

**Practical Exercises for
Mobile Business I
WS 2011/2012**

**Work sheet 1
Technology Basics I**

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Exercise 1 (Mobile Communication Services)

- a) Which are the so-called Classic Mobile Communication Services?
- b) Please describe each one of these services.
- c) When establishing a data connection over a GSM network, which are the relevant Mobile Data Services?
- d) Please state the advantages and disadvantages of
 - (i) packet-oriented and
 - (ii) circuit-switched mobile data services.

Exercise 2 (Architecture of the GSM system)

- a) Which are the three “security services” offered by GSM?
- b) Please outline and comment on the security model of the GSM infrastructure regarding subscriber authentication (challenge-response procedure for subscriber authentication).
- c) Name the weaknesses of the GSM security model and describe in particular the possible consequences resulting from these weaknesses.

Exercise 3 (3G/UMTS, 4G, LTE)

- a) What are the additional security features which were implemented in 3G (UMTS) networks compared to those of GSM?
- b) What are the characteristics of 4G networks, how does LTE relate to 4G and what does it mean?

Exercise 4 (Cell-based communication)

- a) What does cell-based communication mean and what are the implications (basic principle, physical form, dependencies)?
- b) Write down the advantages and drawbacks of cellular networks compared to alternative solutions.
- c) In this context, explain “Multiplexing” and why it is used in communication systems.

Exercise 5 (Wireless LAN)

- a) What are the components in a Wireless LAN?
- b) Name two types of Wireless LAN networks.
- c) In a wireless LAN environment, what is a so-called “Distribution system”? Also please explain Wireless LAN roaming within a distribution system.
- d) There are numerous methods for Wireless LAN encryption. Which one of these offers reasonably secure encryption, using a pre-shared key?

Processed Lectures:

- **Lecture 2:** Mobile Telecommunication Infrastructures
- **Lecture 3:** Wireless internet-oriented Infrastructures and Protocols
- **Lecture 4:** Mobile Communication Services