Course Category	TBA	Credits	2
Subject Code	TBA	Taking Year	1st Grade, 2nd Grade
Course Title (Japanese)	信号処理と数値解析	Course Period	2nd Semester
Course Title	Numerical Calculation for Signal Processing	Day of the week / Hour	Wednesday / The second period
Registration Code	TBA	Compulsory / Elective	Elective
Instructor(s)	Mayuko Iwamoto	Course Qualification	Students of Postgraduate Mathematics Course

Course Style	Lecture
Course Aim	Physical phenomena such as sound can be analyzed by signal processing. We give an introduction of the method to understand and analyze 1D and 2D signals. In computer signal processing, Fourier Transform (FT), especially Discrete Fourier Transform (DFT) is important, because signals are treated as a discrete data. We give a lecture and exercises of the way to use DFT with a computer.
Goals and Objectives (Level of Achievement)	To acquire knowledge of Wolfram Mathematica To understand the features of signal processing with Discrete Fourier Transform To acquire how to use DFT in numerical calculations
Course Plan	1. Introduction of Wolfram Mathematica 2. Basic skills of visualization with Wolfram Mathematica 3. Mechanism on sounds and signals 4. Wave motion equation 5. Analog signal processing 6. Fourier Series 7. Discrete Fourier Transform and spectral resolution 8. Fast Fourier Transform computation 9. Signal processing for sounds 10. Signal processing for voice 11. Inverse Fourier Transform 12. Compression of digital signals 13. 2D Fourier transform 14. Image processing 15. Wavelet transform 16. Evaluation
Teaching Methods	There will be exercises of programing with a computer.
Key Words	Wolfram Mathematica, Fourier series, Fourier Transform (FT), Fast FT, Discrete FT
Texts	None
Reference Books	Some references are given in class.
Other Teaching Materials	There will be lecture notes available.
Performance Evaluation	Grading is based up on some reports.
Notes on the Course	It is recommended to finish homework with your computer.
Office Hour	Wednesday, 14:30-16:00
Other Notes	None