D) Data and Methodology

E) Analysis

F) Summary of the resolution of the internship problem and Conclusion

g) References

18.   Internship Report Evaluation (Internal)

Sl. No.	Components	Weightage
1	Definition of the internship problem	4
2	Use of Econometric Methodology	8
3	Analysis and Argumentation	8
4	Integration of the analytical results with the findings	5
	Total	**25**

19.   Internship Report Evaluation (External)

Sl. No.	Components	Weightage
1	Definition of the internship problem	10
2	Use of Econometric Methodology	25
3	Analysis and Argumentation	25
4	Integration of the analytical results with the findings	15
	Total	**75**

First Semester

Course Code	Name of the Course	Type of the Course	Hours per Week	Credit
EM 010101	Micro Economic Theory-1	Core	5	4
EM 010102	Macro Economic Theory-1	Core	5	4
EM 010103	Statistical Methods for Econometric Analysis	Core	5	4
EM 010104	Mathematical Methods for Econometric Analysis-1	Core	5	4
EM 010105	Basic Econometrics	Core	5	4

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
I	EM 010101	**Micro Economic Theory-1**	**Core**	4	90

Course Objectives

The purpose of this course is to provide students with a solid understanding of modern microeconomic theory with a rigorous treatment of the principles governing individual behaviour, market structure, and game theory. The emphasis will be on thinking like a professional economist and the course will illustrate how microeconomic concepts can be applied to analyse the real-life situations.

Learning Outcomes:

On successful completion of the course, the students will be able to:

1) Have a good conceptual understanding of the key concepts and practical applications of microeconomic principles and theories.

2) Develop a critical thinking and synthesis on the various theories related with consumers' behaviour, producers' behaviour and economic behaviour of firms.

3) Apply theoretical frameworks in interpreting microeconomic behaviour of various economic agents.

Unit- 1 Theory of Consumer Behaviour   (Hours 25)

1.1. Utility–Cardinal and Ordinal—The Decomposition of Effects–Hicksian and Slutsky (Self-Study)

The Slutsky Equation—Ordinary Versus Compensated Demand Functions-Applications to Labour Supply- Indirect Utility Function—Roy's Identity.

1.2. The Pragmatic Approach to Demand Theory—Constant Elasticity Demand Function–The New Approach to Consumer Theory—Attributes Model of Kevin Lancaster

1.3. Dynamic Versions of Demand Function; Nerlove, Houthakker and Taylor—Linear Expenditure System.

1.4. Consumer Choices Involving Risk and Uncertainty—St. Petersburg Paradox—Bernoulli Hypothesis—Neumann and Morgenstern Index—Friedman and Savage Hypothesis—Markowitz Hypothesis.

1.5. Inter-Temporal Substitution Effect—Choices Involving Time—Time Allocation Model

Unit- 2: Theory of Production and Cost Production Function   (Hours 20)

2.1. Returns to Scale - Homogenous and Non-Homogenous Production Functions–A Brief Account of Production Function of a Single Product Firm- Production Function of a Multi-Product Firm—The Production Possibility Curve of the Firm—The Isorevenue Curve of the Multiproduct Firm-Equilibrium of the Multiproduct Firm-Duality in Production.

2.2. Empirical Production Functions—Cobb-Douglas Production Function—Constant Elasticity Substitution Production Function—Variable Elasticity of Substitution (VES) Production Function—Translog Production Function—Homothetic Production Function

2.3. A Summary of Short—Run and Long-Run Cost in Traditional and Modern Microeconomic Theory (Without Illustration)

2.4. The L Shape Scale Curve—Engineering Production Function and Engineering Cost Curves (With Illustration) —Learning Curve—Returns to Scope

Unit- 3: Oligopoly and Economic Behaviour of Firm (Contact Hours 30)

3.1. Oligopoly–Price and Output Determination—Collusive and Non-Collusive Oligopoly

3.2. A Brief Account of Collusive Oligopoly (Cartels and Price Leadership)

3.3. Oligopoly with Homogeneous Product—Cournot, Bertrand & Stackelberg Model

3.4. Oligopoly with Non-Homogeneous Product—Chamberlin's Model—Sweezy's Kinked Demand Curve—The Contestable Market Theory

3.5. Theory of Games-Strategies—Prisoner's Dilemma—Nash Equilibrium—Static and Dynamic Games—Equilibrium with Complete and Incomplete Information Game Theory Applications–Mechanism Designs–Auctions—Revenue Equivalence Theorem.

Unit- 4: Theories on Distribution   (Hours 15)

4.1. Marginal Productivity Theory and Product Exhaustion Problem: Euler's Theorem—Clark-Wicksteed—Walras

4.2. Macro Theories of Distribution: Ricardo—Marx—Kalecki—Kaldor.

Select Readings:

1) Geoffrey A. Jehle and Philip J. Reny (2014): Advanced Microeconomic Theory 3rd Ed, Prentice Hall

2) Hal R. Varian (2014): Intermediate Microeconomics with Calculus,1st Ed, W. W. Norton & Company.

3) Henderson, M. and R.E. Quandt (1989): Microeconomic Theory: Mathematical Approach, 3rd Ed, McGraw Hill.

4) Andreu Mas-Colell, Michael D. Whinston and Jerry R. Green (2005): Microeconomic Theory, OUP

5) A Koutsoyiannis (1985): Modern Microeconomcis,2nd Ed, MacMillan Education (Reprint).

6) Douglas Bernheim and Michael D. Whinston (2016): Microeconomics, McGraw-Hill.

7) Maddala , G. S., & Miller, E. (2016). *Microeconomics: Theory and Applications*. McGraw Hill Education India.

Additional Readings

1) Austan Goolsbee, Steven Levitt and Chad Syverson (2013): Microeconomics, Worth Publishers

2) Christopher Snyder, Walter Nicholson and Robert Stewart (2015): Microeconomic Theory: Basic Principles and Extensions, Cengage Learning.

3) David Besanko and Ronald R.Braeutigam (2014): Microeconomics, 4th Ed, John Wiley and Sons, Inc.

4) Genaro C. da Costa (2005): Value and Distribution in Neoclassical and Classical System, 2nd Ed, Himalaya Publishers, Mumbai.

5) Gibbons, R. (1992): Game Theory for applied economists, Princeton University Press.

6) Jeffrey M. Perloff (2016): Microeconomics with Calculus, 3rd Ed, Pearson.

7) Judy A. Whitehead (2015): Microeconomic: A Global Text, Routledge.

8) Mike Rosser (2011): Microeconomics: The Firm and the Market Economy, MacMillan

9) Robert Awh (2001): Microeconomics, John Wiley.

10) Robin Bade and Michael Parkin (2017): Foundations of Microeconomics, 7th Ed, Pearson.

11) Saul Estrin, David Laidler and Michael Dietrich (2016): Microeconomics,5th Ed, Prentice Hall

12) Snyder and Nicholson (2016): Microeconomic Theory: Basic Principles and Extensions, 11th Ed, Pearson.

13) Steven E. Landsburg (2017): Price Theory and Applications,8th Ed. Cengage Learning.

14) Thomas J Nechyba (2010): Microeconomics: An Intuitive Approach with Calculus- 1stEdition, South Western Cengage Learning.

15) William A. McEachern (2017): Principles of Microeconomics, 4th Ed, Cengage Learning.

16) David M. Kreps, (1990) A Course in Microeconomic Theory, Princeton University Press.

17) Broadway, R. W and N.Bruce (1984), Welfare Economics, Basil Blackwell, Oxford

18) 25. Martin J. Osborne (2012): An Introduction to Game Theory, Oxford University Press

19) Thomas J Webster (2009): Introduction to Game Theory in Business and Economics, Segment Books

20)   H. Scott Bierman, Luis Fernandez (2011): Game Theory with Economic Applications, Addison Wesley.

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
I	EM 010102	Macro Economic Theory-1	Core	4	90

Course Objectives

The main objective of the course is to familiarise students with the theoretical developments of various schools of macroeconomic thought. This course provides the students with a thorough understanding with the competing macroeconomic approaches viz, Classical, Keynesian, Monetarism, New Classical Macroeconomics and New Keynesian School and the New Classical New Keynesian Synthesis. The course will eventually enable students to evaluate various macroeconomic policies and their implications in the light of such theoretical approaches.

Learning Outcomes

On successful completion of the course, students will be able to:

1) Have a critical understanding of the different macroeconomic approaches such as Classical, Keynesian, Monetarism, New Classical Macroeconomics, New Keynesian School and the New Classical New Keynesian Synthesis.

2) Critically evaluate the usefulness and implications of macroeconomic theories with a view to examining the functioning of the macro economy

3) Apprise the scope and limitations of modelling approach for macroeconomic policy making

Unit- 1: Classical versus Keynesian Approach (Hours 35)

1.1. Classical Macroeconomics: Mercantilism—Physiocracy—Laissez Faire- Labour Theory of Value—Classical Labour Market—Employment and Output-Say's Law— Quantity Theory of Money: Neutrality of Money and Classical Dichotomy—Real Balance Effect—Classical Theory of Interest Rate—Policy Implications of Classical Equilibrium Model.

1.2. Keynesian Fixed Price Models: Neo-Classical Synthesis—Keynesian Cross Model (Three Sector Model) And IS-LM Model—IS-LM BP Model-Keynes Effect—Liquidity Trap—Fiscal and Monetary Policies—Crowding Out Effect.

1.3. Keynesian Flexible Price Model: AD-AS Framework—Policy Implications-Multiplier—Balanced Budget Multiplier—Built-In-Stabilizers.

1.4. Neo-Keynesian Disequilibrium Models: Walrasian Vs. Keynesian Models—Effective Demand and Notional Demand—Incompatibility of Walras Law—Disequilibrium Models of Robert Clower—Leijonhufvud—Barro-Grossman and Malinvaud.

1.5 Post-Keynesian Economics (PKE): Essential Characteristics of Post Keynesian Economics—Various Strands of PKE—Principles of Effective Demand and Labour Market: Employment and Unemployment—Consumption Theory—Pricing Theory and Distribution of Income—Expectation—Investment Theory Money: Endogenous Supply of Money and Circuit Theory—Minsky's Financial Instability Hypothesis-Path Dependency and Hysteresis-Role of State—Fiscal and Monetary Policy in PKE

Unit- 2: Monetarism   (Hours 15)

2.1. Main Propositions of Monetarism—Friedman's Re-Statement of Quantity Theory of Money—Monetarist Inflation Theory—Adaptive Expectation Hypothesis

2.2. Monetarism and The Philips Curve: Inflation—Phillips Curve—Lipsey's Excess-Demand Model—Samuelson-Solow Modification of the Phillips Curve—Tobin's Views On Phillips Curve—Friedman-Phelps Expectations-Augmented Phillips Curve—Natural Rate of Unemployment Hypothesis—Accelerationist Hypothesis and NAIRU-Policy Implications—Business Cycles and Monetary Policy.

Unit- 3: New Classical Macroeconomics   (Hours 15)

3.1. Main Propositions of NCM: The Lucas Critique—Rational Expectations Hypothesis- Continuous Market Clearing—The Lucas Supply Curve—The Policy Ineffectiveness Proposition

3.2. The New Classical Economics and the Business Cycle

3.3. Monetary Policy in the NCM and the Philips Curve—Credibility and Dynamic Time-Inconsistency.

3.4 Macroeconomic Policy Issues: Rule Versus Discretion—Cold Turkey versus Gradualism—Taylor Rule-Inflation Targeting

4.1. New Keynesian School**:** Imperfect Competition and Price Setting—Sticky Nominal Wages—Staggered Wage-Contract Theory.

4.2. Sticky Price Model: Menu Costs and Demand Externality.

4.3. Sticky Real Wages: Asymmetric Information Model—Implicit Contract Theory— Insider Outsider Model and Hysteresis.

4.4. Efficiency Wage Theories of Involuntary Unemployment: Shapiro—Stiglitz Model -Turnover Cost-Selective Theory—On the Job Efficiency—Shirking Theory and Coordination Failure—Policy Implications of NKE.

4.5 New Classical New Keynesian Synthesis.

Select References:

1) Allen, R.G.D. (1968). *Macroeconomic Theory: A Mathematical Approach*, McGraw Hill, Tokyo

2) Levacic, Rosalind and Rebmann, Alexander (1982): *Macroeconomics: An Introduction to Keynesian- Neo-Classical Controversies*, 2nd Ed, MacMillan

3) Gardner Ackley (1978): *Macroeconomic Theory*, Collier Macmillan Ltd; International Edition.

4) Romer, David (1996): *Advanced Macroeconomics* 4th Ed, McGraw-Hill.

5) Richard T Froyen, (2006) : *Macroeconomics Theories and Policies* Pearson.

6) Anitha Ghatak, (1994): *Macroeconomics: A Mathematical Approach*, Concept Publishing Co, ND.

7) Snowdon, Brian and Vane, Howard, R (2005): *Modern Macroeconomics: Its Origins, Development and Current State*, Edward Elgar.

8) Pentacost, Eric (2000): *Macroeconomics: An Open Economy Approach*, Macmillan.

9) Snowdon, Brian and Vane, Howard R (1997): *A Macroeconomics Reader*, Routledge.

10) Brendan Sheehan (2009): *Understanding Keynes' General Theory*, Palgrave Macmillan

11) Lavoie, Marc (2014): *Post-Keynesian Economics: New Foundations*, Edward Elgar.

12) Chirichiello, Giuseppe (1994): *Macroeconomic Models and Controversies*, The Macmillan Press Ltd.

13) Tsoulfidis, Lefteris (2010): *Competing Schools of Economic Thought*, Springer.

14) Jagdish Handa (2009): *Monetary Economics*, 2nd Ed, Routledge.

15) Paul Davidson (1994): *Post Keynesian Macroeconomic Theory*, Edward Elgar, 1994.

Additional Readings

1) Lavoie, Marc (2006): *Introduction to Post-Keynesian Economics*, Palgrave.

2) Goodfriend, M., & King, R. (1997). The New Neoclassical Synthesis and the Role of Monetary Policy. In NBER, *NBER Macroeconomics Annual* (pp. 231 – 296). MIT Press.

3) McCallum, B. T. (1999). Recent Developments in Monetary Policy Analysis: The Roles of Theory and Evidence. *Working Paper 7088, National Bureau of Economic Research.*

4) Zouache, A. (2004). Towards a 'New Neoclassical Synthesis'? An Analysis of the Methodological Convergence Between New Keynesian Economics and Real Business Cycle Theory. *History of Economic Ideas*, 95-117

5) Heijdra, Ben J. (2017): *Foundations of Modern Macroeconomics*,3rd Ed, OUP
6) Aschheim, Joseph and Hsieh, Ching-Yao (1970): Macroeconomics: Income and Monetary Theory, Charles E. Merrill Publishing Co.

7) Carlin, Windy and Soskice, David (1990): *Macroeconomics and the Wage Bargain: A Modern Approach to Employment, Inflation, and the Exchange Rate*, OUP.

8) De Vroey, Michel (2016): *A History of Macroeconomics from Keynes to Lucas and Beyond*, CUP.

9) Dilip M.Nachane (2018): *Critique of the New Consensus Macroeconomics and Implications for India*, Springer.

10) Hagger, A.1(1977): *Inflation: Theory and Policy*, MacMillan.

11) Helmut Frisch (1983): *Theories of Inflation*, Cambridge University Press.

12) Hillier, Brian (2006): *Macroeconomics: Models, Debates and Development*, Basil Blackwell.

13) Jansen, Dennis W and Delorme, Charles Jr and Ekelund, Robert B, Jr (1994): *Intermediate Macroeconomics*, West Publishing Co.

14) Makinen, Gail E. (1977): *Money, The Price Level, and Interest Rates: An Introduction to Monetary Theory*, Prentice Hall Inc.

15) Peterson, Wallace C and Estenson, Paul S (1992): *Income, Employment and Economic Growth*, 7th Ed, W.W Norton, NY.

16) Pierre Picard (1993): *Wages and Unemployment: A Study in Non-Walrasian Macroeconomics*, Cambridge University Press.

17) Scarth, William (2014): *Macroeconomics: The Development of Modern Methods for Policy Analysis*, Edward Elgar.

18) Felderer, Bernhard and Homburg, Stefan (1987): *Macroeconomics and New Macroeconomics*, Springer-Verlag.

19) Westaway, A J and Jones, T G Weyman (1977): *Macroeconomics Theory, Evidence and Policy*, Orient Longman.

20) Williamson, Stephen D. (2018): *Macroeconomics*, 6th Ed, Pearson.

21) 32. Keith Bain and Peter Howells (2003): *Monetary Economics: Policy and its Theoretical Basis*, Palgrave.

22) Harcourt, G. C. (2006): *The Structure of Post-Keynesian Economics the Core Contributions of the Pioneers*, CUP

23) Homburg, Stefan (2017): *A Study in Monetary Macroeconomics*, OUP

24) Peel, David and Minford, Patrick (2016): *Advanced Macroeconomics: A Primer*, Edward Elgar.

25) Peter Galbacs (2015): *The Theory of New Classical: Macroeconomics: A Positive Critique*, Springer.

26) Phelps, E. (1990): *Seven Schools of Macroeconomic Thought*, Oxford University Press, Oxford

27) Philip Arestis (1992): *Post-Keynesian Approach to Economics*, Edward Elgar

28) Richard P.F. Holt and Steven Pressman (2001) (Ed): *A New Guide to Post Keynesian Economics*, Routledge.

29) Rousseas, Stephen (1999): *Post Keynesian Monetary Economics*. MacMillan.

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
I	EM 010103	**Statistical Methods for Econometric Analysis**	Core	4	90

Course Objectives

The main objective of the course is to expose students to the various statistical techniques with a view to enabling them to comfortably engage in econometric analysis in a fairly advanced manner. The course aims to help the student to explore through the various relevant topics in statistics such as probability, statistical inference and sampling techniques in a rigorous yet intuitive style.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Examine the behaviour of random variables by analysing the underlying probability distribution in a theoretical manner

2) Evaluate the sampling methods with a view to apply it for analysing the empirical phenomenon and to apply the principles of statistical inference

3) Implement statistical techniques using software packages such as Gretl and R and intuitively interpret the results in plain language.

Unit 1: Random Variables and Mathematical Expectation   (Hours 20)

1.1 Sets and Sample Space; Permutation and Combination: Random Events; Approaches to Defining Probability: Classical, Axiomatic and Bayesian Approach; Basic Theorems of Probability Theory: Addition, Mutually Exclusive; Conditional and Independence; Bayes Theorem

1.2 Discrete Random Variables with Probability Function; Continuous Random Variables with Probability Density Functions (f); Cumulative Distributions (Distribution Function-F)

1.3 Mathematical Expectations; Moments (About The Origin, About The Mean); Mean and Variance of Linear Combinations of Random Variables; Moment Generating Function and Characteristic Function—Joint Distribution, Marginal Distributions;

Conditional Distribution; Covariance and Independence; Conditional Expectation and Variance

Unit 2: Probability Distribution: (Hours 25)

2.1 Properties of Commonly Used Discrete and Continuous Distributions: Uniform, Bernoulli, Binomial, Poisson, Normal and Exponential Distributions—Log Normal—Pareto—Cauchy—Folded Normal Distribution—Half Normal Distribution—Gamma Probability Distribution (Including Three-Parameter Gamma)—Beta Distribution—Weibull—Rayleigh—Geometric and Negative Binomial Distributions

2.2 Sampling Distribution: Sampling Distribution of Sample Proportion of Success—Binomial Distribution; Normal as a Limiting Case of Binomial Distribution; Sampling Distribution of Sample Mean; Chebyshev's Theorem—Law of Large Numbers Central Limit Theorem; Distribution of Selected Test Statistics- Z, Chi Square, T, F-Distribution

Unit 3: Estimation and Hypothesis Testing (Hours 30)

3.1 Estimation: (1) Point Estimation—Properties of Estimators—(I) Small Sample Properties: –Unbiasedness, Efficiency—(Ii) Asymptotic Properties: Asymptotic Unbiasedness, Efficiency, Consistency and Sufficiency—Robustness (2) Confidence Interval Estimation

3.2 Methods of Estimation: Method of Moments; Least Square Estimation; Maximum Likelihood Estimation—Crammer-Rao Lower Bound

3.3 Bayesian Estimation—Bayesian Point Estimation—Criteria for Finding the Bayesian Estimate—Bayesian Confidence Interval or Credible Interval—Bayesian Hypothesis Testing—Bayesian Decision Theory—Empirical Bayes Estimates—Jack-Knife Resampling

3.4 Testing of Hypothesis: Neyman–Pearson Lemma—Design and Evaluation of Tests; Test Criteria; Types of Errors; Significance Level (Size of A Test), Power of A Test; P-Value

3.5 Parametric Tests Testing for Single Proportion; Testing for Equals of Two Proportions; Testing for Equals of More Than Two Proportions; Testing for Single Mean—Testing for Equality of Two Means; Testing for Equality of More Than Two

Means(ANOVA); Testing of Single Variance; Testing of Equality of Two Variances; Testing for Independence of Two Variables—Non Parametric Test

Unit 4: Sampling Techniques: (Hours 15)

4.1 Principal Steps in Sample Survey; Determination of Sample Size; Probability Sampling: Simple Random Sampling, Stratified Random Sampling, Systematic Sampling, Cluster Sampling; Non Probability Sampling: Quota Sampling, Purposive Sampling, Convenience Sampling, Snow Ball Sampling; Multi Stage Sampling.

