

L.079.05511

Fundamental Algorithms (in English)

Syllabus

Course code: L.079.05511
Course Level: Bachelors
Instructor: Jun. Prof. Dr. Sevag Gharibian
Office: F2.313
Office hours: 11:00 – 12:00 Wednesday
Email: sevag.gharibian@upb.de
Assistants: Jan Bobolz (F2.111, jan.bobolz@uni-paderborn.de)
Classroom: F1.110 (Tuesday), F2.211 (Wednesday), F0.530 (Friday)
Class website:
http://groups.uni-paderborn.de/fg-qi/courses/UPB_FUNDAMENTAL_ALGS/UPB_FUNDAMENTAL_ALGS.html

1.0 – Major Topics Covered (tentative):

- Review of Big-Oh Notation, Runtime Analysis
- Advanced Heaps
 - Binomial Heaps
 - Fibonacci Heaps
 - Radix Heaps
 - Applications
- Advanced Search Structures
 - Splay Trees
 - (a,b)-Trees
 - Patricia Tries
 - Applications
- Graph Algorithms
 - Shortest Paths
 - Matchings
- Network Flows
 - Ford-Fulkerson Algorithm
 - Preflow-Push Algorithm
 - Applications
- Matrices and scientific computing

- Matrix multiplication algorithms
- Random walks
- Polynomials and the Fourier transform

2.0 – Textbook(s):

- T.H. Corman, C.E. Leiserson, R.L. Rivest, C. Stein. Introduction to Algorithms. MIT Press, 2002.
- J. Kleinberg, E. Tardos. Algorithm Design. Pearson, 2006.

3.0 – Class Schedule:

- Lecture: 8:00 – 11:00 Tuesday
- Tutorial: 14:00-16:00 Wednesday, 11:00-13:00 Friday.
 - Note: Tutorials are held beginning Week 2 of lectures.
- Final Exam (first sitting): Wed, Feb 20, 2019, 9:00-12:00, in room C1.
- Final Exam (second sitting): TBA

4.0 – Grading Scheme:

- The full grade for the course is based on the final exam, which will be written. The grading scheme for the final exam is as follows:

95% - 100%	: 1,0
90% - 94%	: 1,3
85% - 89%	: 1,7
80% - 84%	: 2,0
75% - 79%	: 2,3
70% - 74%	: 2,7
65% - 69%	: 3,0
60% - 64%	: 3,3
55% - 59%	: 3,7
50% - 54%	: 4,0
0 – 49%	: 5,0

- *Bonus points for homework:* The bonus points for completing homeworks are as follows. Note the bonus applies only if you pass the final exam.

$\geq 60\%$ of points earned cumulatively over all homeworks:

1 step bonus (eg 1,3 to 1,0)

$\geq 80\%$ of points earned cumulatively over all homeworks:

2 steps bonus (eg 1,7 to 1,0)