# Calculus 1

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| **Undergraduate / Graduate** | Undergraduate | **Registration Code** | 0061311 |
| **Course Category** | Basic Courses in Natural Sciences | **Credits** | 2.0 |
| **Term (Semester) / Day / Period** | G-I（1st year, Fall Semester) / Mon / 3（13:00～14:30） | | |
| **Instructor** | RICHARD Serge | | |
| **Contact e-mail of the Instructor** | richard.serge.charles.c3@f.mail.nagoya-u.ac.jp | | |

**●Goals of the Course**
The field of mathematics that describes and analyzes quantitative changes is analysis, and its central method is calculus. It is an essential research method in natural sciences, but in recent years it has also been widely applied to social sciences. The goal of this course is to understand the basics of one-variable functions (differentiation and integration) during the first half of this year-round course. In particular, it is important to understand the essence of limits, and to be able to handle freely elementary functions such as the logarithmic function and trigonometric functions.

**●Objectives of the Course**
The aim of the first half of this one-year course is to provide a solid understanding of functions of one real variable. The students will become familiar with the various tools necessary for the analysis of such functions and for their applications.

**●Course Contents or Plan**
1. Limits and continuity: Basic properties of limits of sequences and functions, continuous functions and their basic properties, maxima and minima, asymptotic properties of functions.
2. Differentiation: Basic properties of the derivative and its interpretation, mean value theorem, higher derivatives, Taylor series.
3. Integration: Riemann integral and its properties, improper integrals, the fundamental theorem of calculus.

**●Course Prerequisites and Related Courses**
Some basic knowledge on calculus from high school is assumed, including differentiation and integration of polynomial functions. Students are encouraged to attend the related Math Tutorial Ia.

**●Course Evaluation Method and Criteria**
The final grade will be determined by quizzes (30%), the midterm (30%) and a final exam (40%). The grading scale will The grading scale will be A+, A, B, C, C-, F. Students need to notify the course withdrawal to the instructor when they have no intention of finishing the course during the semester.

**●Study Load (Self-directed Learning Outside Course Hours)**
Students are expected to read their notes, and to be familiar with the content of the previous lecture of Calculus I before attending the next lecture.

**●How to Respond to Questions**
By email.

**●Notice for students**
Check the website mentioned below for updated information. The lectures will be provided in a classroom and/or on Zoom depending on the situation.

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| **Textbook** | Free reference books and lecture notes will be available on the website of the course. |
| **Reference Book** | Free reference books will be available on the website of the course. |
| **Reference website** | http://www.math.nagoya-u.ac.jp/~richard/fall2022.html |