4.2 Properties of Random Samples

Select Readings

1) Kandethody M. Ramachandran and Chris P. Tsokos, (2019), Mathematical Statistics with Applications in R, Academic Press London
2) Charles B. Moss, (2015), Mathematical Statistics for Applied Econometrics, CRC Press Taylor & Francis
3) Hugo A. Keuzenkamp, (2004), Probability, Econometrics and Truth: The Methodology of Econometrics, Cambridge University Press
4) Ramu Ramanathan, (1993), Statistical Methods in Econometrics, Academic Press Inc.
5) William G. Cochran, (1977), Sampling Techniques, John Wiley & Sons

6) Sharon L Lohr, (2019), Sampling Design and Analysis, CRC Press Taylor & Francis
7) A L Nagar and R K Das (1983), Basic Statistics, Oxford University Press
8) Mood, A M., F A Greybill and D C Boes (2001), Introduction to Theory of Statistics, McGraw Hill

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
I	EM 010104	Mathematical Methods for Econometric Analysis-1	Core	4	90

Course Objectives

The course on the mathematical methods is envisaged to furnish the student with all the necessary techniques and tools in mathematics in such a way that the student has to eventually learn it as a language essential to represent the complex economic phenomena in a precise and unambiguous manner. The course attempts to present the mathematical topics in the contextual manner to have a rigorous yet an insightful expertise in the subject matter.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Evaluate the underlying mathematical principles, terminology, methods, techniques and conventions used in econometric analysis

2) Provide a firm comprehension upon the essential mathematical tools required for econometric analysis

3) Apply the appropriate techniques to solve problems with differential calculus, matrices and linear algebra and apply them in static and comparative frame work to solve important economic problems

Unit 1 Matrices and Linear Systems   (Hours 15)

Static Analysis

1.1 Matrices: Addition, Subtraction, Scalar Multiplication, Matrix Multiplication, Laws of Matrix Algebra, Transpose, Systems of Equations in Matrix Form, Special Kinds of Matrices, Elementary Row Operations, Row Echelon Form, Rank, Solution of Linear System of Equations Using Gauss (Or Gauss Jordan) Elimination Method, Systems with Unique Solution, Many Solution or No Solution. Linear Systems, Examples of Linear Models-National Income Models, IS-LM Analysis.

Unit 2 Determinants and Inverse   (Hours 20)

2.1 Determinants – (Definition, Butterfly Method, Properties, Evaluation of 3rd Order Determinant by Sarrus Shortcut Method or The Basket Weave Method-Evaluating The Nth Order Determinant by Laplace Expansion Method Singular & Non-singular

Matrices, Trace of A Matrix, Minor, Co-Factor, Adjoint of Matrices) Inverse of Matrix, Solution of System of Equations Using Cramer's Rule and Inverse Method. Economic Applications of Matrices and Determinants, IS-LM Analysis Via Cramer's Rule, Supply and Demand.

Unit 3 Euclidean space   (Hours 10)

3.1 Vectors - Points and Vectors in Euclidian Space, Algebra of Vectors, Addition Subtraction, Scalar Multiplication of Vectors – Length and Inner Product in Rn, Vector Space Rn, Linear Independence, Spanning Set, Basis and Dimension of Rn,

3.2 Row Space, Column Space, Null Space, Fundamental Theorem of Algebra, Economic Applications of Euclidean Space, Eigen Values and Eigen Vectors Examples, Properties, Symmetric Matrices, Quadratic Forms, Definiteness of Quadratic Forms.

Unit 4 Foundations of Univariate Calculus   (Hours 20)

Comparative Statics

4.1 Set Theory—Cartesian Product—Ordered Pair—Relations—Functions -Functions On R^1, Linear Functions, Sequences of Real Numbers, Limit, Differentiability; Gradient or Slope, Derivatives - First Order and Higher Order -Inverse Functions and Their Derivatives, Maxima and Minima, Mean Value Theorem, Rolle's Theorem and Their Applications, Taylor Approximations, Exponential and Logarithmic Functions—Applications of One Variable Calculus to Economics.

Unit 5 Multivariate Calculus   (Hours 25)

5.1 Function of Several Variables-Definition, Geometric Representation of Functions, Economic Interpretation, Continuous Functions, Partial Differentiation, Applications, Jacobian Determinants, Composite Function or Chain Rule, Total Derivative, Higher Order Derivatives, Implicit Functions and Their Derivatives, Applications to Economics, Vector and Matrix Differentiation –Application in Econometrics

Select Readings

1) Marvin H J Gruber, (2014), Matrix Algebra for Linear Models, John Wiley and sons
2) Carl P. Simon & Lawrence Blume, (1994), Mathematics for Economists, W. W. Norton & Company

Additional Readings

1) Michael Hoy, John Livernois, Chris McKenna, Ray Rees and Thanasis Stengos, (2012), Mathematics for Economics, Prentice Hall India Learning
2) Mike Rosser (2003), Basic Mathematics for Economists, Routledge, London
3) Alpha C Chiang & Kevin Wainwright, (2017), Fundamental Methods of Mathematical Economics McGraw Hill Education
4) Jan R. Magnus and Heinz Neudecker, (2019), Matrix Differential Calculus with Applications in Statistics and Econometrics, John Wiley and Sons
5) Gilbert Strang, (2016), Introduction to Linear Algebra, Wellesley-Cambridge Press
6) Tom M. Apostol, (2007), Calculus: One-Variable Calculus with an Introduction to Linear Algebra, Vol 1, John Wiley & Sons
7) Tom M. Apostol, (2007), Calculus: Multi-Variable Calculus and Linear Algebra with Applications to Differential Equations and Probability, Vol 2, John Wiley & Sons
8) James Stewart, (2003), Multivariable Calculus, Cengage Learning
9) James Stewart, (2011), Single Variable Calculus: Early Transcendentals, Cengage Learning

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
I	EM 010105	Basic Econometrics	Core	4	90

Course Objectives

The objective of this course is to thoroughly introduce the student to the econometric methodology which is widely used in empirical work in Economics. It intends to expose the student to the art of performing estimation, analysis and interpretation of the econometric model designed to capture the economic relationships in real life situations with the help of software packages capable of conducting econometric explorations.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Represent the theoretical relationships in economics in econometric terms
2) Estimating simple and multiple linear regressions with qualitative and quantitative data
3) Explore with the open source econometric software packages such as Gretl, R to estimate cross section econometric models using real world data
4) Explain and intuitively interpret the econometric results in theoretical and plain language.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit—1 Simple Regression Model (Hours- 25)

1.1 Definition & Scope of Econometrics, Methodology-Modern Interpretation-Classical—Linear Regression Model-PRF-Linearity-Stochastic Disturbance Term-Significance—SRF-Method of OLS-Derivation of OLS Estimators-Deviation Form, Properties—Assumptions-Guass-Markov Theorem-Goodness of the Fit—R-square—Estimation and Testing of Hypothesis-Standard Error.

Unit—2 Multiple Regression Model (Hours- 30)

2.1 Multiple Regression-Matrix Approach—General k variable Model—Variance Covariance Matrix—OLS Estimators and Guass-Markov Theorem (Matrix Notation)—

Partial Regression Coefficients—Multiple Coefficient of Determination-R Square and Adjusted R Square—Estimation and Testing of Hypothesis-Test of Coefficients and Overall Significance-t-test and F test-p value—Testing the Equality of Two Regression Coefficients—Restricted Least Squares-Testing Linear Equality Restrictions

2.2 Regression Through Origin -Scaling and Units of Measurement-Different Functional Forms of Regression Models and Their Applications (Log-Linear, Semi log, Double Log, Reciprocal and Log Reciprocal Models)—Choice of Functional Forms

2.3 Qualitative Explanatory Variables—Dummy Variable Regression–ANOVA and ANCOVA Models—Dummy Variable Trap—Interpretation of Regression Results

Unit —3 Violation of Assumptions of Classical Model   (Hours- 10)

2.1 Nature, Consequences, Tests, and Remedial Measures to the Problems of Heteroscedasticity, Auto-correlation and Multicollinearity

2.2 Model Specification and Errors: Consequences—Underfitting and Overfitting—Measurement Errors

Unit —4 Simultaneous Equation Models   (Hours- 15)

4.1 Simultaneous Equation Models—Simultaneous Equation Bias—Inconsistency of OLS Estimators—Identification Problem—Test of Simultaneity and Exogeneity

4.2 Problem of Estimation—Single Equation Methods —OLS—ILS– 2SLS and Systems Methods—2SLS and SURE Model—Lurking Variables

Unit —5 Dynamic Econometric Models   (Hours- 10)

5.1 Estimation of Distributed Lag Models—Koyck Model and its Rationalisation—Partial Adjustment and Adaptive Expectations Model—Almon Approach

5.2 Estimation of Auto Regressive Models—Instrumental Variables—Method of Instrumental Variables—Problems—SARG Test and Durbin h Statistic—Causality—Granger Causality Test and Sims Test

Select Readings

1) Greene, W. H. (2017). *Econometric Analysis* . Pearson.

2) Gujarati , D., Porter, , D. C., & Pal, M. (2020). *Basic Econometrics*. McGraw Hill.

3) Heiss, F. (2020). *Using R for Introductory Econometrics, .* CreateSpace Independent Publishing Platform.

4) Johnston, J. (1985). *Econometric Methods*. John Wiley New York.

5) Kennedy, P. (2008). *A Guide to Econometrics, .* Wiley-Blackwell.

6) Pesaran, M. H. (2015). *Time Series and Panel Data Econometrics*. Oxford University Press .

7) Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data* . The MIT Press.

8) Wooldridge, J. M. (2015). *Introductory Econometrics: A Modern Approach, .* Thomson, South Western.

9) Crawley, M. J. (2007). The R Book Book. John Wiley & Sons.

Additional Readings

1) Bailey, M. (2016). *Real Econometrics: The Right Tools to Answer Important Questions*. Oxford University Press.

2) Baltagi, B. H. (2011). *Econometrics*. Springer.

3) Bhaumik, S. K. (2015). *Principles of Econometrics: A Modern Approach Using EViews*. Oxford University Press.

4) Davidson, R., & MacKinnon, J. G. (2003). *Econometric Theory and Methods* . Oxford University Press.

5) Dougherty, C. (2007). *Introduction to Econometrics*. Oxford University Press.

6) Greene, W. H. (2017). *Econometric Analysis* . Pearson.

7) Gujarati , D., Porter, , D. C., & Pal, M. (2020). *Basic Econometrics*. McGraw Hill.

8) Heiss, F. (2020). *Using R for Introductory Econometrics, .* CreateSpace Independent Publishing Platform.

9) Johnston, J. (1985). *Econometric Methods*. John Wiley New York.

10) Kennedy, P. (2008). *A Guide to Econometrics,* . Wiley-Blackwell.

11) Kmenta, J. (1976). *Elements of Econometrics*. Macmillan, New York.

12) Maddala, G. S. (2002). *Introduction to Econometrics*. John Wiley &Sons.

13) Mukherjee, C., White, H., & Wuyts, M. (1998). *Econometrics and Data Analysis for Developing Countries*. Routledge New York.

14) Pesaran , M. H., & Smith, R. (1995). The Role of Theory in Econometrics M. Hashem Pesaran Ron Smith. *Journal of Econometrics*(67), 61-79.

15) Pindyck , R. S., & Rubinfeld, D. L. (1998). *Econometric Models and Economic Forecasts*. McGraw-Hill Publishing Co.

16) Ramanathan, R. (2002). *Introductory Econometrics with Applications*. Thomson Learning.

17) Stock , J. H., & Watson, M. W. (2020). *Introduction to Econometrics*. Pearson Education.

18) Studenmund, A. H. (2016). *Using Econometrics: A Practical Guide*. Pearson.

19) Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data* . The MIT Press.

20) Wooldridge, J. M. (2015). *Introductory Econometrics: A Modern Approach,* . Thomson, South Western.

Second Semester

Course Code	Name of the Course	Type of the Course	Hours per Week	Credit
EM 010201	Micro Economic Theory-2	Core	5	4
EM 010202	Macro Economic Theory-2	Core	5	4
EM 010203	Indian Economy and Fiscal Federalism	Core	5	4
EM 010204	Mathematical Methods for Econometric Analysis-2	Core	5	4
EM 010205	Univariate Time Series Econometrics	Core	5	4
EM 010206	Term Paper on Econometric Methods-2	Core	1	2

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
2	EM 010201	Micro Economic Theory-2	Core	4	90

Course Objectives

This course is designed to provide students with a sound understanding of advanced microeconomic theory. It will cover the aspects of microeconomic theory that is required to analyse contemporary economics issues and to create new models to explain the behaviour of individuals, firms, and markets, and to evaluate economic policies. This course is intended to acquaint the student with decision making in the context of market interdependence, complexity, uncertainty and informational asymmetry that too in a general equilibrium framework with emphasis on its implications upon the welfare aspects of economic activities.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Critically appraise the important theories that analytically explain the behaviour of firms

2) Analytically evaluate the microeconomic aspects of public choice, behavioural economics, general equilibrium and welfare economics.

Unit- 1: Theories of The Firm   (Hours- 30)

1.1. A Critique of the Neo Classical Theory of the Firm—The Marginalist Controversy; Hall and Hitch Report and Full Cost Pricing—Gordon's Attack On Marginalism

1.2. Team Production Approach by Armenalchian and Harold Demsetz

1.3. Hierarchical Structures- U Form and M Form

1.4. Theory of Limit Pricing: Bain—Sylos-Labini—Modigliani, Bhagwati and Pashigian

1.5. Managerial Theories: W J Baumol—O Williamson—Marris

1.6. Behavioural Theories: March and Cyert—Baumol

Unit-2. Public Goods and Public Choice   (Hours- 15)

2.1. Causes of Market Failure- Externality—Public Goods and Imperfections—Pricing of Public Utility and Regulation.

2.2   Voting - Introduction—Stability—Impossibility—Majority Rule—May's Theorem—Condorcet Winner—Median Voter Theorems—Multidimensional Voting—

Agenda Manipulation—Alternatives to Majority Rule—The Paradox of Voting—The "Alabama" Paradox.

Unit-3. Market Failure and Behavioural Economics (Hours- 25)

3.1. Asymmetric Information, Moral Hazard and Adverse Selection—Problem of First Best, Second or Third Best—Principal Agent Model—Moral Hazard in Owner Manager Relationship—Moral Hazard in Insurance Market—Efficiency Wage Model—Adverse Selection—Market for Lemons—Insurance Market—Rural Credit Market—Market Signalling.

3.2. Behavioural Economics—Beliefs-Heuristic and Biases—Decision Making Under Risk and Uncertainty—Expected Utility Theory—Prospect Theory—Framing—Anchoring Effect—Bracketing—Uncertainty—Law of Small Numbers—Asset Integration and Loss Aversion—Role of Time and Emotions in Economic Decisions—Role of Constraints and Information—Satisficing—Ameliorating—Path Dependence—Bounded Rationality—Altruism and Common Good—Strategic Interaction and Social Norms.

Unit- 4: General Equilibrium and Welfare Economics (Hours- 20)

4.1 Partial and General Equilibrium—Walrasian General Equilibrium System—Existence, Uniqueness and Stability of an Equilibrium—2x2x2 and H x M x N General Equilibrium Model

4.2 General Equilibrium and the Allocation of Resources—Prices of Commodities and Factors—Factor Ownership and Income Distribution

4.3. Exposition of Welfare Theories—Social Welfare Function and Pareto Criterion—Social Welfare Function—Theory of Bliss—Benthamite and Rawlsian Welfare Function—Compensation Principle: Hicks Kaldor Compensation Criteria—Scitovsky Reversal and Double Criteria—William Gorman's Intransitivity Problem—Samuelson's Criteria

4.4 First and Second Fundamental Theorem of Welfare Economics—Arrow's Impossibility Theorem—Rawl's Theory of Justice—Equity-Efficiency Trade-off.

4.5. Easterlin Paradox—Human Happiness Index

Select Readings

1) Geoffrey A. Jehle and Philip J. Reny (2014): Advanced Microeconomic Theory 3rd Ed, Prentice Hall.

2) Henderson, M. and R.E. Quandt (1989): Microeconomic Theory: Mathematical Approach, 3rd Ed, McGraw Hill.

3) Hal R. Varian (2014): Intermediate Microeconomics with Calculus, W. W. Norton & Company.

4) Genaro C. da Costa (2005): Value and Distribution in Neoclassical and Classical System, 2nd Ed, Himalaya Publishers, Mumbai.

5) Andreu Mas-Colell, Michael D. Whinston and Jerry R. Green (2005): Microeconomic Theory, OUP.

Additional Readings

1) A Koutsoyiannis (1985): *Modern Microeconomics*, MacMillan Education (Reprint).

2) Mike Rosser (2011): *Microeconomics: The Firm and the Market Economy*, MacMillan

3) Hal R. Varian (2017*): Intermediate Microeconomics: A Modern Approach*, 10th Ed, WW Norton & Co, NY.

4) Yew-Kwang N (2004): *Welfare Economics: Towards a More Complete Analysis*, Palgrave-Macmillan

5) B. Douglas Bernheim and Michael D. Whinston (2016): *Microeconomics*, McGraw Hill.

6) Jeffrey M. Perloff (2016): *Microeconomics with Calculus*, 3rd Ed, Pearson.

7) Snyder and Nicholson (2016): *Microeconomic Theory: Basic Principles and Extensions*, 11th Ed, Pearson. (Chapter 18 Information Economics)

8) Steven E. Landsburg (2017): *Price Theory and Applications*, 8thEd. Cengage Learning.

9*)* Thomas J Nechyba (2010): *Microeconomics: An Intuitive Approach with Calculus*.

10) David Besanko and Ronald R. Braeutigam (2014): *Microeconomics*, 4th Ed, John Wiley and Sons, Inc. Edition, South Western Cengage Learning.

11) Austan Goolsbee, Steven Levitt and Chad Syverson (2013): *Microeconomics*, Worth Publishers

12) William A. McEachern (2017): *Principles of Microeconomics*, 4th Ed, Cengage Learning.

13) Robin Bade and Michael Parkin (2017): *Foundations of Microeconomics*, 7th Ed, Pearson.

14) Robert Awh (2001): *Microeconomics*, John Wiley.

15) Judy A. Whitehead (2015): *Microeconomic: A Global Text*, Routledge.

16) Saul Estrin, David Laidler and Michael Dietrich (2016): *Microeconomics*, 5thEd, Prentice Hall

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
2	EM 010202	Macro Economic Theory-2	Core	4	90

Course Objectives

The main objective of the course is to expose the students to various behavioural foundations of macroeconomic phenomena and to the latest theoretical developments for rigorous empirical analysis. The course enables the student to critically understand the various aspects of policy making with respect to the fiscal and monetary issues especially in a period of economic turbulence.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Examine alternative approaches to modelling consumption behaviour and investment decisions

2) Critically dissect the approaches to the demand for money, the supply of money and the role of financial institutions in the economy.

3) Appraise the various aspects of policy making especially with respect to the fiscal and monetary issues.

Unit- 1: Behavioural Foundations of Macroeconomics   Hours- 25)

1.1. Consumption Function: Current Income Theories : Absolute Income Hypothesis of Keynes—Consumption Function Puzzle: Kuznet's Findings—Drift Hypothesis of Smithies—Relative Income Hypothesis of Duesenberry.

1.2. Fischer's Intertemporal Choice Model.

1.3. Normal Income Theories: Permanent income Hypothesis of Friedman and Life Cycle Hypothesis of Modigliani—Robert Hall's Random Walk Hypothesis—David Laibson Behavioural Hypothesis

1.4. Investment Function: Keynes's Investment Theory—MEC Approach—Accelerator Theory of Investment (Simple and Flexible) —Capital Stock Adjustment Principle—Financial Theory of Investment—Tobin's Q Ratio- Modigliani-Miller Theory—Metzler Inventory Cycle Model—Jorgenson's Neoclassical Investment Model.

Unit- 2: Demand for Money and Supply of Money   (Hours- 25)

2.1. Theoretical Approaches to the Demand for Money: The Classical, Keynes, and Friedman.

2.2 Transactions Theories of Money Demand: The Baumol Model—The Shopping-Time Model—Cash-in-Advance Models.

2.3. Tobin's Portfolio Theories of Money Demand—Buffer Stock Demand for Money: Akerlof and Milbourne (A-M) Model—Miller and Orr(M-O) Model.

2.4 Modern Monetary theory (MMT)

2.5. Supply of Money: Financial Intermediation—Mechanistic Model of Bank Deposit Determination—Behavioural Model of Money Determination—Demand Determined View of Money Supply Process.

2.6. H- theory of money supply- Money Multiplier and Its Determination—Monetary Policy and Central banking—Monetary Transmission Mechanism—Inside and Outside Money—Money Supply Determination in an Open Economy.

Unit- 3: Macroeconomic Business Cycles   (Hours- 25)

3.1 Samuelson's Interaction between Multiplier and Accelerator—Hicks—Kaldor—Goodwin—Kalecki's Theory of Cycles and Dynamics of a Capitalist Society and Political business cycles

3.2. Real Business Cycles Model: Labour Market in RBC Model—Intertemporal Substitution.

3.3. AS-AD in RBC Model-Supply Shocks in RBC Model—Technology Shocks—Neutrality of Money and Flexibility of Wages and Prices—Stabilization Policy

3.4. The Great Recession of 2008: The Roots of the Current Crisis—Financial Innovation and Agency Problems in the Mortgage Markets—Asymmetric Information and Credit Rating Agencies—Residential Housing Prices (The Subprime Debacle)

3.5. Financial Deregulation and Securitization

Unit-4 Supply-Side Economics   (Hours- 5)

4.1. Supply Side Economics: Main Features—Supply-side Policies—Tax (Laffer Curve), Incentive and Production—SSE and Role of the Government

Unit 5. Government Solvency & Constraints on Fiscal Policy (Hours- 10)

5.1 Macroeconomic Effects of Fiscal Deficit—Government Budget Constraint—Government Solvency Condition—Debt Dynamics—Barro's Ricardian Equivalence—Debt Stabilisation and Debt Rescheduling—Seignorage—Problems of Fiscal Austerity and Sound Finance.

Select Readings

1) Gardner Ackley (1978): *Macroeconomic Theory*, Collier Macmillan.

2) Richard T Froyen (2013) : *Macroeconomics Theories and Policies*, Pearson.

