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| **Module code** | SM-4327 | | | |
| **Module Title** | Real Analysis | | | |
| **Degree/Diploma** | Bachelor of Science (Mathematics) | | | |
| **Type of Module** | Major Option | | | |
| **Modular Credits** | 4 | **Total student Workload** | 10 | hours/week |
| | | **Contact hours** | 4 | hours/week |
| **Prerequisite** | SM-1202 Advanced Mathematical Methods for the Sciences | | | |
| **Anti-requisite** | SM-2206 Real Analysis | | | |

**Aims**

The aim of this module is to introduce the algebraic, order theoretical and topological concepts of real analysis, to investigate continuity and differentiability of real-valued functions and to establish a rigorous approach to the Riemann integral.

**Learning Outcomes**

*On successful completion of this module, a student will be expected to be able to*:

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| Lower order : | 40% | To describe the analytic properties of real functions and sequences, including convergence and limits of sequences of real numbers |
| Middle order : | 40% | To understand the calculus of the real numbers, and continuity, differentiability and related properties of real-valued functions |
| Higher order: | 20% | To understand the Riemmann integral, Riemmann criterion of integrability and the fundamental theorem of integral calculus |

**Module Contents**

- The real numbers. Sequence of numbers.
- Continuous functions. Differentiable Functions. Series of numbers.
- The Riemann integral: Riemann integrability, Darboux's sums, Riemann criterion of integrability, properties of Riemann integrable functions, classes of integrable functions, the mean value theorem for the Riemann integral, the fundamental theorem of integral calculus.

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| **Assessment** | Formative assessment | Tutorial and feedback. |
| | Summative assessment | Examination: 60% |
| | | Coursework: 40%<br>-3 class tests (30%)<br>-1 assignment (10%) |