		ACE-F1
授業科目名 Course Title	Programing Exercise for Numerical Analysis	単位数 Credit **1**
担当教員 Instructor	SUZUKI Keigo, KOJIMA Keisuke HOMMA Ayato, FUJIMOTO Akihiro TERASAKI Hiroaki	開講学期 Semester Autumn
キーワード Keywords	Programing, Numerical analysis, Fortran	

授業概要　Course summary

This course develops basic programing ability in numerical analysis that architectural engineers and civil engineers should possess. The programing language is Fortran. Class guidance and compile process is explained in the 1st class. Basics of programing and numerical analysis are learned in the 2nd to 10th classes. The 11th to 15th classes are for the application on the subject of structural analysis using stiffness matrix and Fourier transform.

到達目標　Course goal

To acquire ability in mathematical processing such as simulation, data analysis, and structure behavior prediction, and develop the ability to use it in practice.

授業内容　Course description

01: Class guidance, compile processing, directory, input and output
02: Number, type, sum, difference, product, power, function
03: Conditional branch, solution of quadratic equation
04: Repeated calculation, array, maximum, minimum, average
05: Repeated calculation, Taylor expansion
06: Subroutine, approximation of pi
07: Subroutine, Newton method
08: Setting of output format, input / output of csv file
09: Vector, matrix calculation, inner product calculation
10: Solution of simultaneous equations (Gaussian elimination method)
11: Element stiffness matrix
12: Total stiffness matrix
13: Calculation of nodal displacement by stiffness matrix method
14: Fourier series
15: Discrete Fourier transform

準備学習（予習・復習）等　Preparation / Review

At least one-hour reviewing is necessary.

授業形式　Class style

Exercise style. To write a script using the computer in the information processing lab. The lecturer goes around and answers questions as needed.

成績評価の方法・基準　Method of evaluation

Quizzes and exercise reports: 100%
If the number of absences counts 5 or more, the credit will not be given.
教科書・参考書等　Textbook and material
ザ・Fortran90/95 (NS library, Hayato Togawa)
受講要件・予備知識　Prerequisite
None
その他の注意事項　Note
Bring a USB flash memory.