3) David Romer, (2012): *Advanced Macroeconomics* McGraw-Hill.

4) Ghatak, Anitha (1994): *Macroeconomics: A Mathematical Approach*, Concept Publishing Co, ND.

5) Snowdon, Brian and Vane, Howard R (1997): *A Macroeconomics Reader*, Routledge.

6) Heijdra, Ben J. (2017): *Foundations of Modern Macroeconomics*,3rd Ed, OUP

7) Pentacost, Eric (2000): *Macroeconomics: An Open Economy Approach*, MacMillan.

8) Bober, Stanley (1968): *The Economics of Cycles and Growth*, New York: John, Wiley and Sons

9) Serletis, Apostolos (2007): *The Demand for Money Theoretical and Empirical Approaches*, Springer.

10) Tsoulfidis, Lefteris (2010): *Competing Schools of Economic Thought*, Springer.

11) Junankar, P.N (1972): *Investment: Theories and Evidence*, Macmillan.

12) Lewis, Mervyn and Mizen, Paul D (2000): *Monetary Economics*, OUP.

13) Scarth, William (2014): *Macroeconomics: The Development of Modern Methods for Policy Analysis*, Edward Elgar.

14) Peel, David and Minford, Patrick (2016): *Advanced Macroeconomics: A Primer*, Edward Elgar.

15) Phelps, E. (1990): *Seven Schools of Macroeconomic Thought*, Oxford University Press, Oxford

16) Jagdish Handa (2009): *Monetary Economics*, 2nd Ed, Routledge

Additional Readings

1) Edgmand, Michael R (1987): *Macroeconomic Theory and Policy*, PHI.

2) Peterson, Wallace C and Estenson, Paul S (1992): *Income, Employment and Economic Growth*, 7th Ed, W.W Norton, NY.

3) Pierce, David G.and Tysome, Peter J (1985): *Monetary Economics Theories, Evidence and Policy*, Butterworth.

4) Poindexter, Carl J (1976): *Macroeconomics*. The Dryden Press.

5) Greenaway, David and Shaw G.K (1995): *Macroeconomics: Theory and Policy in UK*, Blackwell.

6) Todd A. Knoop (2015): *Business Cycle Economics: Understanding Recessions and Depressions from Boom to Bust*, Praeger

7) Venieris, Yiannis P and Sebold, D Frederick (1977): *Macroeconomics: Models and Policy*, John Wiley and Sons.

8) Westaway, A J and Jones, T G Weyman (1977): *Macroeconomics Theory, Evidence and Policy*, Orient Longman.

9) Agenor, Pierre-Richard and Montiel, Peter J. (2015): *Development Macroeconomics* 4th Ed, Princeton University Press, Princeton.

10) Galbraith, James, K and Darity, William Jr (1994): *Macroeconomics*, Houghton Mifflin Co, NJ

11) Gärtner, Manfred (2009): *Macroeconomics*,3rd Ed, Prentice Hall.

12) Jansen, Dennis W and Delorme, Charles Jr and Ekelund, Robert B, Jr (1994): *Intermediate Macroeconomics*, West Publishing Co.

13) Blanchard, Olivier and Johnson, David R (2018): *Macroeconomics*, 8th Ed, Pearson

14) 31. Hillier, Brian (2006): *Macroeconomics: Models, Debates and Development*, Basil Blackwell.

15) Homburg, Stefan (2017): *A Study in Monetary Macroeconomics*, OUP.

16) Williamson, Stephen D. (2018): *Macroeconomics*, 6th Ed, Pearson.

17) Makinen, Gail E. (1977): Money, *The Price Level, and Interest Rates: An Introduction to Monetary Theory*, Prentice Hall Inc.

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
2	EM 010203	Indian Economy and Fiscal Federalism	Core	4	90

Course Objectives
The main objective of the course is to equip the students to understand Indian economic problems in the light of relevant economic theories that too in a comparative perspective. The course is expected to enable students to understand the growth and structural changes of the economy from a historical perspective, its institutional and theoretical framework, recent policy changes, nuances in using statistical information for analysing public policy, and to familiarise with the issues for research.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Appraise the strategy of economic planning and to evaluate the growth process and structural changes of Indian economy

2) Critically comprehend the various debates and issues of Indian economy, possible solutions and their effectiveness

3) Formulate applied economic policies for solving economic problems

4) Analyse the economic problems by using various databases and interpret the trend and issues objectively

Unit-1 – India's Economic Transformation   (Hours- 30)

1.1 **Indian Economy in Pre Independence Period**

Ancient India, Medieval India & Colonial India—Role of Railways—Drain Theory—Deindustrialisation—Bengal Famine and Bombay Plan (Contact Hours 4)

1.2. **Indian economic growth**, Distribution, Growth Debates & Structural Change: Comparative Historical Perspective—Planning for Economic Development: Changing Contours of State and Market in India (Contact Hours 4)

1.3 **Rationale and evolution of Economic Reforms**

Economic Reforms Since 1991—Thirty Years of Economic Reforms. (Contact Hours 4)

1.4 **Agriculture sector in India**

Production and Productivity Trends—Agricultural Finance—Leading Issues in Agricultural Marketing—MSP—Agriculture and Technology—WTO's AoA and Indian

Agriculture—Dimensions of the Agrarian Crisis—Farm Sector Reforms (Contact Hours 6)

1.5 Industrial Sector

Industrial Growth and Stagnation, Public Sector and Technology—Role of The Industrial Sector in India's Structural Transformation. Recent Policy Initiatives: Make in India, Start-up Policy, Industrial Corridor Project and Other Initiatives—Implications of Insolvency and Bankruptcy Code—MSMEs. (Contact Hours 6)

1.6 **Leading development issues**: Reforms and Policy Responses—Poverty, Inequality and Unemployment—Recent Debates On Poverty and Inequality During Reforms—Demography and Development—Demographic Dividend—India's Demographic Profile—Inclusive Growth (Contact Hours 6)

Unit-2. Trade and External Sector   (Hours 20)

2.1. Evolution of Trade Policy in India—External Sector Reforms: Trade Policy Reforms Including EXIM Policy and SEZ—Capital Account Convertibility Reforms: Policies On FDI, FPI, ECBs and RDBs.

2.2 Changing Composition and Direction of India's Foreign Trade—Balance of Payment Developments—India and the WTO—India and the IMF.

Unit 3: Financial Sector in India   (20 hours)

3.1 RBI and Its Functions – Monetary Policy – Inflation Targeting – New Liquidity Framework - Monetary Transmission and External Benchmark Based Lending Rate. RBI's Balance Sheet and Economic Capital Framework.

3.2 Financial Sector Reforms – Changing Structure of the Banking System in India – Twin Balance Sheet Problem – Asset Quality Problems (NPA) – Measures to Improve the Asset Quality of Financial Institutions. Basel Capital Standard - Financial Inclusion: Strategies and Progress. - NBFCs– Issues, Role and Developments- Digital Payment Systems in India

Unit- 4: Fiscal Policy in India   (20 hours)

4.1 Fiscal Situation in India - Understanding Government Budget – Concepts and Issues - Fiscal Reforms - Tax Reforms: Direct and Indirect Tax Reforms – Goods and Service Tax Regime, Expenditure Reforms Including Subsidy Reforms.

4.2 Fiscal Consolidation – FRBM – Problems of Sound Finance and Fiscal Austerity- Public Debt and Debt Sustainability for the Centre and States - Fiscal Federalism - Federal Finance and Centre State Financial Relationship in India- Vertical and Horizontal Imbalance - Sub-National Fiscal Reforms in India - Finance Commission— State Finance Commission.

Select Readings Unit: 1.1

1) R. S. Sharma and D. N. Jha (1974) The Economic History of India up to AD 1200: Trends and Prospects, *Journal of the Economic and Social History of the Orient*, Vol. 17, No. 1, pp. 48-80

2) Bipan Chandra (1991) Colonial India: British versus India Views of Development, *Research Foundation of State University of New York*, Vol. 14, No.1 (Winter, 1991), pp. 81-167

3) Naoroji Dadabhai (1899) *Poverty and Un-British Rule in India*, Andesite Press

4) Karl Marx (1853) The British Rule in India, *Tribune* (*New-York Daily*)

5) Husain Iqbal (2014) *Karl Marx on India*, Tulika

6) D Bogart, L Chaudhary (2012) Railways in Colonial India: An Economic Achievement?
Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2073256

7) Amartya Sen (1982) *Poverty and Famines: An Essay on Entitlement and Deprivation*, Oxford University Press

8) Thakurdaus et al (1944) *A Plan of Economic Development for India* (Bombay Plan), Penguin Books, New York, USA

Select Readings Unit: 1.2

1) Pulapre Balakrishnan (2015) (ed.) *Economic Growth and Its Distribution in India*, Orient Blackswan Private Limited, New Delhi

2) Pulapre Balakrishnan (2010)   *Economic Growth in India: History and Prospect*, Oxford University Press, New Delhi

3) R Nagaraj (2000) "Indian Economy Since 1980: Virtuous Growth or Polarisation?", *Economic and Political Weekly*, Vol.35, No.32, pp.2831 - 2839.

4) Nagaraj, R. (2008) India's Recent Economic Growth: A Closer Look. *Economic and Political Weekly*, vol. 43, no. 15, pp. 55–61.

5) Aravind Subramanian (2019) India's GDP Mis-estimation: Likelihood, Magnitudes, Mechanisms and Implications, *WP, Centre for International Development at Harvard University*.

6) Aravind Subramanian (2019) Validating India's GDP Growth Estimates, *WP, Centre for International Development at Harvard University*.

7) T J Byres (1998) (ed.) *The Indian Economy: Major Debates since Independence*, Oxford University Press, New Delhi.

8) Sukhamoy Chakravarty (1987) *Development Planning; The Indian Experience*, Clarendon Press, Oxford

Select Readings Unit: 1.3

1) J. Ahluwalia and I. M. D. Little (1998) (eds*). India's Economic Reforms and Development: Essays for Manmohan Singh*, New Delhi: OUP.

2) Montek S Ahluwalia (2018) India's Economic Reforms: Achievements and Next Steps, *Asian Economic Policy Review*. 14, 1–17

3) Deepak Nayyar (2017) Economic Liberalisation in India Then and Now, *Economic and Political Weekly*, Vol. 52, Issue No. 2, 14.

4) Pranab Bardhan (1990) Symposium on the State and Economic Development, *Journal of Economic Perspective*, Vol. 4, and No. 3, pp. 3-7.

5) R Nagaraj (2017) Economic Reforms and Manufacturing Sector Growth: Need for Reconfiguring the Industrialisation Model, *Economic and Political Weekly,* Vol. 52, Issue No.2.

6) Prabhat Patnaik (2017) Economic Liberalisation and the Working Poor, *Economic and Political Weekly*, Vol. 51, Issue No. 29.

Select Readings Unit: 1.4

1) Vaidyanathan, A (2010): *Agricultural Growth in India: The Role of Technology, Incentives and Institutions*, OUP, New Delhi.

2) Shantanu De Roy (2017) Economic Reforms and Agricultural Growth in India, *Economic and Political Weekly*, vol. 52, Issue No. 9.

3) G S Bhalla (2009) Economic Liberalisation and Indian Agriculture: A State Wise Analysis, *Economic and Political Weekly*, Vol. 44, Issue No. 52.

4) H. Hanumantha Rao (2001) "WTO and Viability of Indian Agriculture." *Economic and Political Weekly*, vol. 36, no. 36. pp. 3453–3457

5) Uma Kapila (2019): *Indian Economy: Performance and Policies*, Academic Foundation.

6) Uma Kapila (2019): *Indian Economy Since Independence: A Comprehensive and Critical Analysis of India's Economy*, 1947-2017 (Academic Foundation).

Select Readings Unit: 1.5

1) Isher J Ahluwalia (1985) *Industrial Growth in India: Stagnation since the Mid-Sixties*, Oxford University Press, New Delhi.

2) K L Krishna (2002) Industrial Growth and Diversification, In Uma Kapila (ed.), *Indian Economy Since Independence*, Academic Foundation, New Delhi, Chapter-17.

3) R Nagaraj (2003) Industrial Policy and Performance since 1980: Which Way Now?, *Economic and Political Weekly*, Vol. 38, No. 35, pp. 3707-3715.

4) Raj, K. N.(1976) Growth and Stagnation in Indian Industrial Development. *Economic and Political Weekly*, vol. 11, no. 5/7, 1976, pp. 223–236.

5) R Nagaraj (2006) Public Sector Performance since 1950: A Fresh Look, *Economic and Political Weekly*, Vol. 41, No. 25, pp. 2551-2557.

6) Deepak Nayyar (1994) (ed.) *Industrial Growth and Stagnation: The Debate in India*, Oxford University Press, New Delhi.

7) Amirapu, Amrit and Subramanian, Arvind, (2015) *Manufacturing or Services? An Indian Illustration of a Development Dilemma*. Centre for Global Development Working Paper No. 408, Available at SSRN: https://ssrn.com/abstract=2623158 or http://dx.doi.org/10.2139/ssrn .2623158

Select Readings Unit: 1.6

1) S. Mahendra Dev, and C. Ravi. (2007) Poverty and Inequality: All-India and States, 1983-2005. *Economic and Political Weekly*, vol. 42, No. 6, pp. 509–521.

2) Patnaik, Utsa. (2007) Neoliberalism and Rural Poverty in India. *Economic and Political Weekly*, vol. 42, no. 30, pp. 3132–3150.

3) Himanshu.(2007) Recent Trends in Poverty and Inequality: Some Preliminary Results. *Economic and Political Weekly*, vol. 42, no. 6, pp. 497–508.

4) Deaton, Agnus and Valerie, Kozel (2006) *The Great Indian Poverty Debate*, Laxmi Publications

5) Chandrasekhar, C. P., et al. (2006) The 'Demographic Dividend' and Young India's Economic Future. *Economic and Political Weekly*, vol. 41, no. 49, pp. 5055–5064.

6) James, K. S. (2008) Glorifying Malthus: Current Debate on 'Demographic Dividend' in India. *Economic and Political Weekly*, vol. 43, no. 25, pp. 63–69.

7) Singh, Sumanjeet, and Minakshi Paliwal. (2015) India's Demographic Dividend: The Context of its Economic Growth., World *Affairs: The Journal of International Issues*, vol. 19, no. 1, 2015, pp. 146–157

8) Thomas Piketty (2014) *Capital in the Twenty-First Century*, Harvard Business School Press India Limited

9) Thomas Piketty & Lucas Chancel (2017) Indian income Inequality, 1922-2015: From British Raj to Billionaire Raj?, *WID World Working Paper Series*, No. 2017/11

Select Readings Unit: 2

1) Uma Kapila (2019) *Indian Economy: Performance and Policies*, Academic Foundation.

2) Uma Kapila (2019) *Indian Economy Since Independence: A Comprehensive and Critical Analysis of India's Economy*, 1947-2017. Academic Foundation.

Select Readings Unit: 3

1) Uma Kapila (2019) *Indian Economy: Performance and Policies*, Academic Foundation.

2) Uma Kapila (2019) *Indian Economy Since Independence: A Comprehensive and Critical Analysis of India's Economy*, 1947-2017. Academic Foundation.

3) RBI (2019) *Report of the Expert Committee to Review the Extant Economic Capital Framework of the Reserve Bank of India*

4) RBI (2020) Monetary Policy Transmission in India: Recent Trends and Impediments, *Monthly Bulletin*.

5) Subhasankar Chattopadhyay (2017) Inflation Targeting amidst Structural Change: Some Analytics for Developing Economies, *Economic and Political Weekly*.

Select Readings Unit: 4

10) Chirashree Das Gupta and Surajit Mzumdar (2017) Fiscal Federalism in India Since 1991: Infirmities of Sound Finance Paradigm. *Economic and Political Weekly*.

11) Mohan, R. (2019). Finance Commissions and Federal Fiscal Relations in India: Analysing the Awards of 11th to 14th Finance Commissions. Working Paper No. 484, Centre for Development Studies, Thiruvananthapuram.

12) Prabhat Patnaik (2006) What is Wrong with 'Sound Finance', *Economic and Political Weekly*, Vol. 41, No. 43/44, pp. 4560-4564

13) Prabhat Patnaik (2001) On Fiscal Deficits and Real Interest Rates, *Economic and Political Weekly*, Vol. 36, No. 14/15, pp. 1160 -1163

Semester	Course Code	Course Title	Type of course	Credit	Teaching Hours
2	EM 010204	Mathematical Methods for Econometric Analysis-2	Core	4	90
		Course Objectives			
The course provides a deeper understanding with insightful knowledge on the various advanced mathematical techniques the student need to assimilate with the purpose of capturing and representing the optimising behaviour of economic agents. The course will also help the student as to how to use and apply mathematical tools by furnishing concrete examples and exercises.					

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Appreciate the essential concepts and techniques of advanced calculus, difference and differential equations and apply them in comparative static and dynamic frame work to solve important economic problems

2) Develop a clear understanding with respect to the optimization techniques used in economic theory

Unit 1: Classical Programming/ Optimisation   (Hours 25)

(Comparative Statics: Optimization or Programming)
Unconstrained Optimization-1

1.1 First Order and Second Order Conditions, Global Maxima and Minima, Hessian Determinant, Economic Applications

Constrained Optimization-2

1.2 First Order and Second Order Conditions—Optimization with Equality Constraints—Lagrange Method –Interpretation of Lagrange Multiplier Two Variables with One Equality Constraint- Several Equality Constraints – Bordered Hessian Determinant (Differentiation Between Hessian and Jacobin)

1.3 Homogeneous and Homothetic Functions–Linearly Homogeneous Functions, Properties, Euler's Theorem, Economic Applications, Homothetic Function, Definition and Characterization, Concave and Convex, Quasi Concave and Quasi Convex and Pseudo Concave Functions–Envelope Theorems—Economic Applications

Unit 2: Mathematical Programming: Linear and Non-linear Programming
(Hours20)

2.1 Optimization with Inequality Constraints –One Inequality Constraint-Several Inequality Constraints–Linear Programming—Graphical Solution–Simplex Method

2.2 Open Sets, Closed Sets, Compact Sets; Non-Linear Programming—Kuhn-Tucker Conditions–Interpretation and Applications

Unit 3 Integration   (Hours 20)
(Dynamic Analysis)

3.1 Integration, Indefinite Integral, Integration as Anti-Derivative, Rules of Integration by Substitution, Integration by Parts, The Fundamental Theorem of Calculus—Integration Using Partial Fractions—Differentiating Integrals—Power Series

3.2 Definite Integral—Properties—Definite Integral as Area Under the Curve—Economic Applications: Harrod-Domar Model

3.2 Multiple Integrals—Change of Variables

Unit 4 Differential and Difference   (Hours 25)

4.1 First Order Linear   Differential Equations –Homogeneous Case and Non-Homogeneous Case-Linear Second Order Equations-Existence of Solutions,

4.2 First Order Difference Equation –Solving First Order Difference Equations—The Dynamic Stably of Equilibrium-Convergence to Equilibrium -Cobweb Model-Second Order Linear Difference Equation-Complimentary Function- Samuelson Multiplier-Accelerator Interaction Model

Select Readings

1) Marvin H J Gruber, (2014), *Matrix Algebra for Linear Models*, John Wiley and sons
2) **Carl P. Simon & Lawrence Blume, (1994),** *Mathematics for Economists*, W. W. Norton & Company
3) Ken Binmore and Joan Davies, *Calculus: Concepts and Methods*, (2012), Cambridge University Press

Additional Readings

1) Michael Hoy, John Livernois, Chris McKenna, Ray Rees and Thanasis Stengos, (2012), *Mathematics for Economics*, Prentice Hall India Learning

2) Jan R. Magnus and Heinz Neudecker, (2019), *Matrix Differential Calculus with Applications in Statistics and Econometrics*, John Wiley and Sons

3) Alpha C Chiang & Kevin Wainwright, (2017), *Fundamental Methods of Mathematical Economics* McGraw Hill Education

4) Mike Rosser (2003), *Basic Mathematics for Economists*, Routledge, London

5) Gilbert Strang, (2016), *Introduction to Linear Algebra*, Wellesley-Cambridge Press

6) Tom M. Apostol, (2007*), Calculus: One-Variable Calculus with an Introduction to Linear Algebra*, Vol 1, John Wiley & Sons

7) Tom M. Apostol, (2007), *Calculus: Multi-Variable Calculus and Linear Algebra with Applications to Differential Equations and Probability*, Vol 2, John Wiley & Sons

8) James Stewart, (2003), *Multivariable Calculus*, Cengage Learning

9) James Stewart, (2011), *Single Variable Calculus: Early Transcendentals*, Cengage Learning

Semester	Course code	Course Title	Type of course	Credit	Teaching Hours
2	EM 010205	Univariate Time Series Econometrics	Core	4	90

Course Objectives
The objective of the course is to provide a rigorous yet intuitive description of the time series techniques dealing with univariate models, econometric forecasting, volatility and growth rates to explore and analyse the behaviour of macroeconomic variables over time with a view to enable the student to identify and critically explain the underlying theoretical relations that determine them. The course also emphasizes the application of theoretical models with software packages.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Learn the various theoretical models to critically evaluate the behaviour of univariate time series

2) Apply the theoretical models to the empirical data with a view to estimating the parameters

3) Critically comprehend the various methods of estimation of growth rates

4) Use the open source econometric software packages such as Gretl, R to estimate time series econometric models using real world data

5) Interpret the estimates of the time series models and to analyse the results.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit — 1 Time Series Decomposition   (Hours- 15)

Time Series Decomposition into Trend, Cyclical, Seasonal, Irregular Components—The Hodrick–Prescott filter—Band-pass filter—The Structural Time Series Approach—State Space Models and the Kalman filter—Trend-Cycle Decomposition of Unit Root Processes—Beveridge–Nelson Decomposition—Watson Decomposition—Seasonal Index Calculation. Smoothing Techniques

Unit —2 Stochastic Process and Stationarity   (Hours- 15)

Stochastic Process—Ergodicity and Stationarity—White Noise Processes—Non Stationarity and Random Walk Models—Deterministic and Stochastic Trends / Trend

and Difference Stationary Processes—Integrated Stochastic Process— Martingale Process—Martingale Difference Process

Unit — 3   Stationarity Tests   (Hours- 15)

Non Stationary Time Series and the Problem of Spurious Regression—Solutions—Transforming the Non Stationary Time Series—Tests of Stationarity —Correlogram (ACF, PACF), and Unit Root Test— The Variance Ratio— Dicky-Fuller and Augmented Dicky-Fuller test—Non-parametric PP test— ADF-GLS Unit Root Test —Structural Change

Unit — 4 ARIMA & ARFIMA Modelling and Forecasting   (Hours- 25)

4.1 The Wold Decomposition Theorem—AR and MA Processes—ARMA and ARMAX—ARIMA and ARFIMA Modelling

4.2 Time Series Forecasting— Single Equation and Simultaneous Equation Regression Modelling and the Lucas Critique

4.3 Point Forecasts and Forecast Optimality—Losses—Quadratic Loss Function—Asymmetric Loss Function— Probability Event Forecasts—Conditional and Unconditional Forecasts—Multi-Step Ahead Forecasting— Combining Forecasts—Forecast Pooling—Sources of Forecast Uncertainty—Forecast Evaluation Framework—Test Statistics of Forecast Accuracy Based on Loss Differential

Unit — 5 Volatility Measurement (Contact Hours- 10)

5.1 Volatility Measurement—ARCH and GARCH Models and Estimation—GARCH Forecasting

Unit —6 Growth Rate Estimation   (Hours- 10)

6.1 Growth Rate Estimation— Kinked Exponential Growth Rates—Robustness—Endogenous and Exogenous Breaks

Select Readings

1) Enders, W. (2014). Applied Econometric Time Series. John Wiley & Sons.

