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# Netzwerksicherheit [NetSec]

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Computer Networks and Communication Systems  
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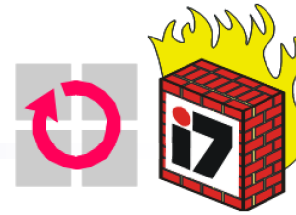
# Systemsicherheit [SysSec]

**Dr.-Ing. Jürgen Kleinöder**

Distributed Systems and Operating Systems  
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# Course Overview - NetSec

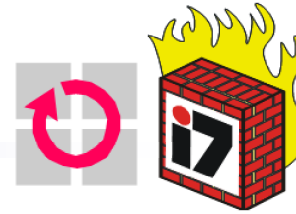
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- ❑ **Cryptography**  
Basics, symmetric cryptography, asymmetric cryptography
- ❑ **Cryptographic Techniques**  
Modification check values, random number generation
- ❑ **Security Protocols**  
Cryptographic protocols, integrating security services into communication architectures
- ❑ **Security in Communication Protocols**  
Medium access (PPP, 802.1x, WLAN), network layer (IPSec), transport/session layer (SSL, TLS)
- ❑ **Security in Mobile Networks**  
Location privacy, pseudonyms, mix networks
- ❑ **Attack Detection**  
Attack detection and prevention, IP traceback

# Course Overview - SysSec

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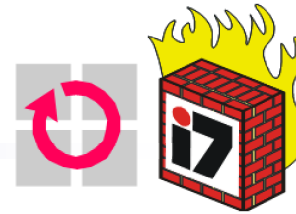


## Security in the context of operating systems

- ❑ **Authentication**
- ❑ **Authorization**  
Access Control Lists, Capabilities
- ❑ **Attack concepts and system weaknesses**  
Trojan horses, worms, privileged applications (s-bit problem)
- ❑ **Security concepts**  
Sandboxing, mandatory access control (AppArmor, SELinux),  
protection domains (Pentium architecture),  
secure booting, TPA, Palladium, SmartCards  
secure administration, tools for enhancing security

# Exercises

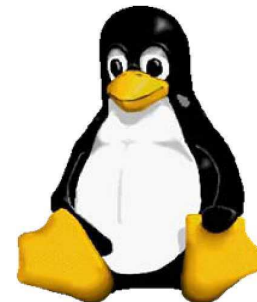
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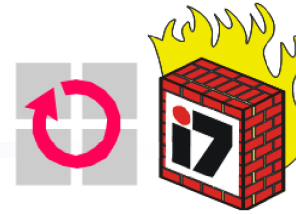
- ❑ Organization
  - ❑ Consolidation of course topics, extended studies
  - ❑ Working groups of 2-3 students
  - ❑ Mix of theoretic and practical exercises



- ❑ Overview
  - ❑ Lab training
  - ❑ Cryptographic algorithms
  - ❑ Certificates, PKI
  - ❑ Security analysis
  - ❑ Network monitoring and analysis
  - ❑ VPN, Firewalls (Linux, Cisco)
  - ❑ WLAN security (how to access secured WLANs)
  - ❑ Attack detection



# Course Overview



## ❑ Material - NetSec

- ❑ Günter Schäfer, “*Netzicherheit - Algorithmische Grundlagen und Protokolle*,” dpunkt Verlag, 2003. (an English version is available)
- ❑ William Stallings, “*Cryptography and Network Security: Principles and Practice*,” Prentice Hall, 3rd ed, 2005.



## ❑ Material – SysSec follows

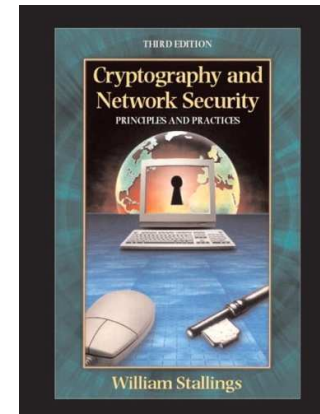
## ❑ News, updates, handouts, ...

