



Course Specification Document

Title	Real Analysis
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Credits	6 ECTS
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Aims	This course aims to provide the student with knowledge and skills related to real functions (limits, the derivative, studying variations, and drawing a curve) and introducing him to famous functions such as the exponential function and logarithms and the trigonometric functions and their inverses.
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Intended learning outcomes

On successful completion of this course, the student will be able to:

- Calculate the limits of a real function.
- Calculate the derivative and use it to study the variations of a function.
- Understand and use of some important functions.

Syllabus

- **Limits:** A reminder of the rules for calculating limits, local comparison of functions, limit of a rational function, comparing power functions and exponential functions and logarithms at infinity, the precise definition of limits using quantifiers. Examples of functions that don't have a limit at a point or at infinity.
- **Continuity and derivability:** Continuous functions, intermediate value theorem, supremum and infimum, extreme values theorem, definition of the derivative, the equation of the tangent to a curve, derivative of sum and product and ratio and composition of two functions, derivatives of some useful functions.
- **Study of functions:** Local minima and maxima, mean value theorem, the study of the variations of a function, use of derivative to calculate limits – L'Hopital's rule, higher derivatives, Leibniz's rule, continuity classes of functions.
- **Some useful functions:** Exponential functions and logarithms, trigonometric and hyperbolic functions, and their inverses.