2) Greene, W. H. (2017). *Econometric Analysis,*. Pearson Education.

3) Pesaran, M. H. (2015). *Time Series and Panel Data Econometrics*. Oxford University Press .

4) Wooldridge, J. M. (2015). *Introductory Econometrics: A Modern Approach, .* Thomson, South Western.

Additional Readings

1) Yaffee, R. A., & McGee, M. (2000). *An Introduction to Time Series Analysis and Forecasting: With Applications of SAS and SPSS,.* Academic Press.

2) Ashenfelter, O., Levine, P. B., & Zim, D. J. (2002). *Statistics and Econometrics: Methods and ApplicationS.* John Wiley & Sons.

3) Baltagi, B. H. (2013). *Econometric Analysis of Panel Data .* Springer .

4) Bhaumik, S. K. (2015). *Principles of Econometrics: A Modern Approach Using EViews.* Oxford University Press.

5) Brockwell, P. J., & Davis, R. A. (2002). *Introduction to Time Series and Forecasting.* Springer.

6) Brooks, C. (2019). *Introductory Econometrics for Finance .* Cambridge University Press .

7) Chatfield, C. (2003). *The Analysis of Time Series: An Introduction.* Chapman and Hall.

8) Gujarati , D., Porter, , D. C., & Pal, M. (2020). *Basic Econometrics.* McGraw Hill.

9) Hamilton, J. D. (1994). *Time Series Analysis.* Princeton University Press.

10) Heiss, F. (2020). *Using R for Introductory Econometrics, .* CreateSpace Independent Publishing Platform.

11) Hsiao, C. (2014). *Analysis of Panel Data.* Cambridge University Press .

12) KirchgassneR, G., Wolters, J., & Hassler, U. (2013). *Introduction to Modern Time Series Analysis.* Springer.

13) Maddala, G. S. (2010). *Unit roots, Cointegration, and Structural Change.* Cambridge University Press.

14) Makridakis, S., Wheelwright, S. C., & Rob , J. H. (1998). *Forecasting: Methods and Applications.* John Wiley & Sons.

15) Pesaran , M. H., & Smith, R. (1995). The Role of Theory in Econometrics M. Hashem Pesaran Ron Smith. *Journal of Econometrics*(67), 61-79.

16) Rachev, S. T., Mittnik, S., Fabozzi, F. J., Focardi, S. M., & Jasic, T. (2007). *Financial Econometrics: From Basics to Advanced Modeling Techniques.* John Wiley & Sons.

17) Stock , J. H., & Watson, M. W. (2020). *Introduction to Econometrics.* Pearson Education.

Third Semester

Course Code	Name of the Course	Type of the Course	Hours per Week	Credit
EM 010301	International Finance and Economics	Core	5	3
EM 010302	Economics of Growth and Development	Core	5	3
EM 010303	Public Finance and Public Choice	Core	5	3
EM 010304	Multivariate Time Series Econometrics	Core	5	4
EM 010305	Econometrics of Limited Dependent Variable Models and Non Linear Regression	Core	5	4
EM 010306	Internship Report on Econometric Issues	Core	1	2

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
III	EM010301	International Finance and Economics	Core	3	90
Course Objectives					
The objective of this course is to present a comprehensive and clear exposition of the theory and principles of international economics. It would also provide an exposure to the theoretical underpinnings and empirical evidence of the major trade policies and practices. It will equip them to understand, evaluate and suggest solutions to the important international economic problems.					

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Have a thorough understanding of the key concepts, theories and their practical applications on issues of international trade and international finance.

2) Understand critically the various trade theories and the results of their empirical testing

3) Analyse the links between trade, international finance, economic growth and globalisation.

4) Critically comment on and participate in current debates on international economic policy.

Unit 1 International Trade Theory   (25 Hours)

1.1 Pre-classical Theory of Trade—Mercantilists' Views On Trade—Absolute Advantage—Comparative Advantage—Comparative Advantage—Opportunity Cost Theory—Offer Curves —Terms of Trade: Definition and Measurement of the Terms of Trade

1.2 Factor Endowments and Heckscher-Ohlin Theory—Empirical Tests of Hecksher-Ohlin Model—The Leontief Paradox—Stolper–Samuelson Theorem (SST) —Economic Growth and International Trade: Rybczynski Theorem—Brander–Krugman Models.

Unit 2 International Trade Policy   (25 Hours)

2.1 Trade Restrictions: Tariffs—Partial Equilibrium Analysis of a Tariff—Theory of Tariff Structure—General Equilibrium Analysis of a Tariff—Small and Large Country Case—Optimum Tariff

2.2 Trade Restrictions: Non-Tariff Trade Barriers and New Protectionism—Import Quotas—Other Non-Tariff Barriers and New Protectionism—Political Economy of Protectionism—Strategic Trade and Industrial Policies.

2.3 Economic Integration: Customs Union—Trade Creating Customs Unions—Trade Diverting Customs Unions—Theory of Second Best—Dynamic Benefits from Customs Union.

Unit -3 Balance of Payments and International Finance (20Hours)

3.1. Balance of Payments Concepts—IMF Balance of Payment Manual—Intermediate Exchange Rate System—The Indian Context.

3.2 Balance of Payment Disequilibrium—Case Study of Balance of Payment Crisis in India during 1990-91.

3.3 International Monetary System—Features and Working of The BWS—Collapse of The BWS.

3.4 IMF-Functional Evolution—Lending and Resources of the Fund—Working and Relevance of The SDR—IMF Governance Reforms.

3.5 Significance of NEER and REER.

3.6 Foreign Exchange Market—Spot and Forward—Derivatives—Currency Swap—Futures and Options—Euro Currency Market—Crypto Currency

Unit-4 Capital Mobility and Trade Issues (20 Hours)

4.1 Open Economy Macroeconomics—Role of Capital Mobility.

4.2 Mundell-Fleming Model—Impossible Trinity.

4.3 Diverse Forms of Capital Flows and Their Features—FDI and FPI Policies in India.

4.4 MNCs—International Tax Policies— Double Taxation Avoidance Agreement (DTAA) and Base Erosion and Profit Shifting (BEPS)—Indian Experiences—Role of Global Value Chains.

4.5 International Capital and State-Investor Disputes— Bilateral Investment Promotion and Protection Agreement (BIPA)—Trends and Developments—Indian Experience

4.6 India and China—China as Trading Power and Current Account Imbalances—Asian Infrastructure Investment Bank

4.7 Multilateral Trading System—WTO—Role and Performance—Challenges and Reforms.

Select Readings

1) Bo Soderston and Geoffrey Reed (1994): *International Economics*, 3rd Edition, McMillan Press Ltd. London

2) Feenstra Robert C (2004): *Advanced International Trade Theory and Evidence*, Princeton University Press, Princeton

3) Farrokh Langanda and Peter T.Murphy (2014) : *International Trade and Global Macro Policy* ,Springer ,USA.

4) Krugman P R and Obsfeild M (2009): *International Economics: Theory and Policy*, 8th Ed, Pearson, Dorling Kindersley (India) Pvt. Ltd, New Delhi.

5) Dominick Salvatore (2008): *International Economics*, Wiley India, New Delhi

6) Stewart Paterson, (2018), China*, Trade and Power: Why the West's Economic Engagement Has Failed*. London Publishing Partnership

7) Dicken Peter., (2015). *Global Shift Mapping the Changing Contours of the World Economy* Guilford Publications.

8) Ranjan Prakash., (2019) India and Bilateral Investment Treaties: Refusal, Acceptance, Backlash Oxford University Press.

9) Balance of Payment Manual for India, RBI, September 2010.

10) Global value Chains and Development, UNCTAD, 2013.

11) Joshi and Little, India's Economic Reforms, 1991-2001, Oxford University Press (1996).

12) Ashoka Mody., Bordo Michael D, Oomes Nienke., (2004), Keeping Capital Flowing: The Role of the IMF *International Monetary Fund*.

13) Mike Callaghan and Paul Hubbard., (2016). The Asian Infrastructure Investment Bank: Multilateralism on The Silk Road, Paper No. 116, *EABER Working Paper Series*

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
III	EM010302	Economics of Growth and Development	Core	3	90
Course Objectives					

The objective of the course is to provide a unifying theoretical framework with which the diverse issues connected with the process of economic growth and development are discussed with empirical examples especially in the context of developing countries. The approach of this course is to provide a comprehensive introduction to the theoretical paradigms of economic development. The course attempts to familiarize students with the conceptual routes, theoretical dynamics and practical strategies of growth and development eventually leading the student to critically address the challenges of economic development.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Evaluate critically the theories of economic growth and discuss its implications upon economic development
2) Appraise the recent literature, both analytical and empirical, on theories of underdevelopment and growth in developing countries
3) Understand the conceptual routes, theoretical dynamics and practical strategies of growth and development

Unit-I: Concepts and Measurement   **(10 hours)**

(Self-study)

1.1. Meaning and Measurement of Economic Development: Conventional, Human Development Index (Human Development Index, Inequality-Adjusted Human Development Index, Gender Related Development Index, Gender Empowerment Measure, Gender Inequality Index, Human Poverty Index, Multi-Dimensional Poverty Index).

1.2. Quality of Life Indices: Entitlements Approach—Capabilities and Functioning-Development as Freedom—Human Rights-Based Approach—Three Core Values of Development

1.3. Poverty and Income Distribution: Poverty and Its Measurement—Economic Theories of Convergence and Divergence—Development Gap—Inequality in Income Distribution—Kuznets Inverted U Hypothesis—Lorenz Curve and Gini-Coefficient—Atkinson, Theil, Palma Ratio—Piketty's Concept of Inequality—Concept of Sustainable Development.

Unit- 2: Theories of Underdevelopment   (25 Hours)

2.1. Vicious Circle of Poverty—Dualistic Theories—Social—Financial and Technical Dualism

Prebisch-Singer Thesis and Myrdal Thesis: Backwash and Spread Effect—Circular and Cumulative Causation—Rostow's Stages of Growth—Vent for Surplus Theory of Hla Myint—Staple Theory—Dutch Disease.

2.2. Dual Economy Models and Labor: Lewis Model—Ranis and Fei Model—Rural Urban Migration and Urban Unemployment (Harris-Todaro)—Rural-Urban Wage Gap (Labor Turnover Model, Wage Efficiency Model)—The Jorgenson Model—Dixit-Marglin Model.

2.3. Political Economy of Underdevelopment: Contributions of Paul Baran, Gundar Frank, Samir Amin and Emmanuel Wallerstein (World Systems Approach).

Unit- 3: Theories of Development and Growth   (25 Hours)

3.1. Classical Theory of Development–Adam Smith, David Ricardo, Karl Marx and Schumpeter.

3.2. Theories of Economic Growth: Harrod-Domar Model.

3.3. Neo-Classical Growth Models—Solow and Meade.

3.4. Cambridge Growth Models: Mrs. Joan Robinson's and Kaldor's Growth Models.

3.5. Endogenous Growth Models—Ramsey's Model—Romer's Model—Uzawa-Lucas Model—AK Model—Arrow's Model—Grossman and Helpman's Model—Aghion and Howitt).

Unit- 4: Approaches To Development   (10 Hours)

4.1. Theory of Big Push—Critical Minimum Effort Thesis—Low Income Equilibrium Trap—Balanced and Unbalanced Growth. (Self-Study)

4.2. Michael Kremer's O-Ring Theory of Economic Development

4.3. Resources Allocation for Development: Need for Investment Criteria—Present Versus Future—Alternative Investment Criteria—Cost Benefit Analysis—Shadow Prices—Project Evaluation—Choice of Techniques—Application of Input Output Analysis

Unit- 5: Institution And Development   (20 Hours)

5.1. Institution and Development—Institutional Economics—Contributions of Thorstein Veblen, John R. Commons, Wesley Mitchell—New Institutional Economics: Contributions of R. H Coase, Oliver E Williamson, Douglass C. North, Acemoglu, D. and J. Robinson

5.2. Empirical Development Economics—Development Issues and Randomised Trials
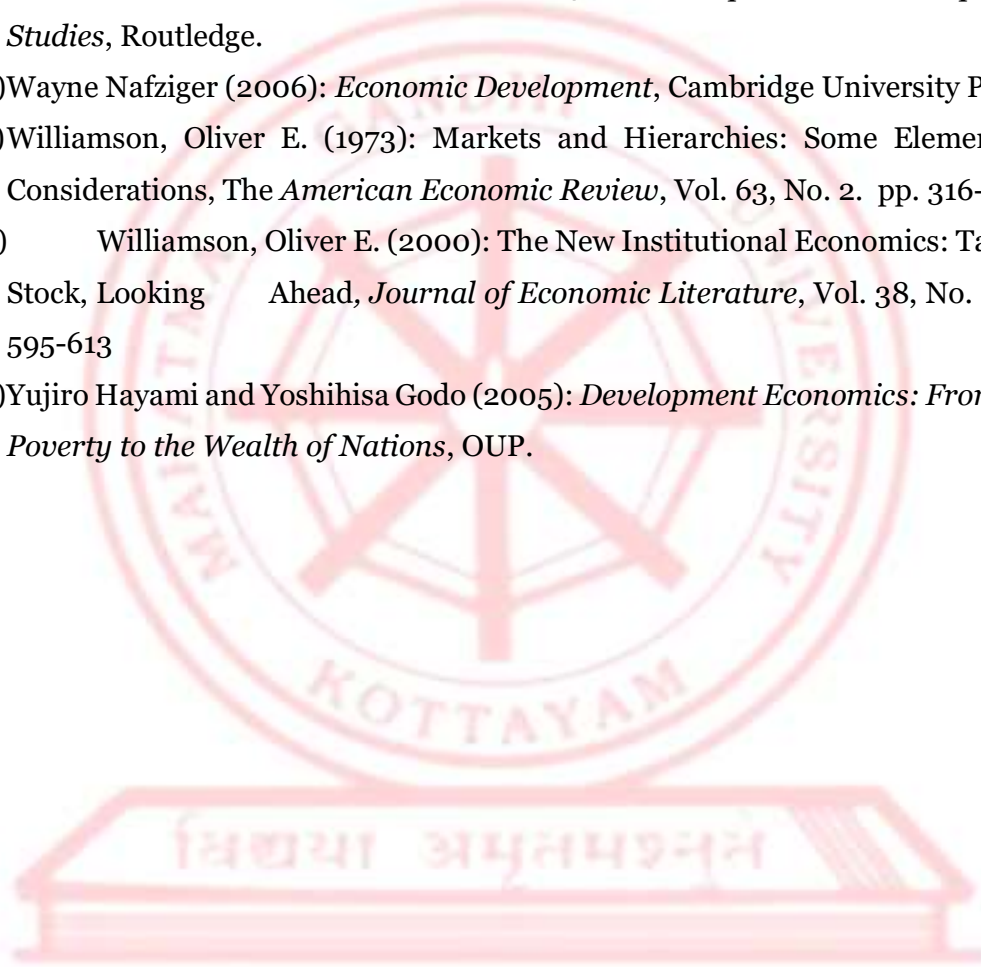
Select Readings:

1) Debraj Ray (2009): *Development Economics*, Oxford University Press.
2) Irma Adelman (1961): *Theories of Economic Growth and Development*, Stanford University   Press.
3) Higgins, B. 1963): *Economic Development: Theory and Policies*, Central Book Depot, Allahabad,
4) Meier, G.M and J.E. Rauch (2014): *Leading Issues in Economic Development*, Oxford   University Press, New Delhi
5) Michael P. Todaro, Stephen C. Smith (2017): *Economic Development*. Pearson
6) Subrata Ghatak (2008): *Introduction to Development Economics*, Routledge.
7) Thirlwall A. P. (2011): *Growth and Development with Special Reference to Developing   Economies*. McMillan

Additional Readings:

1) Acemoglu, D. (2009): *Introduction to Modern Economic Growth*. Princeton University Press.
2) Adam Szirmai (2014): *The Dynamics of Socio-Economic Development: An Introduction*, Cambridge University Press.
3) Aghion, P. &Howitt, P. (2008), *The Economics of Growth*, MIT Press, Cambridge MA.
4) Alain de Janvry, Elisabeth Sadoulet (2016): *Development Economics: Theory and Practice*, Routledge.

5) Banerjee, A., Duflo, E., (2012). *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. Public Affairs, New York, NY.

6) Bardhan, Pranab K. (2000): Understanding Underdevelopment: Challenges for Institutional Economics from the Point of View of Poor Countries, *Journal of Institutional and Theoretical Economics*, Vol. 156, No. 1,

7) Douglass North., (2000). Big-Bang Transformations of Economic Systems: An Introductory Note. *Journal of Institutional and Theoretical Economics* pp. 3-8

8) Basu, Kaushik (1983): On Why We Do Not Try to Walk off without Paying after a Tax Ride, *Economic and Political Weekly*, Vol. 18, No. 48, pp. 2011-2012

9) Coase, R. H (1998): The New Institutional Economics, *The American Economic Review*, Vol. 88, No. 2, pp. 72-74

10) Charles I. Jones and Dietrich Vollrath (2013): *Introduction to Economic Growth*, W. W. Norton & Company.

11) David N. Weil (2013): *Economic Growth*, Pearson.

12) Dwight H. Perkins, Steven Radelet, David L. Lindauer and Steven A. Block (2013): *Economics of Development*, W. W. Norton & Company

13) Gerard Roland (2016): *Development Economics*, Routledge.

14) Graham Hacche (1987): *The Theory of Economic Growth: An Introduction*, Macmillan.

15) James M. Cypher, James L. Dietz (2014): *The Process of Economic Development*, Routledge.

16) John Rapley (2007): *Understanding Development: Theory and Practice in the Third World*, Lynne Rienner Publishers.

17) Martha Nassbaum and Amarthya Sen (1993): *The Quality of Life*, the World Institute for Development Economics.

18) North, Douglass C. (1986): The New Institutional Economics, *Journal of Institutional and Theoretical Economics* (JITE), Vol. 142, No. 1, pp. 230-237

19) North, Douglass C. (1998): *The New Institutional Economics and Development*, Washington University at St. Louis

20) Preston, P.W(1996): *Development Theory: An Introduction*, Blackwell Publishers.

21) Richard Peet and Elaine Hartwick (2009): *Theories of Development: Contentions, Arguments, Alternatives*, The Guilford Press.

22) Robert Joseph Barro, Xavier Sala-i-Martin (2009): *Economic Growth*, The MIT Press.

23) Rodrik, D. (2008): The New Development Economics: We shall Experiment, But How Shall   We Learn? *Working Paper 2008-0142, Weather head Centre for International Affairs*, Harvard University.

24) Thirlwall, A.P and Penélope Pacheco-López (2017): *Economics of Development: Theory and   Evidence*, Macmillan (Palgrave)Education UK

25) Vandana Desai and Robert B. Potter (2014): *The Companion to Development Studies*, Routledge.

26) Wayne Nafziger (2006): *Economic Development*, Cambridge University Press.

27) Williamson, Oliver E. (1973): Markets and Hierarchies: Some Elementary Considerations, The *American Economic Review*, Vol. 63, No. 2. pp. 316-325

28)   Williamson, Oliver E. (2000): The New Institutional Economics: Taking Stock, Looking   Ahead*, Journal of Economic Literature*, Vol. 38, No. 3 pp. 595-613

29) Yujiro Hayami and Yoshihisa Godo (2005): *Development Economics: From the Poverty to the Wealth of Nations*, OUP.

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
III	EM010303	Public Finance and Public Choice	Core	3	90

Course Objectives
The objective of the course is to critically understand the role of public sector in a mixed economy by exploring the economic effects of policies and programmes of public expenditure and resource mobilisation by considering the process of economic decision making in a democratic set up. The course critically discusses the nature of government intervention in a mixed economy and its implications upon the allocation, distribution, and stabilization functions of the public household.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Discuss critically the theoretical issues of provision of public goods

2) Evaluate the theoretical developments with respect to collective choice with a view to appreciate the process of decision making by the public sector

3) Appraise the theories of public expenditure and taxation to critically comprehend the role of public sector in a market economy

4) Critically discuss the theoretical contributions in fiscal federalism and to examine its practice in the context of Indian economy

Unit-1: Role of Government and Provision of Public Goods   (20 Hours)

1.1 Theories of Public Economy—Three Objectives of Budget Policy—Market Failure—Externalities—Government Intervention—Government Failure.