<http://www7.informatik.uni-erlangen.de/~dressler/lectures/netzwerksicherheit-ws0708/>

[http://www4.informatik.uni-erlangen.de/Lehre/WS07/V\\_SYSSEC/](http://www4.informatik.uni-erlangen.de/Lehre/WS07/V_SYSSEC/)

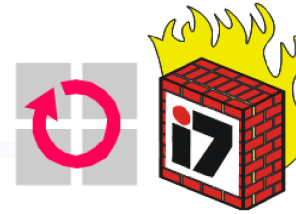
## ❑ Persons

- ❑ Dr.-Ing. Falko Dressler (NetSec: lecture and exercises)
- ❑ Tobias Limmer (NetSec: exercises)
- ❑ Dr.-Ing. Jürgen Kleinöder (SysSec: lecture)
- ❑ Michael Gernoth, Reinhard Tartler (SysSec: exercises)



# Course Organization

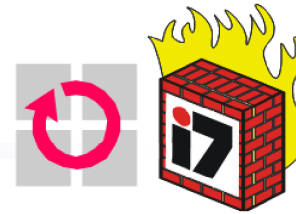
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- ❑ Lecture
  - ❑ NetSec: Monday, 14:15-15:45, H5
  - ❑ SysSec: Thursday, 10:15-11:45, H4
  - ❑ Common lectures for NetSec and SysSec on Monday **and** Thursday up to November 5<sup>th</sup>
  
- ❑ Exercises (in groups à 2-3 students) starting in November!
  - ❑ NetSec
    - Tuesday, 14:15-15:45, 01.153 CIP-Pool
    - Tuesday, 16:15-17:45, 01.153 CIP-Pool
    - Thursday, 16:15-17:45, 01.153 CIP-Pool
  - ❑ SysSec
    - Tuesday, 10:15 – 11:45, 0.156
    - Wednesday, 12:00 – 14:00, 01.153 CIP-Pool
  
- ❑ ... see web page for more up-to-date information

# Course Organization

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## ❑ Examination

### ❑ Computer science

- NetSec in combination with [KS] (main subject: communication systems)
- NetSec in combination with SysSec (main subject: operating systems)
- SysSec in combination with Operating Systems or with Distributed Systems (main subject: operating systems)

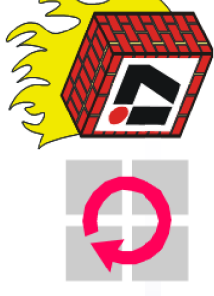
### ❑ CE / IuK: oral examination

### ❑ Exercises are relevant!

## ❑ “Schein”

- ❑ Oral examination at the end of the semester
- ❑ “benoteter Schein”: successful processing of ALL exercises, the grade results form the oral examination
- ❑ “unbenoteter Schein”: successful processing of ALL exercises, at least 50% must be achieved in the oral examination

## NetSec - General Course Bibliography



- [Amo94] E. G. Amorosi. *Fundamentals of Computer Security Technology*. Prentice Hall, 1994.
- [Cha95] Brent Chapman and Elizabeth Zwicky. *Building Internet Firewalls*. O'Reilly, 1995.
- [For94b] Warwick Ford. *Computer Communications Security - Principles, Standard Protocols and Techniques*. Prentice Hall, 1994.
- [Gar96] Simson Garfinkel and Gene Spafford. *Practical Internet & Unix Security*. O'Reilly, 1996.
- [KPS95] C. Kaufman, R. Perlman und M. Speciner. *Network Security – Private Communication in a Public World*. Prentice Hall, 1995.
- [Men97a] A. J. Menezes, P. C. Van Oorschot, S. A. Vanstone. *Handbook of Applied Cryptography*. CRC Press Series on Discrete Mathematics and Its Applications. CRC Press, 1997.
- [Sch96] B. Schneier. *Applied Cryptography - Second Edition: Protocols, Algorithms and Source Code in C*. John Wiley & Sons, 1996.
- [Sta98a] W. Stallings. *Cryptography and Network Security: Principles and Practice*. Prentice Hall, 2nd ed, 1998.
- [Sti95a] D. R. Stinson. *Cryptography: Theory and Practice (Discrete Mathematics and Its Applications)*. CRC Press, 1995.
- [Sch03] G. Schäfer. *Netzicherheit – Algorithmische Grundlagen und Protokolle*. dpunkt.verlag, 2003.