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: Jannes Stubbemann (stubbi@mail.upb.de)
Classroom: F1.110 (Friday)
Class website:
    http://groups.uni-paderborn.de/fg-qi/courses/UPB_FUNDAMENTAL_ALGS/W2019/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

- o Matrix multiplication algorithms
- o Random walks
- o 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: 9:00 – 12:00 Friday (note this differs from PAUL)
- Tutorial: 12:00-14:00 Friday (note this differs from PAUL)
  - o Note: Tutorials are held beginning Week 3 of lectures.
- Final Exam (first sitting): TBA
- 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.

\>= 60% of points earned cumulatively over all homeworks:
1 step bonus (eg 1,3 to 1,0)
\>= 80% of points earned cumulatively over all homeworks:
2 steps bonus (eg 1,7 to 1,0)