

# MC738 - Algoritmos Probabilísticos / Randomized Algorithms - 2016

Prof. Flávio Keidi Miyazawa

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## Informations about the course

- [Topics](#)
- [Evaluation](#)
- [Office Hours](#)
- [Lists of Exercises](#)
- [Grades](#)
- [Slides](#) [[4 slides per page](#)]
- [Important dates](#)
- [Knuth talking about Randomized Algorithms](#) (made available by [Hsueh-I Lu](#))
- [Theoretical Computer Science Cheat Sheet](#) by [Steve Seiden](#)
- [Bibliography](#)

## ● Links about randomized algorithms

- [Wikipedia](#)

## ● Topics

- Basic concepts in probability.
- Moments and Deviations.
- Tail Inequalities.
- Ball, Bins and Random Graphs.
- The Probabilistic Method.
- Markov Chains and Random Walks.
- Applications in graphs, data structures, optimization, game theory, etc.

## ● Classes

Monday and Wednesday, from 14:00 to 16:00, room 351, building IC3.5.

## ● Office Hours

Monday: 13-14hs, room 30, building IC1.

## ● Evaluation

- The final grade is calculated from grades  $T$ ,  $A$  and  $L$ .
- The grade  $T$  is the average score of seven small tests (one for each given chapter).
- The grade  $A$  is obtained from two parts. One part, corresponding to 80% of the grade  $A$ , is obtained from the the oral presentation and short text detailing the contents of the presentation, about a paper using the techniques considered in the course. The second part, corresponding to 20% of the grade  $A$ ; is obtained from the average grade of very simple one question tests for each presentation.
- The grade  $L$  is the average score of seven lists of exercises. To obtain the score of a list of exercises, the professor will correct the same exercise of the list (randomly selected) for all students.
- The final grade  $N$  is equal to  $(2T+A+L)/4$ .

## ● List of Exercises

- For each chapter, the corresponding list of exercises will be released until the last class of the chapter.

## ● Important dates

- Tests: will occur in the next class after the deadline of the corresponding list of exercises.
- Lists of exercises: at least one week after the list is published.
- Presentations: Will occur in the last two weeks of the course.

## ● Bibliography

- M. Mitzenmacher and E. Upfal. Probability and Computing : Randomized Algorithms and Probabilistic Analysis. Cambridge University Press, New York (NY), 2005. [Errata of the first printing](#), [second printing](#). **This is the main book used in this course.**
- R. Motwani and P. Raghavan. Randomized Algorithms, Cambridge, 1995.
- J. Michael Steele. Probability Theory and Combinatorial Optimization, SIAM, 1997.
- V. Vazirani. Approximation Algorithms. 2001. Springer-Verlag.
- D.S. Hochbaum (ed). Approximation Algorithms for NP-Hard Problems, PWS Publishing Company, 1997.
- Papers on the subject.

