

Course number		U-LAS10 20010 LE55					
Course title (and course title in English)		Function Theory of a Complex Variable-E2 Function Theory of a Complex Variable-E2		Instructor's name, job title, and department of affiliation		Kyoto University Not fixed	
Group	Natural Sciences			Field(Classification)		Mathematics(Development)	
Language of instruction	English			Old group	Group B	Number of credits	2
Number of weekly time blocks	1	Class style	Lecture (Face-to-face course)		Year/semesters	2025 • Second semester	
Days and periods		Target year	Mainly 2nd year students		Eligible students	For science students	
[Overview and purpose of the course]							
Based upon knowledge of calculus, this is an introductory course to the function theory of one complex variable (i.e. introduction of complex analysis), and its goal is to understand fundamentals about holomorphic functions and meromorphic ones, which are dealt through the Cauchy's integral formula. The purpose of this course is not only to understand rigorous theories but to obtain some skills about the residue calculus. The theory for complex functions are not only beautiful in a mathematical sense but also very useful in applied fields e.g. physics, engineering and medical sciences etc. Almost all the mathematical theories in this course are rigorously dealt with, and some examples related with physics are also explained. An additional goal of this course is to give a chance to the students to present and discuss mathematics in English.							
[Course objectives]							
The goal is to understand fundamentals about holomorphic functions and meromorphic ones, which are dealt through the Cauchy's integral formula. In addition to learning modern mathematics and proofs, students can also learn how to discuss and present mathematical topics in English through this course.							
[Course schedule and contents)]							
The course will cover the following topics, and each of them is read in 2 or 3 weeks:							
1. complex numbers, the complex number plane and the Riemann sphere							
2. differential of complex functions; holomorphic functions and the Cauchy- Riemann equation etc.							
3. power series and analytic functions							
4. integral; the Stieltjes integral and Cauchy's integral formula							
5. fundamental theories for holomorphic functions							
6. singularities and residue; the Laurent expansion and the residue calculus.							
Total : 14 classes, 1 Feedback session							
[Course requirements]							
(Eligible students) mainly the sciences of the second grade							
Students are required good understanding of both calculus and linear algebra.							
[Evaluation methods and policy]							
The evaluation of the course will take into account the following criteria:							
-homework (40%)							

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-presentation (20%)
-final report (40%)

[Textbooks]

Not Specified

[References, etc.]

(**References, etc.**)

Donald Sarason 『Complex Function Theory』 (AMS: American Mathematical Society)

Elias Stein, Rami Shakarachi 『Complex Analysis』 (Princeton University Press)

磯 祐介 『複素関数論入門』 (サイエンス社) ISBN:978-4-7819-1326-1

[Study outside of class (preparation and review)]

The students are requested to solve exercises given in class by themselves even though they are not assigned as homework.

[Other information (office hours, etc.)]

This class is an English class for the classes of 「関数論」, and their syllabuses are the same to one another.

Office hours are not assigned and it is advisable to make comments willingly during and after the class.