Aalto University
School of Electrical
Engineering

ELEC-C1310
Automaatio- ja systeemitekniikan laboratoriotyöt
Laboratory Course in Automation and Systems Technology

Spring 2019

Background

- ELEC-C1310
  - Automaatio- ja systeemitekniikan laboratoriotyöt
  - Laboratory Course in Automation and Systems Technology
  - A core course of Automation B.Sc. Major
  - 5 ECTs

- Responsible lecturer: Prof. Quan Zhou
- Course manager: Anastasiia Kravtcova

- Other teachers/assistants responsible for individual labs (lab teacher):
  - Mika Vainio,
  - Hoang Nguyen Khac,
  - Ilkka Seilonen,
  - Udayanto Dwi Atmojo,
  - Francesco Verdoja,
  - Anastasiia Kravtcova

Course Organization

- Content
  - 6 labs
  - 1-2 lab teachers for each lab
- Rules
  - Teaching group size: 4 students / group
  - Grading: Pass/Fail
  - Language:
    - Labs: Finnish or English;
    - Introduction and course information: English
  - Schedule for each lab:
    - Scheduled time is fixed, please respect the schedule and do your best to come
    - No exception case for students without compelling reasons
    - Only one extra timeslot reserved in each lab for exceptional cases

Procedure

- Students form groups in MyCourses using the group choice functionality
  - Group choice open until Fri 18th Jan 23:55
- Lab teacher prepares a scheduler in MyCourses
  - Announcement in the “News” –section when the lab is open for booking
- Each student group selects a suitable timeslot for each lab
  - Prehearing and lab time agreed with the lab teacher via MyCourses scheduler
  - Lab teacher specifies the location
- Lab teacher uploads the pre-assignment to MyCourses
- Student group completes the pre-assignment of each lab and submits it as instructed by lab teacher

Procedure…

- Student group attends the prehearing of each lab
  - ~15 min,
  - Condition to proceed to the real lab,
  - The whole group needs to redo the prehearing if fails; 3 times failure – fail the course;
  - If a student in a group is not coming, it is considered the student is dropped from the group,
    - the student can join other group if there is compelling reasons
- Student group attends the lab session according to the schedule
  - ~90-180 min
  - If a student in a group is not coming, it is considered the student is dropped from the group,
    - The student can join other group if there is compelling reasons, otherwise fail the course
- Student group submits a lab report when required
  - Instructions and deadlines are provided by lab teacher
  - Submitted to the relevant assignment corresponding folder in MyCourses

Labs and lab teachers

- Control Engineering Lab 1&2: Hoang Nguyen Khac
  - Optimal control of an inverted pendulum
  - PID control of a DC motor
- Microforce measurement: Anastasiia Kravtcova
- Process plant automation system: Ilkka Seilonen, Udayanto Dwi Atmojo
- Sensor fusion with Kalman filter: Mika Vainio
- Fixing bugs in industrial robot: Francesco Verdoja

Schedule

- Control Engineering Lab 1&2: January - February
  - Optimal control of an inverted pendulum
  - PID control of a DC motor
- Microforce measurement: February
- Process plant automation system: February - March
- Sensor fusion with Kalman filter: March
- Fixing bugs in industrial robot: March – April

Skills	Control lab	Process lab	Micro lab	Robot lab	Automation lab
Understanding the physics and models of systems	X				X
Understanding the control concept	X				
implement, use and program automation systems,		X			
implement, use and program microcontrollers, PLC, etc		X			X
implement, use and program sensors,			X		
implement, use and program automation networks,		X			
implement, use and program robots				X	
Perform data measurements			X		X
Interpret measurement results			X		X
Basic software engineering and IT technology		X		X	

General skill	Control lab	Process lab	Micro lab	Robot lab	Automation lab
Group work	X	X	X	X	X
Applying theoretical concepts/knowledge in practice	X	X	X	X	X
Practicing scientific method	X		X	X	
Solving engineering problems	X	X		X	
Design engineering solutions	X	X		X	
Critical thinking			X	X	
Perform data analysis			X	X	X
Presentation skills (oral and writing).	X	X	X	X	X

Questions?