

**Course number: 15SET10410****Mathematics 1****Study Level: Bachelor /
Undergraduate****Prof. Dr. Thomas Hellmuth****Language of Instruction: English****ECTS Credits: 5**

The lecture "Mathematics 1" offers a comprehensive exploration of fundamental topics in mathematics, providing students with a foundation in mathematical analysis. Through a combination of theoretical discussions and practical applications, this course aims to develop students' analytical and problem-solving skills. The module covers a range of essential topics, including:

- **Sequences and Series:** Students will study the behavior and properties of sequences and series, learning about convergence, divergence.
- **Complex Numbers:** The module will introduce complex numbers and their algebraic operations. Students will explore the complex plane and gain an understanding of the applications of complex numbers in solving equations and problems related to electrical engineering, and other fields.
- **Differentiation and Taylor Series:** Students will learn about the definition of derivatives (difference quotient), rules for computing derivatives, and techniques for finding maximum and minimum values. Additionally, the module will introduce Taylor series expansions, as these are used for system modeling in engineering.
- **Integration:** The module will cover the fundamentals of integration, including techniques for computing definite and indefinite integrals. Students will explore applications of integration, such as finding areas, volumes, and accumulation. The connection between differentiation and integration, including the Fundamental Theorem of Calculus, will be emphasized.