

# Part I

## Organizational Matters

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- ▶ Modul: IN2003
- ▶ Name: “Efficient Algorithms and Data Structures”  
“Effiziente Algorithmen und Datenstrukturen”
- ▶ ECTS: 8 Credit points
- ▶ Lectures:
  - ▶ 4 SWS  
Mon 10:00–12:00 (Room Interim2)  
Fri 10:00–12:00 (Room Interim2)
- ▶ Webpage:  
<https://www.moodle.tum.de/course/view.php?id=100478>

- ▶ Required knowledge:
  - ▶ IN0001, IN0003  
“**Introduction to Informatics 1/2**”  
“Einführung in die Informatik 1/2”
  - ▶ IN0007  
“**Fundamentals of Algorithms and Data Structures**”  
“Grundlagen: Algorithmen und Datenstrukturen” (GAD)
  - ▶ IN0011  
“**Basic Theoretic Informatics**”  
“Einführung in die Theoretische Informatik” (THEO)
  - ▶ IN0015  
“**Discrete Structures**”  
“Diskrete Strukturen” (DS)
  - ▶ IN0018  
“**Discrete Probability Theory**”  
“Diskrete Wahrscheinlichkeitstheorie” (DWT)

# The Lecturer




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# 1 Contents

- ▶ Foundations
  - ▶ Machine models
  - ▶ Efficiency measures
  - ▶ Asymptotic notation
  - ▶ Recursion
- ▶ Higher Data Structures
  - ▶ Search trees
  - ▶ Hashing
  - ▶ Priority queues
  - ▶ Union/Find data structures
- ▶ Cuts/Flows
- ▶ Matchings

## 2 Literatur

-  Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman:  
*The design and analysis of computer algorithms*,  
Addison-Wesley Publishing Company: Reading (MA), 1974
-  Thomas H. Cormen, Charles E. Leiserson, Ron L. Rivest,  
Clifford Stein:  
*Introduction to algorithms*,  
McGraw-Hill, 1990
-  Michael T. Goodrich, Roberto Tamassia:  
*Algorithm design: Foundations, analysis, and internet  
examples*,  
John Wiley & Sons, 2002

## 2 Literatur

-  Ronald L. Graham, Donald E. Knuth, Oren Patashnik:  
*Concrete Mathematics*,  
2. Auflage, Addison-Wesley, 1994
-  Volker Heun:  
*Grundlegende Algorithmen: Einführung in den Entwurf und die Analyse effizienter Algorithmen*,  
2. Auflage, Vieweg, 2003
-  Jon Kleinberg, Eva Tardos:  
*Algorithm Design*,  
Addison-Wesley, 2005
-  Donald E. Knuth:  
*The art of computer programming. Vol. 1: Fundamental Algorithms*,  
3. Auflage, Addison-Wesley, 1997



## 2 Literatur



Donald E. Knuth:

*The art of computer programming. Vol. 3: Sorting and Searching,*

3. Auflage, Addison-Wesley, 1997



Christos H. Papadimitriou, Kenneth Steiglitz:

*Combinatorial Optimization: Algorithms and Complexity,*

Prentice Hall, 1982



Uwe Schöning:

*Algorithmik,*

Spektrum Akademischer Verlag, 2001



Steven S. Skiena:

*The Algorithm Design Manual,*

Springer, 1998