Aalto University
School of Electrical
Engineering

ELEC-E7910
Special Project in
Communications Engineering

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School of Electrical Engineering

Aalto University

Course structure

- Timeline
    - 14.01.2021 at 10.15   Introduction
    - 28.01.2021 at 9.15   Initial topics presentation
    - 26.03.2021   Deadline for initial report into MyCourses
    - 23.04.2021   Deadline for initial report into MyCourses
    - 11.05.2021   Final Report into MyCourses
    - 12.05.2021 at 9.15   Final presentation
- Grading
    - Based on the final report
        - Definition of Scope, Topic presentation, Results contribution
        - Report: presentation, structure
        - Evaluated (Supervisor/Professor + course lecturer)

Reports
Problem solving method

Example of steps

1. I can:
   – Explain why the problem can be solved, what approach, method
2. Define:
   – What is to be done, what is left out (in given content)
3. Explore
   – Explain background, what is known about the problem
4. Plan
   – How the work is to be solved what method is used
5. Do
   – Solution
6. Check
   – How the results are tested, validated
7. Generalize
   – Conclusions

28.01

26.03

23.04

11.05
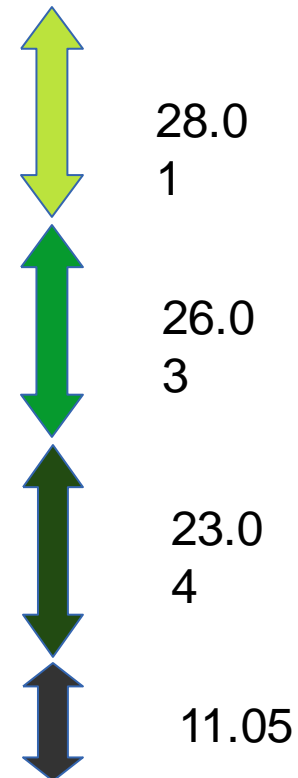
Topics

- Agreed with supervisors from some of the Comnet research groups
  - Before 28.01
- https://www.aalto.fi/en/department-of-communications-and-networking
  - Ambient Intelligence
  - Wearable computing
  - Communications Ecosystem
  - Mobile Communications Networking
  - Wireless Communication, Information and Communication Theory

Ambient Intelligence

- https://www.aalto.fi/en/department-of-communications-and-networking/ambient-intelligence

- or https://ambientintelligence.aalto.fi/

- Topic: to be agreed with contact person

- Group size: 1-2

- Contact: Stephan.sigg@aalto.fi

Wearable computing II: Mobile Cloud Computing

- Topic: 1. Prototyping of a multiplayer virtual reality performance

- Task: The Wearable Systems Lab (aalto.fi/wearsys) collaborates with performing artists on the development of a multiplayer VR performance. The student group is expected to code the VR application based on pre-defined designs.

- Prerequisites: At least one group member should have experience with Unity or Unreal Engine.

- Contact: Tiainen Eero <eero.tiainen@aalto.fi>

Wearable computing III: Mobile Cloud Computing

- Topic: A Mobile Application for Crowdsourced Mapping Data Collection

- Background: The existing web map services, such as Google Maps and HERE maps, provide basic road network data and limited semantic information including locations of intersections, crosswalks, parking spots, traffic lights, and speed limits and turn restrictions for lanes. However, these existing maps are lacking a lot of semantic information which is needed for improving traffic safety. For example, they do not provide precise locations of construction sites, information about temporarily closed lanes, or free parking slots. If traffic signs have been temporarily changed in certain areas, the information may not be updated in time, since companies like Google create maps through infrequent on-site surveys using professional tools like laser scanners. The mobile cloud computing group (mobilecloud.aalto.fi) is working on a crowdsourcing solution which utilizes images/video collected from widely available smartphones for creating and updating semantic road maps.

- Tasks: The student group is expected to develop a mobile app (either Android or iOS) that allows end users to take photos on the streets, annotate (e.g. bounding box, object name, situation description) the photos, and upload the photos and GPS locations to a web server. In addition, users can browse the crowdsourced data (e.g. traffic signs, construction sites, parking slots) on a map (e.g. Google Maps, Open Street Map, or HERE maps).

- Prerequisites: Android or iOS programming

- Contact: Xuebing Li xuebing.li@aalto.fi

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Communications Ecosystem

- Topic: Mobile service subscription offerings and network constraints in Helsinki Downtown

- Group: one group (5 students)

- Contact: Jarno Lähteenmäki jarno.lahteenmaki@aalto.fi

Mobile communications networking: Network Security and Trust

- https://www.aalto.fi/en/department-of-communications-and-networking/network-security-and-trust

- Topic: to be agreed with contact person

- Group: 1 – 2

- Contact: Raimo.Kantola@aalto.fi

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Mobile communications networking: Performance analysis

- https://www.aalto.fi/en/department-of-communications-and-networking/performance-analysis

- Topic: to be agreed with contact person

- Group: to be agreed with contact persons

- Requirements: One group with all students having passed at least one of the courses ELEC-E7450 (Performance Analysis) and ELEC-E7460 (Modeling and simulation)

- Contact: Pasi.Lassila@aalto.fi