University of St.Gallen

# Course and Examination Fact Sheet: Spring Semester 2020

# 8,027: Ubiquitous Computing and the Internet of Things

# ECTS credits: 3

## Overview examination/s

(binding regulations see below)
Central - Written examination (100%, 90 mins.)

## Attached courses

Timetable -- Language -- Lecturer
8,027,1.00 Ubiquitous Computing and the Internet of Things -- Englisch -- Mayer Simon

## Course information

### Course prerequisites

No formal prerequisites.

### Learning objectives

- Students understand and are able to explain the concept of Ubiquitous Computing, and know central technological drivers behind this development.
- Students know the (technical) definition of the Internet of Things. They can explain what role the IP protocol plays in this context. They can differentiate the IoT and the Web of Things, and can explain the basic principles behind networking stacks.
- Students know what resource-constrainedness means in the context of Ubiquitous Computing, and can recognize resource-constrained contexts when they encounter them. They are aware of communication technologies that are suitable in resource-constrained contexts.
- Students understand and can explain the fundamentals of autonomous software systems, and are able to relate these concepts to the Internet and the Web of Things.
- Students understand and can explain basic business implications of Ubiquitous Computing, the Internet of Things, Digitalization, and of service ecosystems.
- Students optionally have implemented individual pieces of IoT/WoT software, and have optionally implemented a Web mashup application.

### Course content

In this course, we cover fundamental concepts, foundational technologies and technological and societal trends and implications of the Internet of Things and of Ubiquitous Computing in general. The course will complement students' entrepreneurial know-how with knowledge about the technological foundation of the IoT and about how real-world applications can be implemented on top of it. In addition, we discuss implications of the proliferation of the IoT and of UbiComp on businesses and on society as a whole.
In the first part of the course, we will discuss the underlying technological trends that drive the accelerating incorporation of sensing, computation, communication, and actuation abilities in traditionally "dumb" everyday things. Next, we will cover the interaction of these things with each other and how they can be integrated within "Smart Environments" and with digital services, forming an "Internet of Things" - we will discuss current developments in the Internet of Things space, in particular with respect to the application-level integration of heterogeneous services and interoperability challenges. Finally, we will give an overview of novel applications and business scenarios that are enabled by smart interacting objects from a technological viewpoint and discuss social implications of Ubiquitous Computing technology.
Optionally (and ungraded), we will support students in the practical application of the concepts and technologies we discuss in the course - in particular regarding Internet and Web programming and the technological realization of environments of interacting (physical) services.

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## Course structure

Weekly lecture with embedded short theoretical and practical exercises. Optionally and ungraded, exercises for applying learned concepts and technologies within practical implementation projects.

## Course literature

John Krumm (Ed.): Ubiquitous Computing Fundamentals. Taylor & Francis, 2009

Friedemann Mattern (Ed.): Die Informatisierung des Alltags. Springer-Verlag, 2007

Additional publications that are referenced from the course materials.

## Additional course information

Canvas page of this course: https://learning.unisg.ch/courses/5697

# Examination information

## Examination sub part/s

## 1. Examination sub part (1/1)

### Examination time and form

Central - Written examination (100%, 90 mins.)

### Remark

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### Examination-aid rule

Extended Closed Book
The use of aids is limited; any additional aids permitted are exhaustively listed under "Supplementary aids". Basically, the following is applicable:

- At such examinations, all the pocket calculators of the Texas Instruments TI-30 series and mono- or bilingual dictionaries (no subject-specific dictionaries) without hand-written notes are admissible. Any other pocket calculator models and any electronic dictionaries are inadmissible.
- In addition, any type of communication, as well as any electronic devices that can be programmed and are capable of communication such as notebooks, tablets, PDAs, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

### Supplementary aids

No further aids are permitted.

### Examination languages

Question language: English
Answer language: English

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## Examination content

All contents from the lectures as well as referenced literature, in the following domains:

- The Ubiquitous Computing Vision, Technological Drivers and Trends

- Sensing and Passive Communication (RFID, etc.)

- Networking Basics and Wireless Communication

- The Internet of Things and the Web of Things

- Location Awareness and location-based Services

- UbiComp Applications and Business Scenarios

- Social Implications of UbiComp

## Examination relevant literature

- Provided slides

- Provided hand-outs

- Referenced literature

- Discussions during the lecture

## Please note

Please note that this fact sheet alone is binding and has priority over any other information such as StudyNet (Canvas), personal databases or faculty members' websites and information provided in their lectures, etc.

Any possible references and links within the fact sheet to information provided by third parties are merely supplementary and informative in nature and are outside the University of St.Gallen's scope of responsibility and guarantee.

Documents and materials that have been submitted no later than the end of term time (CW21) are relevant to central examinations.

Binding nature of the fact sheet:

- Information about courses and examination time (central/decentral) and examination typestarting from the beginning of the bidding on 23 January 2020
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for decentral examinations after the 4th semester week on 16 March 2020
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for central examinations as from the starting date for examination registration on 6 April 2020

Please consult the fact sheet again after these deadlines have expired.