

# MAT1000

**1. Course Name:** MAT 1000: Calculus.

**2. Instructor Name:** Debapratim Banerjee. email: debapratim.banerjee@ashoka.edu.in

**3. Overview:** This course is a basic course in calculus. You'll learn the foundation of calculus in this course, like number system, sequences, limits, function, differentiation and integration etc. This course is a mandatory course for all students considering mathematics major or minor. Students with mathematics at 10+2 level might find some overlap with this course. However mathematical rigor and emphasis on problem solving is the key for this course. So it will most possibly be quite different that the school level calculus.

**4. Course prerequisites:** Mathematics in 10+2 level. A few students who have not done class 11 and 12 mathematics request that they may be allowed to take this course provided they meet the required criteria. One might refer [here](#) for the criteria.

**5. Syllabus:** Number systems.ref Sequences and series. Functions of a real variable. Graphs of functions. Limits and continuity. Differentiation. Mean value theorem. L'Hospital rule. Maclaurin and Taylor series. Curve tracing. Riemann integral. Definite and indefinite integrals. Fundamental theorem of calculus. Applications of differential and integral calculus in areas such as optimization and mechanics.

**6. References:**

1. J. Stewart: Calculus, Cengage Publishers, 2012.
2. K. A. Ross: Elementary Analysis, The Theory of Calculus, Second Edition, Undergraduate Texts in Mathematics, Springer, 2013.
3. M. Spivak: Calculus, Cambridge University Press,2006.

**6. Grading policies:** Will be discussed later.