

Course Category	TBA	Credits	2
Subject Code	TBA	Taking Year	1 <sup>st</sup> Grade, 2 <sup>nd</sup> Grade
Course Title (Japanese)	複素解析学	Course Period	2 <sup>nd</sup> Semester
Course Title	Complex Analysis	Day of the week / Hour	Monday / The third period
Registration Code	TBA	Compulsory / Elective	Elective
Instructor(s)	Toshihiro Nakanishi	Course Qualification	Students of Postgraduate Mathematics Course

Course Style	Lecture
Course Aim	This lecture aims to provide advanced theory of complex analysis. Topics included in this lecture are conformal mappings, elliptic functions and automorphic functions.
Goals and Objectives (Level of Achievement)	The participants are expected to master the way to find conformal mappings between plane domains.
Course Plan	<ol style="list-style-type: none"> <li>1. Conformal mappings</li> <li>2. Analytic continuations</li> <li>3. Reflection principle</li> <li>4. Schwarz-Christoffel transformations</li> <li>5. Conformal mappings and fluid dynamics</li> <li>6. Normal families and Montel's theorem</li> <li>7. Boundary problems of the heat equations and Riemann mapping theorem</li> <li>8. Applications to some extremal problems</li> <li>9. Schwarzian derivatives and differential equations</li> <li>10. Conformal mappings to curvilinear domains</li> <li>11. Jacobi's elliptic functions</li> <li>12. Conformal mappings and elliptic functions</li> <li>13. Weierstrass elliptic function</li> <li>14. <math>SL(2, \mathbb{Z})</math> and its subgroups</li> <li>15. Automorphic functions</li> </ol>
Teaching Methods	The lectures mainly rely on Z. Nehari's textbook. Certain portion of the time is devoted to exercises.
Key Words	Conformal mappings, Riemann mapping theorem, Elliptic functions
Texts	[1] Z. Nehari, Conformal mapping, Dover. [2] H. Umemura, Theory of Elliptic Functions, Univ. Tokyo Press (Japanese).
Reference Books	L. V. Ahlfors, Complex Analysis, McGraw-Hill
Other Teaching Materials	Handouts and other teaching materials are given as needed.
Performance Evaluation	Grading will be based on class attendance and reports.
Notes on the Course	Prerequisite for this course is knowledge of basic calculus of functions in real and complex variables.
Office Hour	Tuesday 16:15-17:45, Room 720 of Bldg 1 of Faculty of Sci. and Tech.
Other Notes	None