1.2 Public Goods: Pure and Impure Public Goods—Mixed and Quasi-Public Goods—Global Public goods—Merit Wants and Merit Goods—Provision of Public Goods: Wicksell and Lindahl Model, Samuelson's Model—Theory of Clubs—Clarke-Groves Taxation—Provision Local Public Goods- Tiebout Model

Unit-2: Public Choice and Collective Decision-Making   (20 Hours)

2.1 Problem of Collective Choice—Theory of Voting Rules—Anthony Downs's Rational Voter Hypothesis—Arrow's Impossibility Theorem—Duncan Black Model—Buchanan and Tullock Model

2.3 Representative Democracy: Role of Politicians and Political Parties—Logrolling and Political Manifestos—Voting and the Leviathan Hypothesis—Tax Price and Majority Voting—Fiscal Illusion—Costs of X-inefficiency—Directly Unproductive Profit-Seeking Activities—Social Costs—Lobbying and Interest Groups

Unit-3: Theories of Public Expenditure and Taxation (25 Hours)

3.1 Theories of Public Expenditure: Wagner's Law—Wiseman-Peacock Hypothesis—Population Growth—Pricing of Public Sector Inputs—Baumol's Model— Other Causes of Growth—Incidence of Public Expenditure—Distributional Issues and Fiscal Incidence—Aaron and McGuire's Model—Public Expenditure and Bureaucracy—Niskanen Model

3.3 Approaches to Tax Equity—Benefit Principle—Ability to Pay—Horizontal and Vertical Equity—Sacrifice Rules—Social Welfare Approach—Incidence of Taxation—Statutory Incidence, Economic Incidence and Tax Shifting—Alternative Concepts of Incidence—Principles of Tax Incidence—Partial Equilibrium View of Product Taxes and Factor Taxes—Incidence in General Equilibrium in Perfect and Imperfect Markets

3.4 Excess Burden and Efficient Tax Design—Tax Distortions in Partial and General Equilibrium—Optimal Taxation—Taxation Effects on Capacity Output, Work Effort, Private-Sector Saving, Private Investment and Economic Growth.

Unit-4 Budgetary Policy, Public Deficit and Debt (15 Hours)

4.1 Budgetary Policy in India—Recent Budgets—Trends in Fiscal Parameters—Macroeconomic implications—Concepts of Budget Deficit—Measurement—Problem of Fiscal Deficit— Corrective Measures—FRBM Act— Problems of Sound Finance

4.2 Theories of Public debt: Classical—Keynesian—Modern—Burden of Public Debt—Intergenerational Equity—Buchanan Thesis

Unit- 5: Fiscal Federalism: Theory and Practice (10 Hours)

5.1. Theory of Fiscal Federalism: Optimal Federalism: Stigler—Decentralization Theorem: Oates—Optimal Redistribution

5.2. Theory of Intergovernmental Transfers and Grants—Distribution of Fiscal Capacity—Design of Grants—Fly Paper Effect—Fiscal Illusion

5.3. Fiscal Federalism in India— Vertical and Horizontal Equity in Transfers—Terms of References and Challenges before 15th Finance Commission

Select Readings

1) Atkinson, A. B., & Stiglitz, J.E. (2015). *Economics of the Public Sector*. Princeton University Press.

2) Boadway, R. W, & Wildasin, D.E. (1984). Public Sector Economics. Little Brown and Company.

3) Brown, C. V, & Jackson, P.M. (1993). *Public Sector Economics*. Blackwell Publishers .

4) Cullis, J, & Jones, P. (2009). *Public Finance and Public Choice: Analytical Perspectives*. Oxford University Press.

5) Due , J. F, & Friendlaender, A.F. (1997). *Government Finance: Economics of the Public Sector*. AITBS Publishers and Distributors.

6) Feldman, A. M, & Serrano, R. (2006). *Welfare Economics and Social Choice Theory*. Springer .

7) Musgrave, R.A, & Musgrave, P.B. (1989). *Public Finance in Theory and Practice* . McGraw-Hill.

8) Musgrave, R.A, & Peacock, A.T. (1994). *Classics in the Theory of Public Finance*. Palgrave Macmillan.

9) Musgrave, R. A. (1959). *The Theory of Public Finance: A Study in Public Economy* . Tata-Mcgraw-Hill.

10) Tresch, R. W. (2015). *Public Finance: A Normative Theory* . Elsevier .

Additional Readings

1) Boadway, R. W, & Wildasin, D. E. (1984). *Public Sector Economics*. Little Brown and Company.

2) Arrow, K. J. (2012). *Social Choice and Individual Values (Cowles Foundation Monographs Series)*. Yale University Press.

3) Bagchi, A. (2005). *Readings in Public Finance*. Oxford University Press.

4) Cornes, R, & Sandler , T. (1996). *The Theory of Externalities, Public Goods and Club Goods*. Cambridge University Press.

5) Foley, D. K. (1978). State Expenditure from a Marxist Perspective. *Journal of Public Economics, 9*(2), 221-38.

6) Glennester, H, & Hills, J. (1998). *The State of Welfare: the Economic and Social Spending*. Oxford University Press.

7) Hindriks, J, & Myles, G. D. (2007). *Intermediate Public Economics*. Prentice Hall of India.

8) Mueller, D. C. (1979). *Public Choice*. Cambridge University Press.

9) Rosen, H. (2012). *Public Finance*. McGraw Hill Education.

10) Stiglitz, J. E, & Rosengard, J. K. (2015). *Economics of the Public Sector*. W W Norton.

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
III	EM010304	**Multivariate Time Series Econometrics**	Core	4	90

Course Objectives
The objective of the course is to provide a rigorous nevertheless user-friendly account of the empirical regularities with respect to the behaviour of macroeconomic variables. The furnishes a clear exposition of the multivariate time series techniques such as models dealing with uncertainty, expectations, VAR models and cointegration required for the analysis of macroeconomic and financial data. The course also emphasizes the application of theoretical models and techniques with software packages.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Learn the various theoretical models to critically evaluate the behaviour of multivariate time series

2) Apply the theoretical models to the empirical data with a view to estimating the parameters

3) Use the open source econometric software packages such as Gretl, R to estimate time series econometric models using real world data

4) Interpret the estimates of the time series models and to analyse the results.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 System of Equations and Dimensionality   (20 Hours)

1.1 System of Equations—Recursive Systems—Simultaneous Equations—Identification—Estimation: ILS, IV, 2SLS and 3SLS— Seemingly Unrelated Regression Equations

1.2 Principal Components and Common Factor Models—Canonical Correlation Analysis (without derivation)

Unit-2 Modelling Uncertainty and Expectations   (10 Hours)

2.1. Rational Expectations Models with Future Expectations—Forward Solution—Models with Forward & Backward Components—Feedbacks—Rational Expectations DSGE Models—General Framework (without derivation)

Unit-3 Vector Autoregressive (VAR) Models   (20 Hours)

3.1. VAR Models—Stationary Conditions for VAR(P)—Unit Root Case—Deterministic Components—VAR Order Selection

3.2. Granger Causality—Toda and Yamamoto Procedure

3.3. Forecasting with Multivariate Models—Multivariate Spectral Density— SVAR—Testing and Estimation

Unit-4 Cointegration Analysis   (20 Hours)

4.1. Testing for Cointegration: Single Equation and System Approaches—Bounds Testing (ARDL)

4.2. Cointegrating VAR: Multiple Cointegrating Relations—Identification of Long-Run Effects—Cointegrating VAR Models—Long-Run Structural Modelling

4.3. Small Sample Properties of Test Statistics—Estimation of Short-Run Parameters of VEC Model—Stability of the Cointegrated System—Beveridge–Nelson Decomposition in VARs— Testing and Estimation

Unit-5 Impulse Response Functions   (20 Hours)

5.1. Traditional Impulse Response Functions—Orthogonalized Impulse Response Function—Generalized Impulse Response Function (GIRF)

5.2. Forecast Error Variance Decompositions—Structural Systems with Permanent and Transitory Shocks—Testing and Estimation

Select Readings

1) Walter Enders, Applied Econometric Time Series, John Wiley & Sons
2) Hashem Pesaran, Time Series and Panel Data Econometrics, Oxford University Press
3) William H. Greene, Econometric Analysis, Pearson
4) Wooldridge, Jeffrey M, Introductory Econometrics: A Modern Approach, Thomson, South Western, USA, 2015

Additional Readings

1) James D Hamilton, Time Series Analysis, Princeton University Press
2) Pesaran , M. H., & Smith, R. (1995). The Role of Theory in Econometrics M. Hashem Pesaran Ron Smith. Journal of Econometrics(67), 61-79.
3) Gujarati Damodar & Dawn C Porter, Basic Econometrics, McGraw Hill
4) Florian Heiss, (2020), Using R for Introductory Econometrics, CreateSpace Independent Publishing Platform

5) Pesaran , M. H., & Smith, R. (1995). The Role of Theory in Econometrics M. Hashem Pesaran Ron Smith. *Journal of Econometrics*(67), 61-79.

6) Sankar Kumar Bhaumik, Principles of Econometrics: A Modern Approach Using EViews, Oxford University Press

7) Stock and Watson, Introduction to Econometrics, Pearson Education

8) Cheng Hsiao, Analysis of Panel Data, Cambridge University Press

9) Badi H. Baltagi, Econometric Analysis of Panel Data, John Wiley & Sons

10) Orley Ashenfelter, Phillip B. Levine, David J. Zimmerman, Statistics and Econometrics: Methods and Applications, John Wiley & Sons

11) Chris Chatfield, The Analysis of Time Series: An Introduction, Chapman and Hall

12) Peter J. Brockwell, Richard A. Davis, Introduction to Time Series and Forecasting, Springer

13) Chris Brooks, Introductory Econometrics for Finance, Cambridge University Press

14) Gebhard Kirchgassner, Jurgen Wolters, Uwe Hassler, Introduction to Modern Time Series Analysis, Springer

15) G. S. Maddala, Unit roots, cointegration, and structural change, Cambridge University Press

16) Svetlozar T. Rachev, Stefan Mittnik, Frank J. Fabozzi, Sergio M. Focardi, Teo Jaic, Financial Econometrics: From Basics to Advanced Modeling Techniques, John Wiley & Sons

17) Spyros Makridakis, Steven C. Wheelwright, Rob J. Hyndman, Forecasting: Methods and Applications, John Wiley & Sons

18) Robert Alan Yaffee, Monnie McGee, An Introduction to Time Series Analysis and Forecasting: With Applications of SAS and SPSS, Academic Press

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
III	EM010305	Econometrics of Limited Dependent Variable Models and Non Linear Regression	Core	4	90
Course Objectives					
The objective of the course is to provide a rigorous yet intuitive account of econometric models in which the dependent variables are either qualitative or limited in their range because of some underlying stochastic choice mechanism. Such variables are commonly encountered in empirical work that analyses survey data and the course attempts to expose the student to the econometric tools and techniques needed to analyse the nonlinear regression models as well. The course also emphasizes the application of theoretical models and techniques with software packages.					

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Critically understand the various econometric models in which the dependent variables are either qualitative or limited in their range

2) Apply the theoretical models to the empirical data with a view to estimating the parameters

3) Use the open source econometric software packages such as Gretl, R to estimate various limited dependent variable models using real world data

4) Analyse the results and interpret the estimates of the limited dependent variable models both in theoretical and plain language.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 Qualitative Dependent Variable Models   (20 Hours)

1.1. Dichotomous Dependent Variable and The Linear Probability Model—Linear Discriminant Function

1.2. Logit and Probit Models—Ungrouped and Grouped—Dichotomous and Polychotomous Variables—Unordered, Sequential, And Ordered Categories

1.3. Logit Models with Randomized Data—Non-categorical Variables: Poisson Regression and Negative Binomial Regression

Unit-2 Multinomial Models & Bayesian Logistic Regression   (15 Hours)

2.1. Multinomial Logit and Mcfadden's Conditional Logit—Multinomial Probit Model—Nested Multinomial Logit Model—Generalized Extreme-Value Model—Conditional Logistic Models—Recursive Logistic Model

2.2. Bayesian Logistic Regression—Informative Priors

Unit-3 Limited Dependent Variable Models   (15 Hours)

3.1. Limited Dependent Variables—Truncation, Censoring and Sample Selection

3.2. Truncated Random Variable and Truncated Distributions—Moments—Truncated Regression Model—Stochastic Frontier Model

Unit-4 Censored Regression Models & Models for Duration   (20 Hours)

4.1. Censored Normal Distribution—Moments—Censored Regression (Tobit) Model

4.2. Two-Part Models and Corner Solutions—Issues of Heteroscedasticity and Non-Normality

4.3. Models for Duration—Parametric Models of Duration—Nonparametric and Semiparametric Approaches—Incidental Truncation and Sample Selection—Evaluating Treatment Effects

## Unit-5 Nonlinear Regression Models   (20 Hours)

5.1. Assumptions—Nonlinear Least Squares Estimator—Asymptotic Properties of the Estimators—Hypothesis Testing and Parametric Restrictions

5.2. Applications: Log linear Models—Partially Linear Regression—Nonparametric Regression

Select Readings

1) Garson, G. D. (2014). *Logistic Regression: Binary and Multinomial* . Statistical Associates Publishers .

2) Greene, W. H. (2017). *Econometric Analysis,*. Pearson Education.

3) Gujarati , D., & Dawn , P. C. (2009). *Basic Econometrics*. McGraw Hill .

4) Heiss, F. (2020). *Using R for Introductory Econometrics* . Createspace Independent Publishing Platform.

5) Hilbe, J. M. (2015). *Practical Guide to Logistic Regression* . CRC Press Taylor & Francis Group.

6) Kleinbaum , D. G., & Klein , M. (2010). *Logistic Regression A Self-Learning Text* . Springer .

7) Liu, X. (2016). *Applied Ordinal Logistic Regression Using Stata: From Single-Level to Multilevel Modeling* . Sage .

8) Maddala, G. S. (1983). *Limited-Dependent and Qualitative Variables in Econometrics* . Cambridge University Press .

9) Ritz , C., & Streibig , J. C. (2008). *Nonlinear Regression with R* . Spinger .

10) Smithson , M., & Merkle, E. C. (2014). *Generalized Linear Models for Categorical and Continuous Limited Dependent Variables*. CRC Press Taylor & Francis Group.

11) Stock , J. H., & Watson, M. W. (2020). *Introduction to Econometrics*. Pearson Education.

12) Wooldridge, J. M. (2015). *Introductory Econometrics: A Modern Approach*. Thomson, South Western.
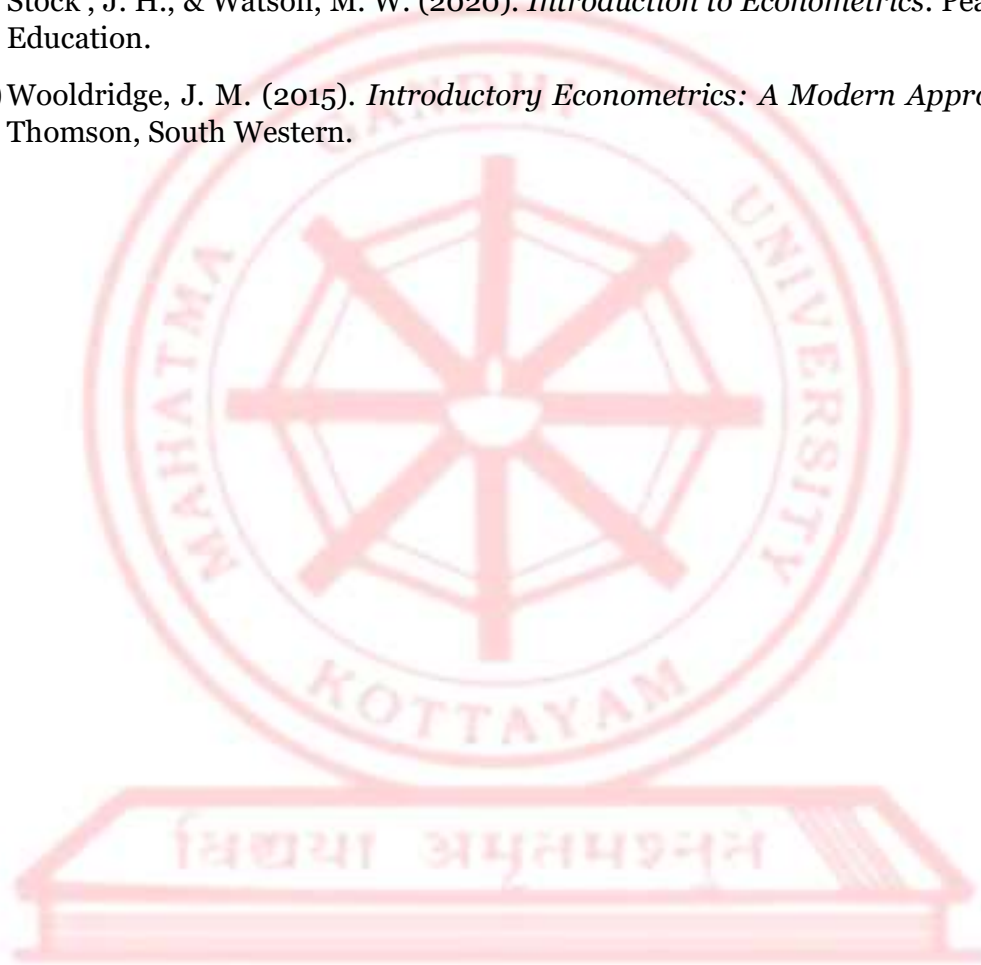
Fourth Semester

Course Code	Name of the Course	Type of the Course	Hours per Week	Credit
EM 010401	Environmental and Ecological Economics	Core	5	3
EM 010402	Kerala Economy with Database	Core	5	3
Electives Group: A				
EM 800401	Financial Econometrics	Elective	5	3
EM 800402	Panel Data Econometrics	Elective	5	3
EM 800403	Experimental Design and Cliometrics	Elective	5	3
Electives Group: B				
EM 810401	Microeconometrics	Elective	5	3
EM 810402	Macroeconometrics	Elective	5	3
EM 810403	Econometrics of Policy Evaluation	Elective	5	3
Dissertation and Viva-Voce				
EM 010403	Project/Dissertation	Core		2
EM 010404	Comprehensive Viva -Voce	Core		2

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM010401	**Environmental and Ecological Economics**	Core	3	90
Course Objectives					
The objective of the course is to enlighten the students about the basic intuition that that the economic system is a part or subsystem of a larger global ecosystem that sustains it. The course attempts to critically evaluate the fundamental vision of neoclassical economics, that the economic system is a self-sufficient whole entity unto itself. It also discusses the alternative perspectives that define and dissect the idea of sustainable growth and development with a view to having a firm grasp upon the ramifications of effects of economic growth.					

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Critically comprehend the economic problems and ecological considerations with respect to the utilisation of resources, climate change, environmental policies

2) Provide more insights about environmental valuation and environment protection movements

3) Familiarize with the practices of global environmental governance and treaties

4) Address the environmental problems and issues with a view to finding practical solutions with a firm grounding in the theoretical developments in environmental and ecological economics

Unit 1: Basic Concepts of Environment and Ecology   (10 hours)

1.1. Economy, Environment and Ecology—Environmental and Ecological Economics—Interlinkages Between the Economy and the Environment— Material Balance Approach—Strategies for Integrating Ecology and Economics

1.2. Limits to Growth—Beyond the Limits—Simon Julian's Thesis of Ultimate Resource—The Skeptical Environmentalist

1.3. Issues of Environmental Degradation—Resources: Renewable and Non-Renewable (Self Study)

1.4. Climate Change—Ozone Layer Depletion—Global Deforestation and Extinction Crises—Impact on Flora and Fauna—Endangered Species and Conservation. (Self Study)

Unit 2: Environmental Valuation (20 hours)

2.1 Environmental Valuation—Use Values—Non-Use Values—Option Values

2.2. Approaches to Environmental Valuation—Direct Methods—Contingent Valuation Method—Trade Off Game Method—Costless Choice Method—Delphi Method

2.3. Indirect Methods—Revealed Preference Methods—Travel Cost Method—Hedonic Pricing Method—Preventive Expenditure Method—Surrogate Market Approach—Wage Differential Approach—Cost Based Methods—Other Methods of Valuation

Unit 3: Environmental Policies and Issues (25 hours)

3.1. Environmental Externalities—Market Failure—Design of Environmental Policy—Quantity Based Instruments—Market Based Instruments

3.2. Pigouvian Tax and Subsidy Approach—Non-Market Instruments—Command and Control Mixed Instruments—Marketable Permits—Tradeable Pollution Permits—Bargaining Solution—Coase Theorem

3.3. Informal Regulation—Collective Action—Grass Root Movements (Chipko Movement, Save Silent Valley Movement, Narmada Bachao Andolan, Appiko Movement)

3.4. Monitoring and Enforcement—The New Model of Pollution Contro—Major Environmental Policies and Legislations in India—Eco-Taxes and Eco-Subsidies.

Unit 4: Natural Resources and Sustainable Development (25 hours)

4.1. Natural Resources—Resource Taxonomy—Theories of Optimum Use of Exhaustible and Renewable Resources—Hotteling Rule—Maximum Sustainable Yield—Common Property Resource Management

4.2. Tragedy of Commons—Environment-Development Trade Off—Ecological Sustainability—Protecting Forest Products and Services.

