COURSE SYLLABUS

Foundations of ICT

ECTS 4 (2 credit hours)   Language of instruction: German

Winter Term 2014/15 (PI 0140)   Instructor: Alexander Novotny, MSc

Programs: Bachelor's programs, all versions (BaWiSo, BaWiRe)

COURSE CONTENTS

Description

The tremendous technological advances in information and communication technologies, especially in wireless communication and portable devices, have enabled the development of the era of mobile computing in the 1990's and ubiquitous computing nowadays. Information is expected to be available everywhere and at all times.

Networks and mobile communication are key enablers of modern E-Business and ubiquitous computing. Ubiquitous computing merges virtual and physical environments. In the physical environment objects are identified, environment is sensed and interaction between computers and humans is pushed to the invisible. In the virtual environment behavioral data is collected. Business intelligence applications help to combine both information sources to gain new insights. But the ubiquitous availability of information and services imposes risks which need to be minimized to protect humans and businesses.

Course design

The course is taught in an interactive manner. In addition to input from the instructor, students are expected to participate in in-class team assignments and deliver a team presentation to peers. Moreover, students have the opportunity to demonstrate their obtained skills in a final exam.

Prerequisites

Registration in the LPIS.

LEARNING OUTCOMES

After attending this course, students will be able to understand, describe and judge key information and communication technologies that support electronic business transactions and smart commerce environments.

Subject-related skills

- Know what technologies are used for business in electronic environments (fixed/mobile systems, data collection (i.e., RFID), networks, localization technologies).

- Understand the fundamental challenges in the emerging area of mobile and ubiquitous computing
- Understand the evolution of interfaces between humans and computers from direct manipulation to implicit interaction.
- Judge on the impact technologies will have and how their technical traits and capabilities foster and limit their business use and deployment potential.

Transferable skills

- Ability to discuss, analyze and judge the suitability of technical solutions and services in business.

UNITS

Unit 1 – How ICT developed
- Information and communication systems, hardware and software
- Drivers increasing network utilization (digitalization, computerization, packet-based switching)
- Internetworking (IPv4/IPv6, DNS)
- Mobile communication (GSM, GPRS, EDGE, HSCSD, UMTS, LTE, WiMax)
- Next Generation Networks

Unit 2 – Ubiquitous Computing: Technologies for ad-hoc communication
- Ubiquitous computing and related concepts (IoT, Pervasive Computing, Ambient Intelligence)
- Mobile Ad-hoc networks (WiFi, IrDA, Bluetooth, ZigBee)
- Discovery systems (SSDP, SLP)

Unit 3 – Identification, data collection and user interfacing in physical environments
- Identification systems (Barcodes, RFID, Smartcards)
- Sensor systems
- User interfaces and human-computer interaction

Unit 4 – Tracking and retrieving information in electronic environments
- The stateless web (HTML, XML, RDF, meta-data)
- Tracking state on the web (Cookies, IP address, Sessions, JavaScript Tags, etc.)
- Retrieving information from the web (Indexing and web crawlers, web archives, ranking and relevance, content-based/collaborative filtering)

Unit 5 – Business Intelligence
- Types of BI systems (MIS, DSS, MSS, EIS, Intelligence)
- Motivation for BI (decision making, data - information - knowledge)
- Architecture (layer model)
- Applications (Reporting, Balanced Scorecard systems)

Unit 6 – IS Security and Final Exam
- Basic concepts (vulnerability, threats, risk analysis, etc.)
- Security and privacy targets
- Cryptography (symmetric, asymmetric, hash functions, digital signature)
- Identity management systems

Unit Structure

140 min lecture and in-class discussions
Break
45 min preparation of teams
40 min presentation of team results

TEAM PRESENTATIONS

For each unit, teams of four students will prepare for tasks on a topic relevant to the course. In class, two teams randomly selected by the instructor will present their results in a <u>compact</u> presentation (10-15 minutes per team) to the audience. All students of a team should be involved in the presentation. Over the course of a semester, teams may get the opportunity to present more than once. Thus, all teams should be prepared for presentation in all units. Student will be assigned to teams in Unit 1.

Teams should prepare the tasks and presentations before class. In class, the teams will be given short in-lecture preparation time for team coordination. This <u>time</u> is <u>not regarded as sufficient</u> for preparing the team presentations.

Moreover, the teams shall be prepared to answer questions from the audience and instructor.

The evaluation will consider the following components:

- Accuracy and structure of the content presented
- Understandability of the results
- Originality
- Communication skills (clear talk, pace of speech and body language)
- Handling of questions

At the end of the course, all members of a team will have the opportunity to hand in a peer-evaluation sheet. Peer evaluation aims to balance within-team differences in contribution to the team's performance. Students may distribute a total of 100% to all members of the team analogous to the respective contribution, effort and workload of each member. Based on the evaluations provided by the team, the scores of the team members may be adjusted up or down. If no peer evaluation sheet is filed, by default equal distribution of the team members' contributions will be assumed.

<u>Example:</u>
A team of 4 students has reached a total 80.00% for the team presentations.

Peer evaluations for a student:
Self: 25%
Peer 1:   30%
Peer 2:   20%
Peer 3:   30%

The grade of the respective student will be adjusted upwards by 105%. Thus, the student will receive a total of 84.00% for the team presentations.

The instructor reserves the right of adjusting the distribution of grades within a team based on the actual contributions made by each team member.

GRADING

There are three types of deliverables:

70% Final exam
20% Team presentations
10% In-class participation

To obtain an overall positive grade in the course, at least 50% have to be reached at the final exam.

Grading system

87.5% - 100%	= "Sehr gut"	(Excellent)
75% - 87.49%	= "Gut"	(Good)
62.5% - 74.99%	= "Befriedigend"	(Satisfactory)
50% - 62.49%	= "Genügend"	(Sufficient)
Below 50%	= "Nicht Genügend"	(Fail)

PARTICIPATION

Standard PI (="prüfungsimmanent" - continuous assessment of course work) attendance policy applies: In general, attendance is mandatory. A maximum of 4 hours (or 20%) absence is acceptable. Please check back with the instructor per E-Mail if you have any questions regarding attendance.

FEEDBACK

This course is pseudonymously evaluated by WU's quality management services. Moreover, students are encouraged to provide feedback at any time to the instructor either orally or per E-Mail.

ACADEMIC DISHONESTY

Academic misconduct (plagiarism, cheating, etc.) will be prosecuted in accordance with the university's policies and regulations.