MATHEMATICS FOR ECONOMICS - I

PROF. DEBARSHI DAS

Department of Humanities and Social Sciences

IIT Guwahati

PRE-REQUISITES : Mathematics in the 10+2 level is prerequisite

INTENDED AUDIENCE : Undergraduate students

COURSE OUTLINE :
This is a basic course on application of mathematical techniques in economics. Students of science or engineering background would find it helpful since they have grounding in mathematics. The course will enable them to explore the subject of economics. If they want to branch out to economics or finance this course would give them training of the kind of mathematical applications used in these subjects. Students of economics and other social sciences would also benefit from this course.

ABOUT INSTRUCTOR :

Prof. Debarshi Das is associate professor of economics in the Department of Humanities and Social Sciences in the Indian Institute of Technology Guwahati. He has about 16 years of teaching experience, as well as 22 years of research experience, including stints at Delhi University and Panjab University, Chandigarh. His areas of teaching interest are microeconomics, macroeconomics, game theory, mathematical economics, development economics and political economy. Development economics, political economy and macroeconomics are his research interest areas. In 2010 he recorded the NPTEL video course titled "Game theory and economics".

COURSE PLAN :

Week 1: Preliminaries: aim of the course, real number system, logic, mathematical proof

Week 2: Sets and set operations

Week 3: Functions of one variable, graph of functions, types of functions

Week 4: Differentiation, partial differentiation, differentiable functions: properties

Week 5: Differentiation of higher order, linear approximation

Week 6: Sequence and series, limits, convergence, exponential and logarithmic functions

Week 7: Single variable optimization: convex and concave functions, geometric properties

Week 8: Single variable optimization: results, applications

Week 9: Integration: area under curves, indefinite and define integrals, integration by substitution, discontinuous functions

Week 10: Applications of integration

Week 11: Difference functions: discrete time, first order difference equation, applications

Week 12: Higher order difference equations, summing up