4.3. Sustainable Development—Various Approaches: Neo Classical Approach—Ecological Approach—UN Approach

4.4. Possible Sustainability Rules—The Hartwick-Solow Approach—Non-Declining Natural Capital Stock Approach—Safe Minimum Standards Approach—Daly's Operational Principles—

4.4. Indicators of Sustainable Development: The Solow/Hartwick Approach to Sustainability and 'Green' GNP—Natural Capital Stock Approaches—Safe Minimum Standards (SMS) Approach—Common-Perrings Model of Sustainable Development

Unit 5: Environmental Governance and Management   (10 Hours)

5.1. System of Environmental Economic Accounting (SEEA) And The Measurement—Environmentally Corrected GDP-—Ecological Footprint Analysis

5.2. Global Environmental Governance—Rio Conferences (Agenda 21)—Montreal and Kyoto Protocol—Paris Agreement—International Environmental Treaties and Institutions-

5.3. Environment And Natural Resources Accounting (ENRA)

Select Readings

1) Charles D Kolstad, (2014): *Environmental Economics*, Oxford University Press, Indian Edition.
2) Nick Hanley, Jason F. Shogren and Ben White (2010): *Environmental Economics in Theory and Practice*, Palgrave MacMillan.
3) Ahmed M. Hussen (2014): *Principles of Environmental Economics*. Routledge.
4) Horst Siebert (2010): *Economics of the Environment: Theory and Policy*, Springer.
5) Herman E Daly and Joshua Farley (2004). *Ecological Economics: Principles and Applications*. Island Press

Additional Readings

1) Charles S. P. (2000): *Economics and Global Environment*, Cambridge University Press
2) David A. Anderson (2010): *Environmental Economics and Natural Resource Management*, Routledge, London

3) Hans Wiesmeth (2012): *Environmental Economics: Theory and Policy in Equilibrium*, Springer.

4) Henk. F, H. L. Gabel, Shelby G. and Adam Rose, (2001) *Frontiers of Environmental Economics*. Edward Elgar, Cheltenham UK

5) James Crustave Speth and Peter Maas (2009). *Global Environmental Governance: Foundation of Contemporary Environmental Studies*. Island press.

6) Jonathan M. Harris and Brian Roach (2018): *Environmental and Natural Resource Economics: A Contemporary Approach*, Routledge.

7) Katar Singh, Anil Shishodia (2007): *Environmental Economics; Theory and Applications*, Sage publications, New Delhi.

8) Kavi Kumar, in Kanchan Chopra and Vikram Dayal (2009), (Ed). *Hand book of Environmental Economics*; Oxford University Press.

9) Kimio Uno and Peter Bartelmus (1998): *Environmental Accounting in Theory and Practice*, Springer

10) Lee G. Anderson and Juan Carlos Seijo (2010): *Bioeconomic of Fisheries Management*, Wiley-Blackwell, Iowa

11) Lester R. Brown (2001): *Eco Economy: Building an Economy for the Earth*, W.W Norton and Company, London

12) Lester R. Brown (2015): *The Great Transition: Shifting from Fossil Fuels to Solar and Wind Energy*, W.W Norton and Company, London

13) Mohan Munasinghe and James Gustave Speth, (2012). *Sustainable Development in Practice* Cambridge University Press.

14) Nicholas Stern (2007): *The Economics of Climate Change*: Stern review, Cambridge University Press.

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16) Olson, Jr., Mancur (1971), *The Logic of Collective action: Public Goods and the Theory of Groups*, Cambridge, Harvard University Press.

17) Ostrom, E. (1990), *Governing the Commons: The Evaluation of Institutions for Collective Actions*, Cambridge University Press, Cambridge.

18) Pearce, D.W. and R. Turner (1991): *Economics of Natural Resource Use and Environment*, John Hopkins University Press, Baltimore.

19) Pearce D.W. and Jeremy J. Warford (1996), *World without End: Economics, Environment and Sustainable Development*, OUP.

20)   Peter G. Brown and Geoffry Garner (2009), *Right Relationship, Building a whole Earth Economy*, Berrett-Koehler publishers, Sanfransisco.

21) Rabindra N Bhattacharya (2002*), Environmental Economics: An Indian Perspective*, OUP, New Delhi.

22) Steven C. Hackett (2006): *Environmental and Natural Resources Economics: Theory, Policy, and the Sustainable Society*, M.E. Sharpe, New York

23) Donella Meadows, Jorgen Randers, Dennis Meadows., (1972). *Limits to Growth*. A Potomac Associates Book

24) Sugatha Margit (2007): *India Macroeconomics Annual* 2007, Centre for Studies in Social Sciences, Kolkata, Sage Publishers

25) Tietenberg, T. (1994): *Environmental Economics and Policy*, Harper Collins, New York.

26) Tony Prato (1998): *Natural Resource and Environment Economics*, Iowa State University Press.

27) Trond Bjorndal and Gordon Munro (2012): *The Economics and Management of World Fisheries*, OUP, London

28)   Ulaganathan Sankar (2004) *Environmental Economics* OUP, New Delhi.

29) United Nations (2014): *System of Environmental Economic Accounting Central Framework*, New York.

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM010402	**Kerala Economy with Database**	Core	3	90

Course Objectives
The basic objective of the course is to introduce students to the current and critical issues, problems and challenges of the Kerala economy and thereby enhance their analytical ability to understand the dynamics of a regional economy and its development experiences in historical perspective. The contents of the course are so structured that it makes students critically aware of the pressing issues in agriculture, industry and social sectors of Kerala economy. Keeping in view the scope for alternative approaches, it discusses the competing theorisations in a consummate manner. It may help to better comprehend the variegated ramifications of the development phenomena taking place in the economic scenario of Kerala.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Dissect the Kerala's development experiences from a historical perspective.
2) Critically understand the problems, performance, prospects and of the Kerala economy.
3) Evaluate the structural changes and sectoral issues of Kerala economy.
4) Comprehend critically the fiscal and decentralisation issues of Kerala Economy
5) Familiarise the various databases on Kerala economy and use them for analysing the problems of the state economy

Unit- 1: Historical Context / Evolution   (15 Hours)

1.1. Origin of Pre-Capitalist Relations of Production and Socio-Economic Consequences: Land Tenure System from 1700 onwards—Land Ownership Pattern and Rights—Origin of Jenmon Right—Land Taxation in Malabar: Mysore Settlement and Ryotwari Settlement—Travancore Anti-Slavery Proclamation 1853—Travancore Pattom Proclamation 1865—Mobilisation of Agricultural Labour

1.2. Commercialisation of Agriculture: Shift from Food Crops to Cash Crops—Social and Political Movements—Welfare State Initiatives of Princely States— (Self-Study)

1.3. Kerala's Development Experience—Limits to Kerala model of development—Outliers—Issues of Inequality: Income and Gender— Social Security—Sustainability Issues

1.4. Broad Features of Kerala Economy—Trends and Pattern of GSDP and Sectoral Contribution

Unit- 2: Agriculture and Allied Sectors   (20 Hours)

2.1. Agriculture Growth and Performance—Trends in Production and Productivity
2.2. Land Reforms and Land Use Pattern—Cropping Pattern and Changes
2.3. Food Security and Nutrition
2.5. Agricultural Wages
2.6. Collective Farming Initiatives
2.7. Finance to Agriculture
2.10. Agricultural Stagnation

Unit- 3: Industrial Sector and Business   (15 Hours)

3.1. Industry—Growth and Performance—Hypothesis of Industrial stagnation in Kerala
3.2. Labour Relations
3.3. Mining, Manufacturing and Construction Sector—Issues and Challenges
3.4. State Public Sector Undertakings
3.5. Industrial Financing in Kerala

Unit- 4: Service Sector   (20 Hours)

4.1. Growth and Performance of Service Sector
4.2. Performance of Service Sub-Sectors—Economic Infrastructure—Transport—Energy—Communication

4.3. Social Infrastructure—Health and Education—Pattern of Public Expenditure—Issues of Morbidity and Ageing—Tendencies of Exclusion

4.5. Trends, Pattern and Problems of Migration—Role of Remittance

4.6. In Migration—Issues of Interstate Migration

Unit- 5: Local Governments, Fiscal Issues and Databases   (20 Hours)

5.1. Decentralised Planning—Performance of Local Government—Financing of Local Government Plans—Rural Development Programmes—Kudumbasree—Problems of Decentralised Planning: Bureaucratic Capture

5.2 Fiscal Issues of Kerala—Fiscal Crisis—Nature, Magnitude and Causes—KIIFB—State Finance Commissions

5.3 Databases On Kerala Economy—Kerala State Panning Board—Dept of Economic and Statistics Kerala—Census Data—National Level Data Base (RBI DBIE and EPW RF)

Select Readings: Unit-1-1

1) Banerjee , A., & Iyer, L. (n.d.). History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India. *American Economic Review, 95*(4), 1190-1213.

2) Bharadwaj , K., & Das, P. K. (1975). Tenurial Conditions and Mode of Exploitation: A Study of Some Villages in Orissa. *Economic and Political Weekly, 10*(5/7), 221-40.

3) Cherian, P. (2006). Land Tenure Legislations in Kerala: An Enquiry into Their Roots in 1865 in Travancore. *Proceedings of the Indian History Congress, 67*, 457-463.

4) Desai, M. (2005). Indirect British Rule, State Formation, and Welfarism in Kerala, India, 1860-1957. *Social Science History, 29*(3), 457-488.

5) Ganesh, K. N. (1991). Ownership and Control of Land in Medieval Kerala: Janmam and Kanam Relations during the 16th-18th Centuries. *The Indian Economic and Social History Review, 28*(3), 299-321.

6) Ganesh, K. N. (2002). Trade Networks and the Process of Production in Medieval Kerala. In M. O. Koshi, *Cannanore in the Maritime History of India, Kannur* (pp. 30-42). The Kannur University.

7) Kannan, K. P., & Hari, K. S. (2020). Revisiting Kerala's Gulf Connection: Half a Century of Emigration, Remittances and Their Macroeconomic Impact, 1972–2020. *The Indian Journal of Labour Economics, 63*, 941–967.

8) Kooiman, D. (1992). State Formation in Travancore: Problems of Revenue, Trade and Armament. In A. V. Hoek, D. H. Kolff, & M. S. Oort, *Ritual, State and History in South Asia: Essays in Honour of J.C. Heesterman* (p. 5). Leiden: E.J. Brill.

9) Menon, D. M. (1999). Houses by the Sea: State-Formation Experiments in Malabar, 1760-1800. *Economic and Political Weekly, 34*(21), 1995-2003.

10) Nair, P. R. (1976). Education and Socio-Economic Change in Kerala, 1793-1947. *Social Scientist, 4*(8), 28-43.

11) Oommon, T. K. (1975). Agrarian Legislations and Movements as Sources of Change: The Case of Kerala. *Economic and Political Weekly, 10*(40), 1571-1584.

12) Prakash, B. A. (1988). Agricultural Backwardness of Malabar during the Colonial Period: An Analysis of Economic Causes. *Social Scientist, 16*(6/7), 51-76.

13) Ravindran, G. (1995). Political Economy of Late Pre-Colonial Malabar. *Social Science Probings, 11/12*, 66-87.

14) Ravindran, G. (1996). *Aspects of the Agrarian Economy of Malabar: Mid 19th century Upto the End of the Second World War*. PHD Thesis Submitted to JNU, New Delhi. Retrieved from https://shodhganga.inflibnet.ac.in/handle/10603/17369?mode=full

15) SheaJr, T. (1959). Barriers to Economic Developments in Traditional Societies: Malabar A Case Study. *The Journal of Economic History, 19*(4), 504-522.

16) S'Jacob, H. K. (1994). State Formation and the Role of Portfolio Investors in Cochin. *Itinerario , 18*(1), 65-85.

17) Thomas, P. J. (2021). The Economic Incidence of Tenurial Systems. In E. M. Thomas, *Collected Scientific Papers of the Pioneering Economist and Planner P.J. Thomas* (pp. 125-136). Academic Foundation New Delhi. *(Forthcoming)*

18) Varghese, T. (1970). *Agrarian Change and Economic Consequences Land Tenures in Kerala 1850-1960*. Allied Publishers, Bombay.

19) Varier, M. R., & Gurukkal, R. (1997). Parambu-Purayiṭa Sambadvyavasta. In M. R. Varier, *Madhakāla Kēraḷam Sambatt, Samūham, Samskāram* (pp. 23-32). Thiruvanthapuram: Chintha Publications.

Select Readings: Unit-1.2 to 1.4

1) Chakraborty, A. (2005). Kerala's Changing Development Narratives. *Economic and Political Weekly, 40*(6), 541-547.

2) George, K. (1993). *Limits to Kerala Model of Development*. Centre for Development Studies.

3) George, K. K. (2011). Kerala Economy: Growth, Structure, Strength and Weakness. *Working Paper No. 25, Centre for Socio-Economic & Environmental Studies, Kochi*.

4) Justino, P. (2006). Impact of Collective Action on Economic Development: Empirical Evidence from Kerala, India. *World Development, 34*(7), 1254–1270.

5) Kannan, K. (2005). Kerala's Turnaround in Growth: Role of Social Development, Remittances and Reform. *Economic and Political Weekly, 40*(6), 548-554.

6) Kurien, J. (1995). The Kerala Model: Its Central Tendency and the Outlier. *Social Scientist, 23*(1/3), 70-90.

7) Oommen, M. A. (2014). Growth, Inequality and Well-Being. *Journal of South Asian Development, 9*(2), 173–205.

8) Pani , N., & Jafar , K. (2010). Mass Education-Led Growth and Non-Agrarian Villages: Long-Term Results of the Kerala Model. *Oxford Development Studies, 38*(1), 25-42.

9) Rammohan, K. (2000). Assessing Reassessment of Kerala Model. *Economic and Political Weekly, 35*(15), 1234-1236.

10) Singh, P. (2010). We-Ness and Welfare: A Longitudinal Analysis of Social Development in Kerala, India. *World Development, 39*(2), 282–293.

11) Tharakan, P. K. (2008). When the Kerala Model of Development is Historicised: A Chronological Perspective. *Working Paper No. 19, Centre for Socio-Economic & Environmental Studies, Kochi.*

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13) Vernon, R. (n.d.). The ``New'' Kerala Model: Lessons for Sustainable Development. *World Development, 29*(4), 601-617.

Select Readings: Unit-2

1) Baby, A. A. (1996). *Trends in Agricultural Wages in Kerala 1960-1990.* Centre for Development Studies.

2) Johnson, D. M. (2018). Cropping Pattern Changes in Kerala, 1956-57 to 2016-17. *Review of Agrarian Studies, 8*(1).

3) Jose, A. V. (1973). Wage Rates of Agricultural Labourers in Kerala. *Economic and Political Weekly*(23), 281-288.

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5) Kannan , K. P., & Pushpangadan, K. (1988). Agricultural Stagnation in Kerala: An Exploratory Analysis. *Economic and Political Weekly, 23*(39), A120-A128.

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7) Kannan, K. P. (2011). Agricultural Development in an Emerging Non-Agrarian Regional Economy: Kerala's Challenges. *Economic and Political Weekly,, 46*(9), 64-70.

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9) Kannan, K. P., & Pushpangadan., K. (1990). Dissecting Agricultural Stagnation in Kerala: An Analysis Across Crops, Seasons and Regions. *Economic and Political Weekly, 25*(35/36).

10) Krishnan, T. N. (1991). Wages, Employment and Output in Interrelated Labour Markets in an Agrarian Economy: A Study of Kerala. *Economic and Political Weekly, 26*(26), A82–A96.

11) Kumar, B. M. (2005). Land Use in Kerala: Changing Scenarios and Shifting Paradigms. *Journal of Tropical Agriculture, 42*(1-2).

12) Radhakrishnan, P. (1981). Land Reforms in Theory and Practice: The Kerala Experience. *Economic and Political Weekly, 16*(52), A129–A137.

13) Scaria, S. (2010). Changes in Land Relations: The Political Economy of Land Reforms in a Kerala Village. *Economic and Political Weekly, 45*(26/27), 191-198.

14) Thomas, J. J. (2011). Paddy Cultivation in Kerala. *Review of Agrarian Studies, 1*(2).

15) Thomas, P. M. (2004). Agricultural Performance in Kerala. In B. A. Prakash, *Kerala's Economic Development Performance and Problems in the Post-Liberalization Period*. SAGE Publications Pvt. Ltd.

Select Readings: Unit-3

1) Albin, A. (1990). Manufacturing Sector in Kerala: Comparative Study of its Growth and Structure. *Economic and Political Weekly, 25*(37), 2059– 2070.

2) Mani, S. (1996). Economic Liberalisation and Kerala's Industrial Sector: An Assessment of Investment Opportunities. *Economic and Political Weekly, 31*(34), 2323-2330.

3) Pillai, P. M. (1990). Whither State Sector Enterprises in Kerala? *Economic and Political Weekly, 25*(7/8), M9-M16.

4) Rammohan, K. T. (1995). Captains of the Sands: Metropolitan Hegemony in Mining in Tiruvitamkur, 1900-50. *Economic and Political Weekly, 30*(52).

5) Subrahmanian, K. K. (1990). Development Paradox in Kerala: Analysis of Industrial Stagnation. *Economic and Political Weekly,, 25*(37), 2053-2058.

6) Subrahmanian, K. K., & Pillai, P. M. (1986). Kerala's industrial Backwardness: Exploration of Alternative Hypotheses. *Economic and Political Weekly, 21*(14), 577-592.

7) Subrahmanian, K. K., & Pillai, P. M. (1994). Liberalisation and Small industry: Need for New Growth Strategy in Kerala. *Economic and Political Weekly, 29*(33), 2168-2174.

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9) Thomas, J. J. (2003). Labour and industrialization in Kerala. *Indian Journal of Labour Economics, 46*(4), 575–592.

10) Thomas, J. J. (2005). Kerala's industrial Backwardness: A Case of Path Dependence in industrialization? *World Development, 33*(5), 763-83.

Select Readings: Unit-4

1) Dilip, T. R. (2000). Understanding the level of morbidity and hospitalization in Kerala, India. *Bulletin of the World Health Organization, 80*(9), 746–51.

2) Hari, K. S., & Kannan, K. P. (2020). Kerala's Gulf Connection: Remittances and their Macroeconomic Impact. *The Indian Journal of Labour Economics, 63*(4), 941-967.

3) Kannan, K. P. (2005). Kerala's Turnaround in Growth: Role of Social Development, Remittances and Reform. *Economic and Political Weekly, 40*(6), 548-554.

4) Kumar, N., & George, K. K. (2009). Kerala's Education System: from Inclusion to Exclusion? *Economic and Political Weekly, 44*(41/42), 55-61.

5) Kutty, V. R. (2000). Historical Analysis of the Development of Health Care Facilities in Kerala State, India. *Health Policy and Planning, 15(1),* , 103–109.

6) Naryana, D., & Kurup, H. (2000). Decentralization of the Health Care Sector in Kerala: Some issues. *Working Paper No 298, Centre for Development Studies, Thiruvananthapuram.*

7) Rajan , S. I., & Zachariah, K. C. (2019). Emigration and Remittances: New Evidences from the Kerala Migration Survey, 2018. *Working Paper 483, Centre for Development Studies, Thiruvananthapuram.*

8) Shyjan, D. (2009). Growth and Sectoral Performance of Kerala Economy: Evidences from a Long-Term Analysis. In K. Rajan, *Kerala Economy: Trends During the Post Reform Period.* Serials, New Delhi.

9) Shyjan, D. (2014). The Services Sector and Structural Transformation in Kerala, in. In M. V. Kurien, & R. John, *Kerala Economy and its Emerging issues.* SPSS, Kottayam.

10) Zachariah, K. C., Gopinathan Nair, P. R., & Rajan, S. I. (2001). Return Emigrants in Kerala: Rehabilitation Problems and Development Potential. *Working Paper No 319, Centre for Development Studies, Thiruvananthapuram.*

11) Zachariah, K. C., Mathew, E. T., & Rajan, S. I. (2001). Impact of Migration On Kerala's Economy and Society. *International Migration, 39*(1).

Select Readings: Unit-5

1) Isaac , T. T., & Tharakan , P. M. (n.d.). Kerala: The Emerging Perspectives: Overview of the international Congress On Kerala Studies. *Social Scientist, 23*(1/3), 3-36.

2) Babu, M. S. (2005). Kerala's Growth Trajectory. *Economic and Political Weekly, 40*(30), 3291-3292.

3) C T Kurien. (n.d.). Kerala's Development Experience: Random Comments About the Past and Some Considerations for the Future. *Social Scientist, 23*(1/3), 50-69.

4) CDS. (1977). *Poverty, Unemployment, and Development Policy: A Case Study of Selected issues with Reference to Kerala*. Orient Longman, New Delhi.

5) Deshpande, A. (2000). Does Caste Still Define Disparity? A Look at Inequality in Kerala, India. *The American Economic Review, 90*(2), 322-325.

6) Frank , R. W., & Chasin, B. H. (1992). *Kerala Development Through Radical Reform*. Promilla and Co., New DelhI.

7) George, K. K. (1990). Kerala's Fiscal Crisis: A Diagnosis. *Economic and Political Weekly, 25*(37), 2097-2105.

8) George, KK , K. K., & Krishnakumar, K. K. (2003). Fiscal Management in Kerala: Constraints and Policy Options. *Working Paper No.9, CSES Kochi*.

9) George, P. S. (1988). Dilemma of Cost of Cultivation in Kerala. *Economic and Political Weekly, 23*(39), A129-A132 .

10) GOI. (n.d.). *Kerala Development Report*. Planning Commission of India.

11) Harilal, K. N. (2013). Confronting Bureaucratic Capture: Rethinking Participatory Planning Methodology in Kerala. *Economic and Political Weekly,, 48*(36), 52-60.

12) Harilal, K. N., & Eswaran, K. K. (2016). Agrarian Question and Democratic Decentralization in Kerala,, June, 2017. *Agrarian South: Journal of Political Economy, 5*(2/3).

