Course Category	TBA	Credits	2
Subject Code	TBA	Taking Year	1st Grade, 2nd Grade
Course Title (Japanese)	関数解析	Course Period	2nd Semester
Course Title	Functional Analysis	Day of the week / Hour	Tuesday / The fourth period
Registration Code	TBA	Compulsory / Elective	Elective
Instructor(s)	Takeshi Wada	Course Qualification	Students of Postgraduate Mathematics Course

Course Style	Lecture
Course Aim	We give an introduction to functional analysis and its applications. Functional analysis is an important tool of modern analysis, e.g. theory of differential equations, probability theory, convex analysis, optimization, and dynamical systems.
Goals and Objectives (Level of Achievement)	We aim at giving an introduction to the basic concepts of functional analysis, such as Banach and Hilbert spaces, linear operators, compact operators, spectra, resolvent operators, and semigroups of operators.
Course Plan	1. Banach spaces, Hilbert spaces 2. Examples of Banacha and Hilbert spaces 3. Bounded linear operators 4. Dual spaces (1) 5. Dual spaces (2) 6. Compact operators (1) 7. Compact operators (2) 8. Compact operators (3) 9. Unbounded operators 10. Adjoint operators 11. Specta and resolvent operators 12. Semigroups of operators 13. Hille-Yosida's theorem 14. Analytic semigroups 15. Applications to partial differential equations 16. Examination
Teaching Methods	Homeworks will be given during the course.
Key Words	Banach spaces, Hilbert spaces, Linear operators, Compact operators, Semi-groups
Texts	H. Brezis, Functional Analysis, Sobolev Spaces and Partial Differential Equations, Springer.
Reference Books	Further references and materials will be given in class.
Other Teaching Materials	Further references and materials will be given in class.
Performance Evaluation	Evaluation is based up on final exam and class attendance. It is strongly recommended to study the homeworks.
Notes on the Course	It is desirable that the students taking this class have learned Lebesgue integral.
Office Hour	Tuesday, 10h15 –11h45
Other Notes	None