MATHEMATICS 3001
REAL ANALYSIS II

This course deals with the convergence of sequences, series of constants, series of functions, power series, Taylor series and improper integrals.

Imagine the result due to Euler:

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Who would have suspected that the ratio between the circumference and the diameter of a circle is related to the reciprocals of squares of positive integers? When does a sequence of continuous functions converge to a continuous function? When can we interchange the limit and integral; that is, when is it true that $\lim [\int f_n(x)\, dx] = \int [\lim f_n(x)]\, dx$? Such interesting questions have answers in the study of *convergence*.

How much work is required to lift a 1 kg load from the surface of the earth to infinity? If this work should turn out to be infinite, then it would be impossible to send rockets into unlimited orbits. Fortunately, it is finite! Can one imagine launching rockets without the knowledge of improper integrals?

Text. *Introduction to Real Analysis* by Bartle and Sherbert, Wiley or a similar book. *Real Analysis: Courses Notes* by Bruce Watson is also available.

Marks. 20% for weekly assignments, 30% for midterm test and 50% for the final examination.

Calendar description. **3001 Real Analysis II** examines Infinite series of constants, sequences and series of functions, uniform convergence and its consequences, power series, Taylor series, Weierstrass Approximation Theorem.
Three lecture hours and one laboratory hour per week.
Prerequisite: Mathematics 3000.
Note: Credit cannot be received for both of Mathematics 3001 and the former Applied Mathematics/Pure Mathematics 3201.

Offered. Winter