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14) Heller, P. (1999). *The Labour of Development: Workers and the Transformation of Capitalism in Kerala, India*. Cornell University Press.

15) Isaac, T. T., & Tharakan, P. M. (n.d.). Kerala: Towards a New Agenda. *Economic and Political Weekly, 30* (31/32), 1993-2004.

16) Jeffrey, R. (1992). *Politics, Women and Well Being: How Kerala Became a Model*. Cambridge University Press.

17) Jeromi, P. D. (n.d.). What Ails Kerala's Economy: A Sectoral Exploration. *Economic and Political Weekly, 38*(16), 1584-1600.

18) Kannan, K. P. (1999). Rural Labour Relations and Development Dilemmas in Kerala: Reflections On the Dilemmas of a Socially Transforming Labour force in a Slowly Growing Economy. *Journal of Peasant Studies, 26*(2/3).

19) Kannan, K. P. (2011). Agricultural Development in an Emerging Non-Agrarian Regional Economy: Kerala's Challenges. *Economic and Political Weekly, 46*(9), 64-70.

20) KSPB. (n.d.). *Economic Review, (Various issues)*. Kerala State Planning Board, Thiruvananthapuram.

21) KSPB. (n.d.). *Human Development Report, Various Issues*. Kerala State Planning Board, Thiruvananthapuram .

22) KSPB. (n.d.). *Kerala Development Report, Various Issues*. Kerala State Planning Board, Thiruvananthapuram.

23) Mathew, E. T. (1995). Educated Unemployment in Kerala: Some Socio-Economic Aspect. *Economic and Political Weekly, 30*(6), 325-335.

24) Mohan, R. (2019). Finance Commissions and Federal Fiscal Relations in India - Analysing the Awards of 11th to 14th Finance Commissions . *Working Paper No. 484, Centre for Development Studies, Thiruvananthapuram*.

25) Mohan, R., & Shyjan, D. (2007). Taxing Powers and Developmental Role of the Indian States: A Study with Reference to Kerala. *Review of Development and Change, 12*(1), 99–127.

26) Nielsen, K. B. (n.d.). Political Economy of Development in India: Indigeneity in Transition in the State of Kerala. *Forum for Development Studies, 43*(3), 531-533.

27) PillaI, K. R. (2010). *Land Reforms in Kerala*. APH Publishing Corporation, New Deilhi.

28) Pillai, N. V. (2008). Doubling Kerala's NSDP In 3 Years – Implications for Investment and its Financing. *MPRA Paper 8876, University Library of Munich, Germany.*

29) Pillai, N. V. (2008). Power Sector Reform: Some Lessons for Kerala. *MPRA Paper 12334 University Library of Munich, Germany.*

30) Pillai, P. M., & Shanta, N. (2005). Kerala's Turnaround in Growth. *Economic and Political Weekly, 40*(41), 4481-4483.

31) Prakash, B. A. (2020). *Local Finance, Fiscal Decentralisation and Decentralised Planning: A Kerala Experience*. Sage Publications.

32) Prasad, S. (2013). Polarisation, inequality and inclusive Growth: Kerala's Experience in the Reform Period. *Journal of South Asian Studies, 1*(2), 91-103.

33) Raj, K. N., & Tharakan, M. (1981). Agrarian Reform in Kerala and its Impact on the Rural Economy : A Preliminary Assessment. *Working Paper No 49, International Labour Office.*

34) Rajan, K. (2009). *Kerala Economy: Trends During the Post Reform Period.* Serials, New DelhI.

35) Sato, H. (2004). Social Security and Well-Being in A Low-income Economy: An Appraisal of the Kerala ExperiencE. *The Developing Economies, 42*(2), 288-304.

36) Sreeraj, A. P., & Vakulabharanam, V. (2016). Sreeraj A. P & Vamsi Vakulabharanam (): High Growth and Rising Inequality in Kerala Since the 1980s. *Oxford Development Studies, 44*(4), 367-383.

37) Subramanian, K. K. (2006). Economic Growth in the Regime of Reforms: Kerala's Experience. *Economic and Political Weekly, 41*(10), 885-890.

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39) Tharakan, P. M., & Rawal, V. (2001). Decentralization and the People's Campaign in Kerala. *Social Scientist, 29*(9), 1-6.

40) Tharamangalam, J. (2011). Is Food insecurity in Kerala a Myth? *Economic and Political Weekly, 46*(20), 69-71.

41) Tharamangalam, J. (n.d.). *Kerala: The Paradoxes of Public Action and Development, .* Orient Longman, New Delhi.

42) Thresia, C. U. (2014). Social Inequities and Exclusions in Kerala's Egalitarian Development. *Monthly Review, 65*(9).

43) Yadu, C. R. (2015). The Land Question and the Mobility of the Marginalized: A Study of Land Inequality in KeralA. *Agrarian South: Journal of Political Economy, 4*(3).

44) Zachariah, K. C., & Rajan, S. I. (2003). *Dynamics of Migration in Kerala: Dimensions, Differentials and Consequences.* Orient Black Swan Books, New Delhi.

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Fourth Semester: Electives Group-A

Course Code	Name of the Course	Type of the Course	Hours per Week	Credit
Electives Group: A				
EM 800401	Financial Econometrics	Elective	5	3
EM 800402	Panel Data Econometrics	Elective	5	3
EM 800403	Experimental Design and Cliometrics	Elective	5	3

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM800401	**Financial Econometrics**	Elective: Group A	3	90

Course Objectives
The basic objective of the course is to focus up on econometric models widely and frequently used in the examination of issues in financial economics and financial markets. The course addresses the issues connected with the application and implementation of the techniques of financial econometrics regarding the testing of theories, analysis of volatility, prediction of the behaviour of financial variables and the development of strategies with respect to asset management.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Analyse critically the empirical issues in financial economics and financial markets with the application of various econometric models

2) Critically comprehend and test empirically the efficient markets hypothesis, the predictability of asset returns and volatility models

3) Apply the various theoretical models to the financial data with a view to estimating and predicting the parameters

4) Use the open source econometric software packages such as Gretl, R to estimate various limited dependent variable models using real world data

5) Analyse the results and interpret the estimates of the financial econometric models both in theoretical and plain language.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 Introduction to Financial Markets and Efficient Markets Hypothesis (15 Hours)

1.1. Types of Markets and Trading—Financial Returns: Definition and Measurement—Returns as Random Variables and their Properties—Risk Aversion—Mean Variance Portfolio Analysis—Capital Asset Pricing Model—Arbitrage Pricing Theory

1.2. Return Predictability and the Efficient Markets Hypothesis—Assumptions—Investment Strategies other than EMH—Economic Critiques of the EMH

Unit-2 Random Walk Model, Alternatives & Empirical Evidence
(20 Hours)

2.1. Assumptions About Return Innovations—Testing of Linear Weak Form Predictability under various Assumptions—Autocorrelation Based Testing—Cross Autocorrelations—Empirical Evidence Regarding Linear Predictability—Variance Ratio Statistics—Variance Ratio Test—Autoregression Tests—Testing under More General Conditions—Trading Time Versus Calendar Time

2.2. Alternatives to EMH—Local Alternatives—Fads Model—Time Varying Expected Return—Adaptive Markets Hypothesis

2.3. Empirical Evidence of Linear Predictability based on Variance Ratios—Trading Strategy Based Evidence—Regression Based Tests of Semi-Strong Form Predictability—Robust Tests and Tests of Nonlinear Predictability of Returns

Unit-3 Univariate Financial Time Series Models & High Frequency Data
(20 Hours)

3.1. Linear Time Series Analysis—Applications—Stationarity—Simple Autoregressive Models—Simple Moving-Average Models—Simple ARMA Models—Unit-Root Nonstationary—Seasonal Models—Regression Models with Time Series Errors—Long Memory Models—Model Comparison—Case Studies

3.2. Nonlinear Models—Applications—Nonlinearity Tests—Forecasting

3.3. High Frequency Financial Data—Nonsynchronous Trading—Empirical Characteristics of Trading Data

3.4. Models for Price Changes—Ordered Probit Model—Decomposition Model—Duration Models with Application in Financial Economics—Diurnal Component—ACD Model—Estimation—Realized Volatility—Handling Microstructure Noises—Nonlinear Duration Models

Unit-4 Multivariate Financial Time Series Analysis   (15 Hours)

4.1 Weak Stationarity and Cross-Correlation Matrixes—Vector Autoregressive Models—Vector Moving-Average Models—Vector ARMA Models

4.2. Unit-Root Nonstationary and Cointegration—Error Correction Models—Threshold Cointegration and Arbitrage

4.3. Principal Component Analysis—Factor Analysis—Applications in Financial Economics

Unit-5 Volatility Models and Their Applications   (20 Hours)

5.1. Conditional Heteroscedastic Models—Characteristics of Volatility—ARCH Model—GARCH Model—Integrated GARCH Model—GARCH-M Model—Exponential GARCH Model—Threshold GARCH Model— Asymmetric Power ARCH Models

5.2. Asymmetric GARCH Models: GJR Model and EGARCH Model—Tests for Asymmetries in Volatility—GARCH-in-Mean—Testing Non-Linear Restrictions—Volatility Forecasting—CHARMA Model

5.3. Random Coefficient Autoregressive Models—Stochastic Volatility Model—Forecasting Covariances and Correlations—Covariance Modelling and—Simple Covariance Models—Multivariate GARCH Models—Direct Correlation Models—Time-Varying Hedge Ratio—Long-Memory Stochastic Volatility Model—Higher Dimensional Volatility Models—Factor-Volatility Models—Applications of Volatility Models—Option Pricing and Hedging

Select Readings

1) Brooks, C. (2019). *Introductory Econometrics for Finance* . Cambridge University Press .

2) Cuthbertson, K., & Nitzsche, D. (2004). *Quantitative Financial Economics: Stocks, Bonds and Foreign Exchange.* John Wiley & Sons .

3) Hens, T., & Rieger, M. O. (2016). *Financial Economics: A Concise Introduction to Classical and Behavioral Finance.* Springer.

4) Rachev, S. T., Mittnik, S., Fabozzi, F. J., Focardi, S. M., & Jasic, T. (2007). *Financial Econometrics: From Basics to Advanced Modeling Techniques.* John Wiley & Sons.

5) Ross , S. A. (2005). *Neoclassical Finance.* Princeton University Press.

6) Tsay, R. S. (2002). *Analysis of Financial Time Series.* John Wiley & Sons.

7) Tsay, R. S. (2013). *An Introduction to Analysis of Financial Data with R.* John Wiley & Sons.

8) Tsay, R. S. (2014). *Multivariate Time Series Analysis With R and Financial Applications.* John Wiley & Sons .

9) Cambell , J. Y., Lo , A. W., & Mackinlay, A. C. (1997). The Econometrics of Financial Markets . Princeton University Press.

10) Linton, O. (2019). Financial Econometrics Models and Methods . Cambridge University Press

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM800402	**Panel Data Econometrics**	Elective: Group A	3	90

Course Objectives
The objective of the course is to provide a simple yet rigorous discussion of some of the basic issues of panel data analysis by employing the various econometric methods and techniques. The course attempts to explore the data in a deeper manner helpful to better study the dynamics of adjustment of economic variables and phenomena which may otherwise appear relatively stable hiding a multitude of changes taking place beneath.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Critically understand the econometric techniques to deal with various types of panel data sets

2) Apply critically the various panel data techniques to deal with the error component regression models, serial correlation, heteroscedasticity, seemingly unrelated regressions, simultaneous equations, dynamic models, incomplete panels, limited dependent variables and nonstationary panels.

3) Apply the various theoretical models to the panel data sets with a view to estimating the parameters

4) Use the open source econometric software packages such as Gretl, R to estimate various limited dependent variable models using real world data

5) Analyse the results and interpret the estimates of the limited dependent variable models both in theoretical and plain language.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 Error Component Regression Model   (20 Hours)

1.1. Panel Data: Micro-panels and Macro-panels—Balanced and Unbalanced Panels—Short and Long Panels—Benefits and Limitations

1.2. One-Way Error Component Regression Model—One-Way Fixed Effects Model—One-Way Random Effects Model—Maximum Likelihood Estimation

1.3. Two-Way Error Component Regression Model—Two-Way Fixed Effects Model—Two-Way Random Effects Model—Maximum Likelihood Estimation

Unit-2 Test of Hypotheses with Panel Data   (15 Hours)

2.1. Tests for Poolability—Tests for Individual and Time Effects—Hausman's Specification Test

2.2. Heteroscedasticity and Serial Correlation in the Error Component Model—AR (p) and MA (q) Process—Unequally Spaced Panels with AR(1) Disturbances

2.3. Time-Wise Auto correlated and Cross-Sectionally Heteroskedastic Panel Regression

Unit-3 SUR, Simultaneous Equations and Dynamic Panel Data Models
(20 Hours)

3.1. Seemingly Unrelated Regressions with Error Components—One-Way Model and Two-Way Models—Applications

3.2. Simultaneous Equations with Error Components—Single Equation Estimation—System Estimation—Hausman and Taylor Estimator

3.3. Dynamic Panel Data Models—Arellano and Bond Estimator—Arellano and Bover Estimator—Ahn and Schmidt Moment Conditions—Blundell and Bond System GMM Estimator—Keane and Runkle Estimator—Limited Information Maximum Likelihood

Unit-4 Unbalanced & Other Panel Data Models   (20 Hours)

4.1. Unbalanced One-Way Error Component Model—ANOVA Methods—Maximum Likelihood Estimators—Minimum Norm and Minimum Variance Quadratic Unbiased Estimators (MINQUE and MIVQUE)

4.2. Unbalanced Two-Way Error Component Model—Testing for Individual and Time Effects Using Unbalanced Panel Data—Unbalanced Nested Error Component Model

4.3. Measurement Error and Panel Data—Rotating Panels—Pseudo-Panels—Short-Run Versus Long-Run Estimates in Pooled Models—Heterogeneous Panels—Count Panel Data

Unit-5 Limited Dependent Variables and Non Stationary Panels
(15 Hours)

5.1. Fixed and Random Logit and Probit Models—Dynamic Panel Data Limited Dependent Variable Models—Selection Bias—Censored and Truncated Panel Data Models

5.2. Nonstationary Panels—Panel Unit Roots Tests—Cross-Sectional Independence and Dependence Test—Spurious Regression—Panel Cointegration Tests

Select Readings

1) Baltagi, B. H. (2013). *Econometric Analysis of Panel Data* . Springer .

2) Croissant , Y., & Millo , G. (2019). *Panel Data Econometrics with R*. John Wiley & Sons Ltd.

3) Hsiao, C. (2014). *Analysis of Panel Data*. Cambridge University Press .

4) Longhi , S., & Nandi , A. (2015). *A Practical Guide to Using Panel Data.* Sage.

5) Pesaran, M. H. (2015). Time Series and Panel Data Econometrics. Oxford University Press .

6) Tsionas, M. (Ed.). (2019). *Panel Data Econometrics: Empirical Applications.* Academic Press.

7) Tsionas, M. (2019). *Panel Data Econometrics: Theory.* Academic Press .

8) Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data.* The MIT Press .

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM800403	**Experimental Design and Cliometrics**	Elective: Group A	3	90
		Course Objectives			

The main objective of the course is to explore and dissect the issue of causality in social sciences in general and economics in particular. The course attempts to discuss critically the various research designs, methods and techniques widely used in empirical research to grapple with the problem of casual relationships between economic variables. It also discusses critically the application of econometric methods with a view to analysing the problems of economic history.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Critically understand the econometric techniques to explore the problem of causality in economics

2) Evaluate the applications of Cliometrics methods to comprehend the problems of economic history

3) Apply critically the various econometric techniques involved in randomised control trials, natural experiments and regression discontinuity designs

4) Use the open source econometric software package R to estimate the parameters with casual models by using the real world data

5) Analyse the results and interpret the estimates of the casual models both in theoretical and plain language.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 Introduction to Casual Models **(10 Hours)**

1.1. The Experimental Ideal—Problems of Pre and Post-test Design—Non-randomised Controlled Trials and Selection Bias—Quasi-random Methods—Random Assignment and Selection Problem

1.2. Methods of Randomisation—Sources of Bias—Regression Analysis of Experiments—Regression Fundamentals—Regression and Causality—Heterogeneity and Nonlinearity

Unit-2 The Econometrics of Randomized Experiments   (20 Hours)

2.1. Randomized Experiments and Validity—Rubin Causal Model Framework—Completely Randomized Experiments—Randomization Inference and Regression Estimators—Stratified and Paired Randomized Experiments—Design and Benefits—

2.2. Clustered Randomized Experiments—Noncompliance in Randomized Experiments—Heterogeneous Treatment Effects and Pre-treatment Variables—Experiments in Settings with Interactions

2.3. RCT: Practical Challenges and Ethical Issues—Natural Experiments and Randomized Natural Experiments

Unit-3 Method of Instrumental Variables (IVs)   (20 Hours)

3.1. IV and Causality—Two-Stage Least Squares—Wald Estimator—Grouped Data and 2SLS—Asymptotic 2SLS Inference—Two-Sample IV and Split-Sample IV—IV with Heterogeneous Potential Outcomes—Local Average Treatment Effects—Compliant Subpopulation—

3.2. IV in Randomized Trials—Generalizing Local Average Treatment Effect (LATE)—LATE with Multiple Instruments—Covariates and Heterogeneous Effects Model—2SLS Mistakes—Peer Effects—Limited Dependent Variables Reprise—Bias of 2SLS

Unit-4 Regression Discontinuity and Quantile Regression   (25 Hours)

4.1. Regression Discontinuity (RD) Designs—Assumptions and their Validity—Sharp RD—Fuzzy Set Theory—Fuzzy RD and IV—Tests for Self-Selection and Sorting—Conditions for Valid Casual Inference—Precision of Regression Discontinuity Estimates—LATE Effect and Estimators—Limitations of RDD

4.2. Differences-In-Differences Method—Assumptions— and Panel Data—Individual Fixed Effects—Fixed Effects Versus Lagged Dependent Variables—Limitations of DD—Matching Methods— Matching Techniques—Limitations of Matching Method

4.3. Conditional Quantile Function (CQF)—Quantile Regression Mode—Estimation of Quantile Treatment Effects

4.4. Issues of Nonstandard Standard Error—Bias of Robust Standard Error Estimates—Clustering and Serial Correlation in Panels—Derivation of Simple Moulton Factor

Unit-5 Cliometrics (15 Hours)

5.1. Economic History and Cliometrics—Origin and Basics of Cliometrics—New Economic History—Counterfactual Approach—Critical Viewpoints

5.2. Econometric Techniques for Cliometrics: Multivariate Regression—Instrumental Variables (IVs) And Regression Discontinuity Designs (RDDs)

5.3. Selected Applications of Cliometric Methods—Railroads and Economic Growth—Labour Market Studies

Select Readings (Unit 1-4):

1) Angrist , J. D., & Pischke, J.-S. (2019). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press .

2) Angrist, J. D., & Pischke, J.-S. (2015). *Mastering Metrics: The Path from Cause to Effect*. Princeton University Press .

3) Banerjee, A. V., & Duflo, E. (2017). *Handbook of Economic Field Experiments Volume-1*. North-Holland Elsevier .

Additional Readings (Unit 1-4)

1) Bedecarrats , F., Guerin , I., & Rouba, F. (Eds.). (2020). *Randomized Control Trials in the Field of Development: A Critical Perspective*. Oxford University Press .

2) Glennerster , R., & Takavarasha, K. (2013). *Running Randomized Evaluations: A Practical Guide*. Princeton University Press .

3) O'Cathain, A. (2018). *A Practical Guide to Using Qualitative Research with Randomized Controlled Trials*. Oxford University Press .
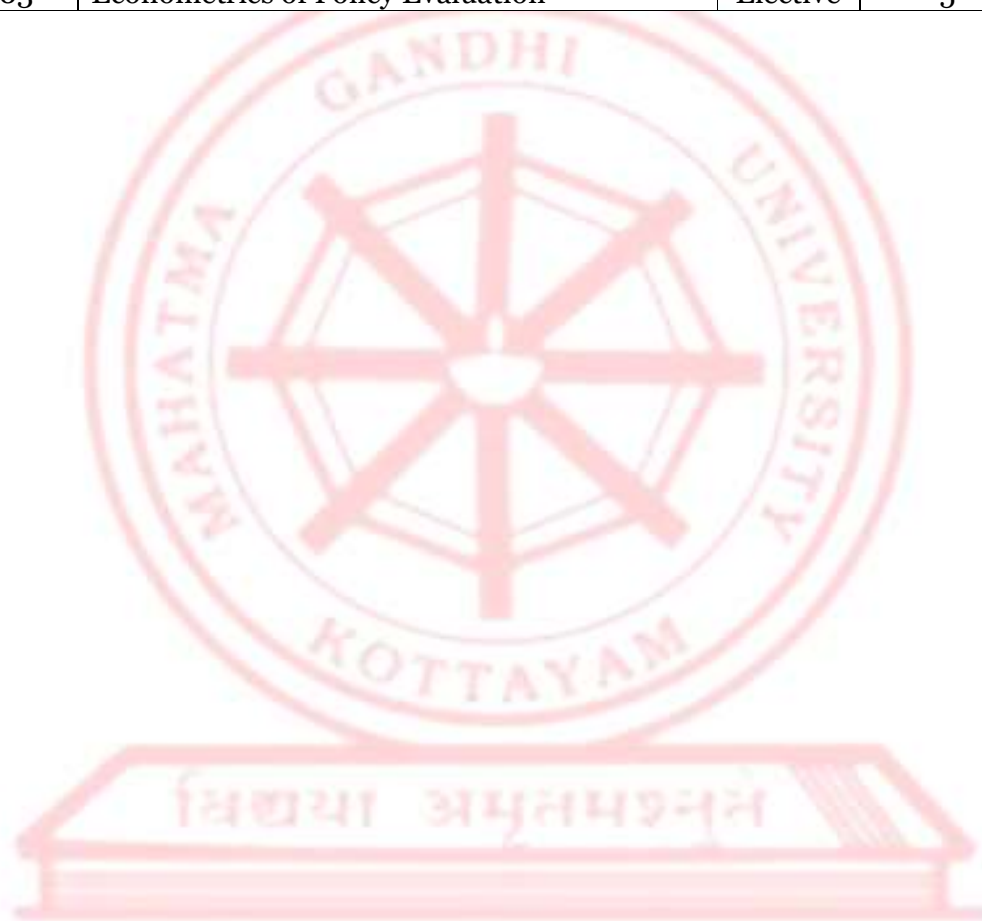
4) Ogden, T. N. (Ed.). (2016). *Experimental Conversations: Perspectives on Randomized Trials in Development Economics*. The MIT Press .

