3. 電気電子情報工学系　Electrical, Electronics and Computer Engineering Field		EEC-S5
授業科目名 Course Title	数値線形計算 Numerical Linear Computation	単位数 Credit	**2**
担当教員 Instructor	廣田　悠輔　Hirota Yusuke 森　眞一郎　MORI Shin-ichiro	開講学期 Semester	春学期 Spring
キーワード Keywords	Numerical Computation, Linear Equation Solver, Direct and Iterative Methods, Parallel Processing	曜日/時限 Day & Time	

授業概要　Course summary

計算機を用いた科学技術計算で最も基礎となる線型計算の手法についての入門コースです．内容は，行列とベクトル，連立一次方程式の表現方法，ガウスの消去法，ＬＵ分解，コレスキー分解，さまざまな反復解法についての解説を行います．

Systems of linear equations appear in solving problems in a wide variety of areas, including mathematics, engineering, business, and so on. In this course, we study several methods to solve systems of linear equations. Topics include Gaussian elimination, the LU factorization, Cholesky factorization and some iterative methods

到達目標　Course goal

1. Understand the fundamental concept of numerical computation to solve linear equation.
2. Understand some numerical algorithms for numerical equation solvers.
3. Having experiences of writing program to solve linear equation systems.

授業内容　Course description

1. Representation of matrix, vector and linear equation for numerical computation.
   Programming of inner product calculation.
2. Gaussian elimination method
3. LU factorization and its application to solve linear equations system
4. Binary data representation inside computer.　Floating point representation. Computational Error
5. Iterative Scheme
6. Parallel Programming for multi-core CPU

準備学習（予習・復習）等　Preparation / Review

Some assignments which require programming skill will be provided for preparation and review.

授業形式　Class style

講義	Lectures

成績評価の方法・基準　Method of evaluation

演習レポートおよび期末レポート	Laboratory reports and final report.

教科書・参考書等　Textbook and material

[Not a textbook, but just a reference]:　Numerical Recipes in C,　W.H.Press, S.A. Teukolsky, W.T. Vetterling, B.P.Flannery, Cambridge University Press.　　http://numerical.recipes/

受講要件・予備知識　Prerequisite

Fundamentals of Linear Algebra, Programming in C language

その他の注意事項　Note

授業形態（対面）	Lecture Style (Face to Face)