Semester	VII
Paper Code	
Paper Title	**Quantitative Economic Analysis I**
No. of Credits	6
Theory/Composite	Theory
No. of periods assigned	4 Theory
Minimum No. of preparatory hours per week a student has to devote	6
Course objective/Learning objective	1. To provide an accessible, reasonably paced course in fundamental concepts and techniques of real analysis. 2. Going beyond the routine manipulations of formulas to solve standard problems and to develop the ability to think deductively and analyse mathematical situations. 3. Giving a thorough treatment of the sets in $\mathbb{R}$ and sequences in $\mathbb{R}$ with an associated limit concept. 4. Solving non-linear first order differential equations and analysing stability. 5. Alternative to steady state solutions to serve as particular solution for a linear second order differential equation with a variable term 6. Applying differential equations to study simultaneous system.
Syllabus	**Module 1: Basics of Real Analysis (35 Marks)** 1. Real Numbers- Natural numbers, Integers, Rational and Irrational numbers. 2. Sets in $\mathbb{R}$ - Interval, Neighbourhood, Interior points, Boundary points, Open set, Limit point, Closed set, bounded set. 3. Sequence – Convergent and divergent sequence, Bounded sequence, Limit of a sequence, divergent sequence, monotone sequence, sub sequence, Bolzano-Weierstrass theorem, compact set. 4. Limits – Limits of a function, one-sided limits, Limits at infinity, monotone functions and their Limits. **Module 2: Dynamics (25 marks)** 1. Non autonomous linear, first order differential equation (Integrating factor). Nonlinear, first order differential equation (phase diagram), Rest point, Stability analysis, Bernoulli's equation and Separable equation. 2. The linear, second order differential equation with a variable term (polynomial, exponential). 3. System of differential equations (2x2, phase diagram) **Module3: Advanced Topics in Matrix Algebra (10marks)** Matrix Decomposition - LU, Cholesky and Singular Value Decomposition and its applications in economic models.

<table>
<tr><td>Readings</td><td>

Module – 1

1. Bartle R. G and Sherbert D. R.: Introduction to Real Analysis, John Wiley and Sons. 1982.
2. Binmore: (Real Analysis)
3. Proter M. H. and Morrey C. B.: A First Course in Real Analysis, Springer Verlag 1991.
4. Ken Binmore: Mathematical Analysis – A straightforward Approach

Module – 2

1. Chiang and Wainwright (2017): Fundamental Methods of Mathematical Economics.
2. K. Sydsater and P. Hammond, Mathematics for Economic Analysis, Pearson Educational Asis: Delhi, 2002.
3. Lawrance Blume and Carl Simon, Mathematics for Economists, W. W. Norton and Company 1994.

Module – 3

1. Matrix Computations, G. H. Golub and C. F. Van Loan, 3rd Edition, John Hopkins University Press, 1996.

2. Abadir, K.M., & Magnus, J.R. (2005) – Matrix Algebra. Cambridge University Press

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<tr><td>Evaluation</td><td>Continuous Internal Assessment: 30 marks
End- Semester Theory Examination: 70 marks</td></tr>
<tr><td>Paper Structure for End Sem Theory</td><td>

Module	No. of Questions to be Answered	No. of Alternatives	Marks
Module 1	3	4	5 × 3 = 15
	2	3	10 × 2 = 20
Module 2	3	4	5 × 3 = 15
	1	2	10 × 1 = 10
Module 3	1	2	10 × 1 = 10
Total Marks			70

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