5) Torgerson, D. J., & Torgerson, C. J. (2008). *Designing Randomised Trials in Health, Education and the Social Sciences: An Introduction*. Palgrave Macmillan.

6) Cerulli, G. (2015). *Econometric Evaluation of Socio-Economic Programs Theory and Application*. Springer .

7) Cattaneo, M. D., Jansson , M, & Ma, X. (n.d.). Simple Local Polynomial Density Estimators. *Journal of the American Statistical Association*. doi:10.1080/01621459.2019.1635480

8) Jacob , R, Zhu , P, Somers , M.A., & Bloom, H. (2012). *A Practical Guide to Regression Discontinuity*. MDRC .

9) Angrist, J, Bettinger, E, Bloom, E., King, E, & Kremer, M. (2002). Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment. *The American Economic Review*, 92 (5), 1535–58.

10) Card, D, & Krueger, A.B. (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. *The American Economic Review*, 84(4), 772-793.

11) Heckman, J.J. (2001). Econometrics and Empirical Economics. *Journal of Econometrics*, 100, 3-5.

12) Imbens, G.W, & Wooldridge, J.M. (2005). Recent Developments in the Econometrics of Program Evaluation. *Journal of Economic Literature*, 47(1), 5–86.

13) Jalan, J, & Ravallion, M. (2003). Estimating the Benefit Incidence of an Antipoverty Program by Propensity-Score Matching. *Journal of Business & Economic Statistics*, 21(1), 19–30.

14) Thistlethwaite, D.L, & Campbell, D.T. (1960). Regression-Discontinuity Analysis: An Alternative to the Ex Post Facto Experiment. *The Journal of Educational Psychology*, 51(6), 309-17.

15) Athey , S., & Imbens, G. W. (2017). The State of Applied Econometrics: Causality and Policy Evaluation. *The Journal of Economic Perspectives, 31*(2).

Select References (Unit 5):

1) Bisin , A., & Federico, G. (2021). *The Handbook of Historical Economics.* (B. Alberto , & F. Giovanni , Eds.) Academic Press. *(Forthcoming)*

2) Buffum , D., & Whaples , R. (1995). Fear And Lathing In the Michigan Furniture Industry: Employee-Based Discrimination A Century Ago. *Economic Inquiry, 33*(2), 234-52.

3) Claude , D., & Haupert, M. (2016). Clio's Contributions to Economics and History. *Revue D'économie Politique, 126*(5), 971-989.

4) Fogel, R. W. (1962). A Quantitative Approach to the Study of Railroads in American Economic Growth: A Report of Some Preliminary Findings . *The Journal Of Economic History, 22*(2), 163-197.

5) Greasley , D., & Oxley, L. (2010). Cliometrics and Time Series Econometrics: Some Theory and Applications. *Journal Of Economic Surveys, 24*(5), 970–1042.

6) Lamoreaux, N. (2015). The Future of Economic History Must be Interdisciplinary . *The Journal Of Economic History, 75*(4), 1251-1257.

7) Mccloskey, D. N. (1976). Does The Past Have Useful Economics? . *Journal Of Economic Literature, 14*(2), 434-461.

8) Meiners, R. E., & Nardinelli , C. (1986). What has Happened to the New Economic History? *Journal of Institutional and Theoretical Economics, 142*(2), 510-527.

9) Meyer , J. R., & Conrad, A. H. (1957). Economic Theory, Statistical Inference, and Economic History. *The Journal Of Economic History, 17*(4), 524-544.

10) North, D. C. (1974). Beyond the New Economic History . *The Journal of Economic History, 34*(1), 1-7.

11) Whaples , R., & Parker , R. E. (Eds.). (2013). *Routledge Handbook of Modern Economic History* . Routledge .

Fourth Semester: Electives Group-B

Course Code	Name of the Course	Type of the Course	Hours per Week	Credit
Electives Group: B				
EM 810401	Microeconometrics	Elective	5	3
EM 810402	Macroeconometrics	Elective	5	3
EM 810403	Econometrics of Policy Evaluation	Elective	5	3

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM810401	Microeconometrics	Elective: Group B	3	90
Course Objectives					
The main objective of the course is to develop competence among students in using the standard tools of Microeconometrics such as ordinary least squares, instrumental variables, probits and logits for the analysis of individual level data on the economic behaviour of individuals or firms. It not only motivates students to understand how these models work with real world data but makes aware that when they do not and about the techniques which could be used to overcome such difficulties as well.					

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Develop competence in using standard tools of Microeconometrics including ordinary least squares (OLS), instrumental variables (IV), probits and logits

2) Critically understand economic problems by using information on what economic agents actually do, then use economic theory with econometric techniques to predict what they would do.

3) Apply the microeconometric models to the empirical data with a view to estimating the parameters

4) Use the open source econometric software package R to estimate the models using real world data and interpret the estimates both in theoretical and plain language.

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 Dual Path Model and Instrumental Variables   (20 Hours)

1.1. Multiple Regression Introductory Ideas—Long and Short Regression—Causal Pathways—Dual Path Model—Dual Path Versus Long Regression Estimator—Matrix Algebra of Dual Path Estimator—Estimating the Direct Effect—Policy Implications of Dual Path Estimates

1.2. Confounded Linear Model—IV Estimator—IV Estimator with Matrix Algebra—Two-Stage Least Squares—Instrument Validity and Tests—Local Average Treatment Effect (LATE)—LATE Estimator

Unit-2 Bounds Estimation and Estimation of Demand   (20 Hours)

2.1. Model of Potential Outcomes—Average Treatment Effect (ATE)—ATE and Do Operators—ATE and Unconfoundedness—Kolmogorov Bounds—Manski Bounds—Bounds with Exogenous Variation—Bounds with Monotonicity—Applications

2.2. Revealed Preference—Modelling Demand—Simple Discrete Choice Model—Modelling Discrete Choice—Maximum Likelihood—Probit Specification—McFadden's Random Utility Model—Probit and Logit Estimators—Multinomial Choice Model—Multinomial Probit—Multinomial Logit—Applications

Unit-3 IV Estimation and Estimating Selection Models   (15 Hours)

3.1. Demand Estimation with IV—Modelling Competition—Hotelling's Line—Steve Berry's Model of Demand—Empirical Model of Demand—Inverting Demand—Demand Shifters to Estimate Supply—Demand Estimation from Supply Estimates

3.2. Modelling Censored Data—Latent Value Model—Tobit Estimator—Modelling Selected Data: Selection Model—James Heckman's Model—Heckman Estimator

Unit-4 Repeated Measurements   (15 Hours)

4.1 First Difference Model—OLS Estimation of First Differences—Difference in Difference—Difference in Difference Estimator

4.2. Fixed Effects Model—Parallel Trends Assumption—Fixed Effects Estimator—Nuisance Parameter—Adjusted Fixed Effects Estimator—Two Step Fixed Effects Estimator
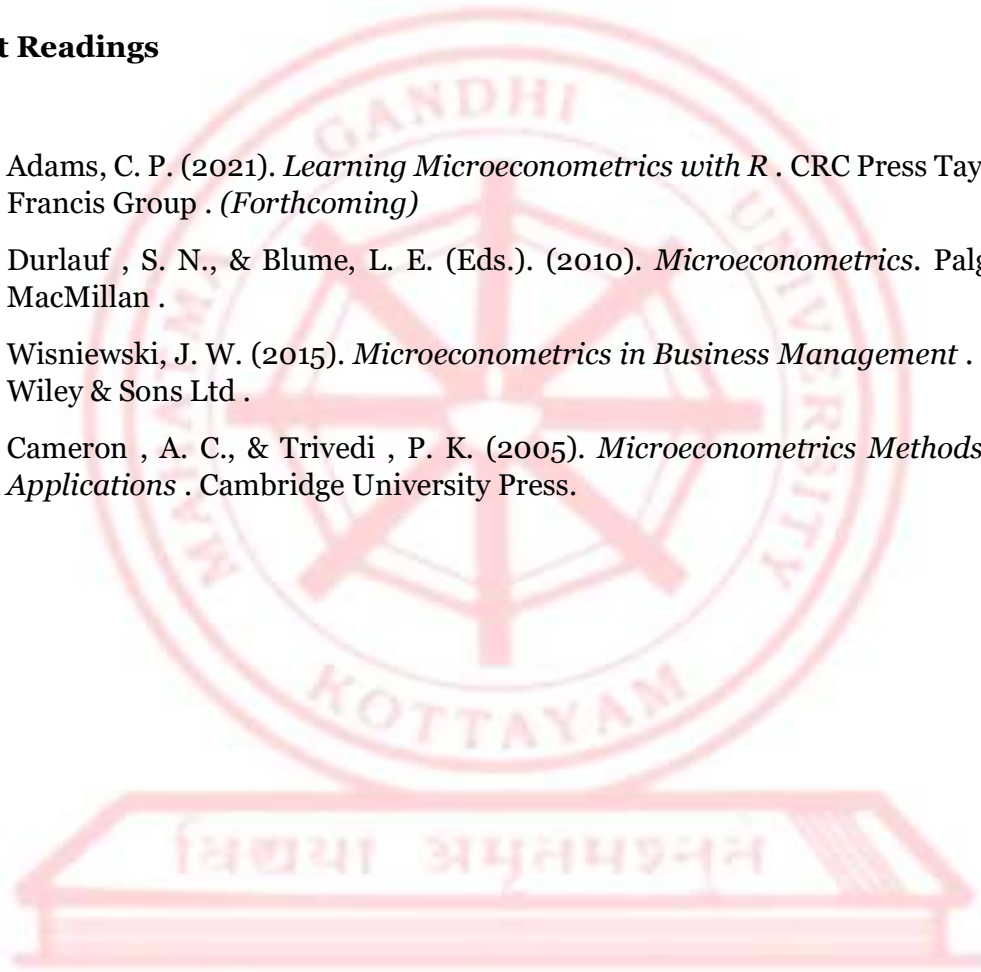
5.1. General Fixed Effects Model—Construction of Synthetic Controls with OLS—Alberto Abadie's Estimator—Regularized OLS Estimator (LASSO)

5.2. Factor Models—Matrix Factorization—Convex Matrix Factorization—Synthetic Controls using Factors—Estimating the Weights—Factor Model Estimates

Select Readings

1) Adams, C. P. (2021). *Learning Microeconometrics with R* . CRC Press Taylor & Francis Group . *(Forthcoming)*

2) Durlauf , S. N., & Blume, L. E. (Eds.). (2010). *Microeconometrics*. Palgrave MacMillan .

3) Wisniewski, J. W. (2015). *Microeconometrics in Business Management* . John Wiley & Sons Ltd .

4) Cameron , A. C., & Trivedi , P. K. (2005). *Microeconometrics Methods and Applications* . Cambridge University Press.

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM810402	**Macroeconometrics**	Elective: Group B	3	90
Course Objectives					

The main objective of the course is to critically appraise the various approaches in macroeconometric modelling which attempted to build models by testing hypotheses of macroeconomic theories. It motivates the student to understand the conflicting objectives in theory building and model construction where the former focusses upon the simple description of the reality whereas the latter emphasises upon model capability to predict and explain problems that might occur for its practical resolution.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Appreciate critically the theoretical underpinnings of macroeconomic policy making

2) Critically discuss the different theoretical approaches in macro econometric modelling

3) Appraise the intertemporal optimization methods in Macroeconometrics

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 Approaches in Macroeconometrics   (15 Hours)

1.1. Economic Theory in Macroeconometrics—Cowles Commission—LSE Approach—Lucas Critique—Sims Critique—Atheoretical Approaches: Sims, Hendry—Cointegration Approach—Astatistical Approaches: Summers, Kydland and Prescott—Criticisms, Challenges and Alternatives

1.2. From Theory to Data: The New-Classical Growth Model—OLS Estimation of Solow's Growth Model—Human Capital in Solow's Growth Model—Importance of Time Series in Macroeconomics—Growth Convergence: Estimation and Testing

Unit-2 Identification Problem and Estimation: Cowles Commission Approach   (20 Hours)

2.1. Identifiability—Identification in Cowles Commission Approach—Application: Identifying IS-LM-AD-AS Model—Identification in LSE Methodology—Identification in the VAR Methodology—Identification in Intertemporally Optimized Models

2.2. Estimation in Cowles Commission Approach—Monetary Transmission Mechanism Model—Assessing Econometric Evaluation of Monetary Policy—Problems

Unit-3 The LSE and VAR Approaches   (20 Hours)

3.1. Estimation in the LSE Approach—LSE Diagnosis—Reduction Process—LSE Testing Methodology—Testing Cowles Commission Model—Congruent Final Specification—Cointegration Analysis—Specifying Structural Model—Model of Monetary Transmission Mechanism—Simulating Monetary Policy—Model Evaluation—Testing Lucas Critique

3.2. VAR Approach—Identification and Estimation—Structural Models with Contemporaneous Restrictions—Structural Model with Long-Run Restrictions—Identification in Cointegrated VARS—Exogenous

3.3. Shocks—Description of VAR Models—Monetary Policy in Closed Economies—Monetary Policy in Open Economies—VAR and Non-VAR Measures of Monetary Policy

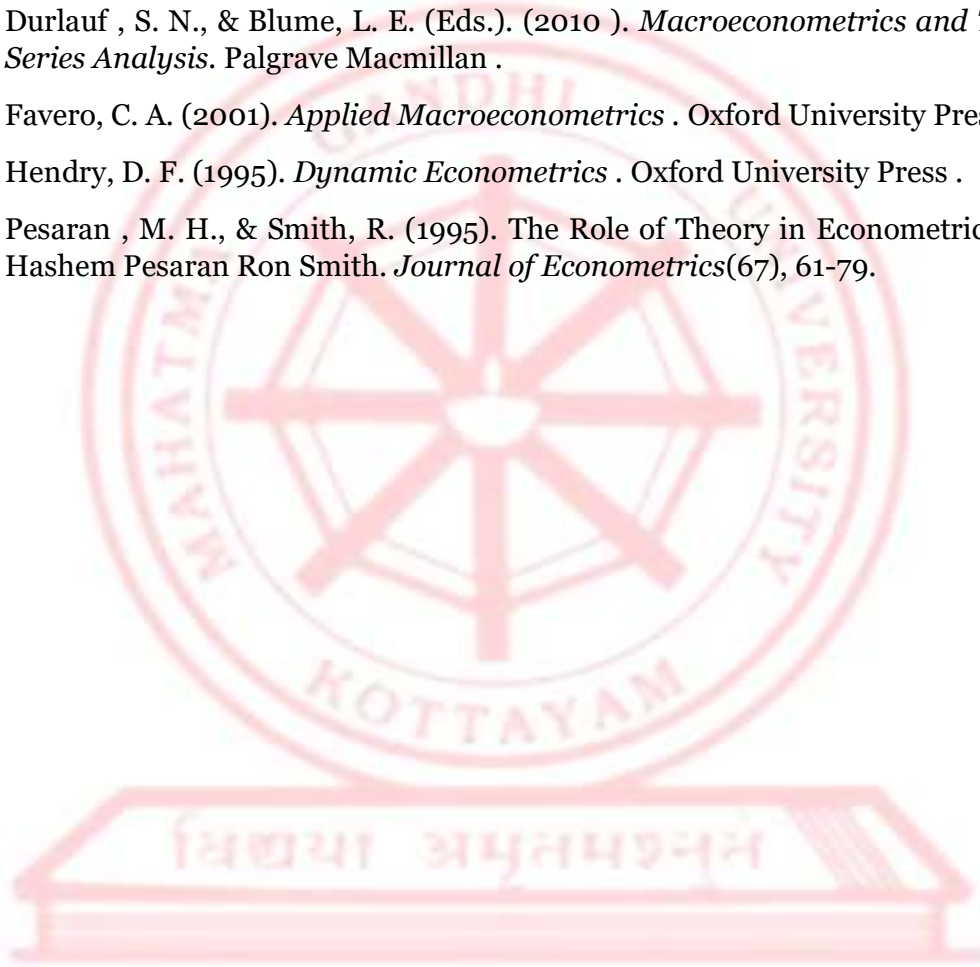**Unit-4 Intertemporal Optimisation and Method of GMM   (20 Hours)**

4.1. Euler Equations and Closed Form Solutions—Estimating Euler Equations: GMM Method—Covariance Matrix Estimation—Limits to Euler Equation

4.2. GMM Approach—Theoretical Problems—Empirical Problems—Applications—GMM and Monetary Policy Rules—Interest Rate Rules and Central Banks' Preferences

Unit-5 Intertemporal Optimization and Calibration   (15 Hours)

5.1. Basic Methodology—Model Design—Dynamic Equilibrium—IS-LM Interpretation—Choice of Parameters

5.2. Calibration—Model Solution—Log-Linearization—Linearized System—Blanchard-Kahn Methodology: Basic Ideas—Model Evaluation—Policy Analysis

Select Readings

1) Bardsen , G. B., Eitrheim , O., & Jansen , E. S. (2005). *The Econometrics of Macroeconomic Modelling*. Oxford University Press .

2) Dejong , D. N., & Dave , C. (2007). *Structural Macroeconometrics*. Princeton University Press.

3) Diebolt , C., & Kyrtsou , C. (Eds.). (2005). *New Trends In Macroeconomics* . Spinger .

4) Durlauf , S. N., & Blume, L. E. (Eds.). (2010). *Macroeconometrics and Time Series Analysis*. Palgrave Macmillan .

5) Favero, C. A. (2001). *Applied Macroeconometrics* . Oxford University Press .

6) Hendry, D. F. (1995). *Dynamic Econometrics* . Oxford University Press .

7) Pesaran , M. H., & Smith, R. (1995). The Role of Theory in Econometrics M. Hashem Pesaran Ron Smith. *Journal of Econometrics*(67), 61-79.

Semester	Course Code	Course Title	Type of Course	Credit	Teaching Hours
IV	EM810403	Econometrics of Policy Evaluation	Elective: Group B	3	90
		Course Objectives			

The main objective of the course is to critically discuss the set of theoretical and applied econometric tools to illustrate the correct implementation of the various modern microeconometric techniques for policy and program evaluation in social sciences in general and economics in particular. The course will motivate the students about the practical guidelines for the selection and application of the most suitable approach to be implemented under the differing policy contexts for program evaluation.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1) Provide the set of both theoretical and applied tools in order to illustrate the correct implementation of modern micro-econometric techniques for program evaluation in economics

2) Develop competencies to appraise the impact of economic and social programs through evidence-based econometric evaluations

3) Design rigorous and effective ex post program evaluation using the statistical software package R

The course may have four lectures for discussing theoretical topics and one-hour session for "Data Lab and Discussion" with Gretl or R in each week.

Unit-1 Basics of Policy Evaluation   (15 Hours)

1.1. Policy Evaluation—Introductory and Basic Ideas—Ex Post Impact Evaluation and Evidence-Based Evaluation

1.2. Qualitative and Econometric Techniques— Experimental, Quasi-Experimental and Non-Experimental Designs

Unit-2 Identification, Selection and Taxonomy   (20 Hours)

2.1. Average Treatment Effect (ATE) Average Treatment Effect on the Treated (ATET) and the on the Untreated (ATENT)—Non-random Assignment and Selection Bias—Selection On Observables and Unobservables—Overt Bias—Assumption of Conditional Mean Independence—Hidden Bias—Overlap Assumption

2.2. Taxonomy of the Econometric Methods for Program Evaluation

Unit-3 Estimation of Average Treatment Effects (ATEs)   (20 Hours)

3.1. Nonlinear Parametric Regression-Adjustment—Estimation of ATE and Regression-Adjustment—Linear Parametric Regression Adjustment—Nonlinear Parametric Regression-Adjustment—Semi-parametric Regression Adjustment

3.2. Matching procedure—Covariates and Propensity-Score Matching—Implications of Assumptions—Matching Estimator and Properties—Reweighting and Weighted Least Squares—Doubly-Robust Estimation

3.3. Implementation and Application of Regression Adjustment

Unit-4 Estimation ATEs and Hidden Bias   (20 Hours)

4.1. Instrumental-Variables—Solution to Hidden Bias—Estimation—Methods of 2SLS, Probit/Logit OLS and Probit-2SLS/Logit-2SLS—IV Estimators and Heterogeneity—Problems of IV Estimation

4.2. Method of Difference-in-Differences—DID with Repeated Cross Sections—DID with Panel Data—Econometric Applications

Unit-5 LATE and RDD Methods   (15 Hours)

5.1. Local Average Treatment Effect—Randomization Under Imperfect Compliance—Wald and LATE Estimator—LATE with Multiple Instruments

5.2. Sharp RDD— Fuzzy Set Theory—Fuzzy RDD—Testing RDD Reliability—Protocol for RDD Implementation—Application and Implementation

Select Readings

1) Cerulli, G. (2015). Econometric Evaluation of Socio-Economic Programs: Theory and Applications . Springer .

2) Angrist , J. D., & Pischke, J.-S. (2019). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press .

3) Angrist, J. D., & Pischke, J.-S. (2015). *Mastering Metrics: The Path from Cause to Effect*. Princeton University Press .

4) Glennerster , R., & Takavarasha, K. (2013). *Running Randomized Evaluations: A Practical Guide*. Princeton University Press .