Advanced Mathematics II

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| Level | 1 (Semester 2) |
| Duration | 4 weeks |
| Lectures | 10 times 40-minute lectures per week for 3 weeks |
| Practicals/tutorials | 5 times 40 min tutorial per week for 3 weeks |

**Syllabus**

* Methods of integration: integration by parts, trigonometric substitution, partial fraction decomposition
* Improper integrals
* Sequences and series of numbers; convergence and divergence
* Tools for determining convergence of a series: comparison test, alternating series test, absolute convergence, ratio test
* Power series and Taylor series
* Vectors and vector-valued functions
* Multivariable calculus: partial and directional derivatives

# Syllabus

To further develop understanding of the concepts, techniques, and tools of calculus. Calculus is the mathematical study of variation. This course emphasises integral calculus, sequences and series, and introduces multivariable calculus. Applications to the theory of functions will be discussed.

# Learning Objectives

By the end of this course the student should:

-be able to state the main definitions and theorems of the course;

-be able to apply appropriate techniques to compute definite and indefinite integrals;

-understand what it means for a sequence to converge;

-be able to compute the limits of many sequences;

-understand what it means for a series (infinite sum) to converge;

-be able to apply appropriate techniques to determine whether a series converges;

-understand how functions may be represented by power series; and

-understand the meaning behind partial and directional derivatives, and how to compute them.