# Applied Mathematics I

Probability and Statistics

## Course Information

School year: 4th, Required for all departments
Semester/Term: Full year (April - August, October - February)
Schedule: 90 minutes, once a week (total 30 lectures)
Credit hours: 2
Prerequisites: Mathematics AI, Mathematics AII, Mathematics B

## Course Description

Probability; Bayes' theorem; variance; population; random number; covariance; correlation coefficient; regression line; multiple regression analysis; random variable; probability distribution; Bernoulli trials; binomial, Poisson and normal distributions; probability density function; multidimensional probablity variable; law of large numbers; central limit theorem; chi-square, t- and F-distributions; interval estimation; confidence interval; testing hypothesis; critical region; two-sided, right-sided and left-sided tests; test statistic, chi-square, F- and t-tests; goodness of fit test; test of independence

## Instructors

Hitoshi Saitoh (saitoh@), Yasuhito Kaminaga (kaminaga@), Tadashi Taniguchi (tani@), Hisashi Usui (usui@), Han Yoshida (han@), Shin'ya Fujita (fujita@)  (Put "nat.gunma-ct.ac.jp" after "@.")

## Course Outcomes

Upon completion of this course/program a student will be able to:

1. Understand the basic terminology of probability such as expected value, multiplication rule and Bayes' theorem.
2. Analyze discrete statistical data properly and understand basic concepts of statistics such as population, sample, correlation coefficient and regression analysis.
3. Understand the basic theory of random variables, probability distribution and density functions.
4. Recognize the relation among binoial, Poisson and normal distributions and apply them to concrete examples.
5. Understand the basic theory of multidimensional probability variables such as the central limit theorem and chi-square, t- and F-distributions.
6. Apply various techniques of interval estimation in order to estimate parameters of populations.
7. Understand the basic concepts of testing hypothesis and apply them to typical problems.

## Textbook

*Probability and Statistics*  (Second Edition)
by K. Arai, H. Usui, S. Ouchi, H. Saitoh, Y. Sato and S. Takato
Dainippon tosho, Tokyo, 2005.
pp.1-120  (in Japanese)
http://www.dainippon-tosho.co.jp/textbook/hs_uc/university_05.html

## Grade Distribution

First Midterm Exam: 20%
Second Midterm Exam: 20%
Third Midterm Exam: 20%
Final Exam: 20%
Assignments, Quizzes: 20%

## Grading Policy and Criteria

Final grades will be a percentage of points earned versus points possible.

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|---|---|
| 80 - 100% | A |
| 70 - 79% | B |
| 60 - 69% | C |
| Below 60% | D (disqualified) |

## Questions

Please contact one of the instrcutors listed above if you have questions or suggestions concerning the syllabus.