Syllabus

List of Syllabus
Common Programs
Mathematics
Physics
Chemistry
Frontier Science
Applied Physics
Materials Science
Nano-Science and Nano-Technology
Materials Science and Engineering

Mathematics

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Program Master's Program

Title **Mathematical Science IIIB**

(in Japanese) 数理科学IIIB

Students recommended to study this course Students in 1st to 2nd year

Number of credits 1.5 [Optional] [Specialized subject]

Teacher

Lecture number	Available term	Available day and period	Classroom	Name of teacher (in Japanese)	Teacher's room	Telephone number or E-mail	Office hour
01BB605	Spring ABC	Tuesday, 3	1E502	Hirokazu Nishimura (西村泰一)	Natural Science Bldg. B625	logic@math.tsukuba.ac.jp	

Objective of coursework

We will discuss Homotopy Type Theory.

Overview of coursework

Homotopy Type Theory lies at the crossroads of computer science, It was found out in this century that dependent type theory is no other than the internal language for (abstract) homotopy theory, just as the Mitchell-Benabou language is the internal language for topos theory.
It is pleasing to note that the Freudenthal suspension theorem, Blakers-Massey theorem, Whitehead's principle for n-types, van Kampen theorem, and some other famous theorems are given new proofs within homotopy type theory.

Keywords of coursework

homotopy theory theory, homotopy theory, model category, dependent type theory, category theory, fibered category theory, comprehensive category, n-types, n-connectedness

Plan of coursework

After providing preliminary courses on category theory and homotopy theory, we will give elements of homotopy theory theory.

Method for evaluating learning results

By occasional reports

Educational materials, reference documents, and documents distributed, etc.

MacLane, Categories for the Working Mathematician
Voevodsky et al., Homotopy Type Theory
Jacobs, Categorical Logic and Type Theory Hirschborn
Model Categories and Their Localizations Whitehead
Elements of Homotopy Theory
Goerss and Jardine, Simplicial Homotopy Theory
Lurie, Higher Topos Theory

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