

Name of Module: Parameterized Algorithmics		CP (ECTS): 6	Short Name: MINF-VS-PA.W11
Person Responsible for Module: Prof. Rolf Niedermeier	Secretariat: TEL 5-1	e-mail address: rolf.niedermeier@tu-berlin.de	
Module Description			

1. Qualification Aims
<p>Participants of the module</p> <ul style="list-style-type: none"> □ know the approach of parameterized complexity analysis for solving NP-hard computational problems, □ are able to design and analyze parameterized algorithms, and □ can use complexity-theoretic methods to determine the limits of parameterized algorithmics. <p>The course is principally designed to impart technical skills 50%, method skills 50% system skills 0% social skills 0%</p>

2. Content
<p>Particular topics include:</p> <ul style="list-style-type: none"> □ algorithms for exactly solving NP-hard optimization problems by exploiting important problem parameters such as solution size □ NP-hard computational problems on graphs and networks and on strings □ algorithmic techniques such as preprocessing by data reduction, depth-bounded search trees, color coding, iterative compression, tree decomposition of graphs

3. Module Components					
Course Name	Course type	Weekly hours per semester	CPs (acc. to ECTS)	Compulsory(C) / Compulsory Elective (CE)	Semester (WiSe / SoSe)
Parameterized Algorithmics	IV	4	6	C	WiSe

4. Description of Teaching and Learning Methods
The course material is presented in lectures. The lectures are accompanied by tutorials in which an active participation and homework on the distributed work sheets is required.

5. Prerequisites for Participation
a) obligatory: Basic knowledge of algorithms

6. Target Group of Module
Computer Science Master with focus "Reliable Systems" Computer Science Master with focus "Intelligent Systems" Computer Science Diploma Computer Engineering Master with focus "Software Engineering" Computer Engineering Master with focus "Information Systems" Computer Engineering Diploma

7. Work Requirements and Credit Points		
Course Type	Calculation Factor	Hours
Course (IV)	15x4	60
Private study, including homework and exam preparation		120
Total		180

8. Module Examination and Grading Procedures

Final oral exam determining the grade (MP). As a prerequisite, an active participation in the tutorials with presentation of own solutions of exercises is mandatory.

9. Duration of Module

1 semester

10. Number of Participants

Max. 30 participants

11. Enrolment Procedures

<http://www.akt.tu-berlin.de/>

12. Recommended Reading, Lecture Notes

Lecture notes available in paper form? yes ^{""} no **X**

Lecture notes available in electronic form? yes **X** no ^{""}

Slides are available at <http://www.isis.tu-berlin.de/>

Recommended Reading:

- Rod G. Downey, Michael R. Fellows: Parameterized Complexity. Springer, New York 1999.
- Jörg Flum, Martin Grohe: Parameterized Complexity Theory. Springer, Berlin 2006.
- Rolf Niedermeier: Invitation to Fixed-Parameter Algorithms. Oxford Univ. Press, Oxford 2006.

13. Other Information

The german title of the module is "Parametrisierte Algorithmik".