

# UBIQUITOUS COMPUTING

Summer 2004



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# OVERVIEW

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## Ubiquitous Computing - Course Structure

- ☐ Lectures/Discussions

Introduction into the broad field of Ubiquitous Computing  
will give a lot of space for discussion. Please interrupt & participate!

- ☐ Seminar Talks

Each participant has to give a presentation and documentation

- ☐ Project Work

CyberLounge 2.0

Small sub-groups of 2-3 people

# OVERVIEW

## Grading Scheme

- ☐ The course gives 3 credit points (32 lh)
- ☐ The participants are expected to
  - Attend
  - Provide discussion input
  - Report about required readings impression (summary)
- ☐ The grading is based on the following table

Type of Evaluation	Description	Percentage of Total Points
Project	<ul style="list-style-type: none"><li>▪ Successful and proactive participation</li><li>▪ Responsibility of work items</li><li>▪ Reports about results</li><li>▪ Delivery in time</li></ul>	50%
Seminar	<ul style="list-style-type: none"><li>▪ Presentation</li><li>▪ Documentation</li><li>▪ Review Process</li><li>▪ Questions during presentation</li></ul>	50%

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## Ubiquitous Computing - Course Schedule

	April. 7	Apr. 14	Apr. 21	Apr. 28	May 5	May 12
9:15	Lecture I	Lecture II	Lecture III		Lecture IV	Lecture V
10:45						
11:15	Sem Prep	Sem Prep	Sem Prep		Seminar 1,2,3	Seminar 4,5,6
12:30	Proj Prep	Proj Prep	Proj Prep			
	May 19	May 26	June 2	June/July	July 30	
9:15	Lecture VI	Seminar 10,11,12	Project	Project Implementation Integration Documentation	Final Project Demo	
10:45						
11:15	Seminar 7,8,9	Project	Project	Seminar Documentation		
12:30						

# OVERVIEW

## Ubiquitous Computing – Lecture Content

- ❑ Lecture I :: *Introduction, Backgrounds, Trends, Definitions*
  - Definition
  - Weiser's Vision
  - The Digital Divine
  - Smart Objects / Data Shadows
  - Infrastructure Requirements
- ❑ Lecture II :: *Topics and Examples of Ubiquitous Computing*
  - Technology Trends
  - New Devices
  - Research Topics in Ubiquitous Computing
- ❑ Lecture III :: *Intelligent Buildings*
  - Examples (Adaptive House, Aware Home, etc.)
  - Goals/Scenarios
  - Functions
  - Devices and Infrastructures (OSGi)

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## Ubiquitous Computing – Lecture Content

- ❑ Lecture IV :: *Ubiquitous User Interfaces (UII?)*
  - Interfaces for Invisible Computers (speech, gestures, etc,)
  - The Reality-Virtuality Continuum
  - Digital Workbenches
  - New Display Technologies
  - Tangible Media
  - Brain Interfaces
- ❑ Lecture V :: *Wearable Computers*
  - History of Wearables
  - Academic, Industry and Military Examples
  - Smart Clothing
  - Design Guidelines
- ❑ Lecture VI :: *Sensor Networks / Smart Dust*
  - Sensor Nodes
  - Monitoring Applications
  - MEMS
  - Micro Robotics

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## Ubiquitous Computing – Seminar Concept

### ☐ Seminar Talks

Each participant has to give a presentation and documentation

30 minutes talk, 15 minutes questions & discussions

All other participants are expected to read document before presentation and to have 3 questions ready during the talk

### ☐ Seminar Documents

Each participant has to provide a seminar report about his/her findings

>= 10 pages, 12pt font, 1.5 line distance

### ☐ Review Process

- The document and slides have to be presented before the session
- Student committee (3 – 4 participants) will meet to review each paper & slide set before the talk (one week before)
- Maybe we do video filming of presentations with post-discussions

# OVERVIEW

## Ubiquitous Computing – Possible Seminar Topics

### (1) Context Awareness

- What is context?
- How to use context information for mobile applications?
- Design of context-aware systems
- Research projects in the field

### (2) Sensors and Actors

- Types of sensors and actors

### (3) Sensor Networks

- AdHoc Networking
- Self-Organization
- Organic Computing
- Swarm Technologies

### (4) Location Tracking Technologies

- WLAN, Bluetooth, GPS

### (5) Object Tracking Technologies

- Barcode, RFID

### (6) User Tracking Technologies

- Fingerprint Scanner, Iris Scanner, Gesture Recognition,
- Speech Recognition, Multimodal systems, etc.



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## Ubiquitous Computing – Possible Seminar Topics

(7) Service Provisioning Infrastructures

- Jini, Salutation, UpnP

(8) Privacy in Ubiquitous Computing

(9) Ubiquitous User Interfaces

- Technologies
- Examples
- Usage in Research Projects

(10) Ambient Intelligence

(11) TinyOs

- Operating System for sensor nodes

(12) Smart Cards

- Technical Foundations
- Standards
- Java for SmartCards

(13) XML

(14) PHP

(15) SQL/mysql

(16) Ubiquitous Computing on Campuses (Book of David G. Brown)

(17) Smart Houses (MIT Home of the Future Project)