Reykjavik University
School of Science and Engineering

Course Title: Measurement Systems

Course Code: T-316-LABB

ECTS: 6

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Teaching Assistants: Yuri Kanash, Ximena Guardia Muguruza and Arthurton Travis Elvean Bellot

Semester: Fall 2023

Office hours: By appointment

Description

This course introduces the essential general characteristics of measuring devices, data acquisition systems, uncertainty analysis, on how to use uncertainty analysis as a tool to design experiments, and sampling and spectral analysis. Planning and executing experiments, and report writing are also covered.

Learning outcomes

Knowledge: After completing this course the students will have knowledge on:

- Principles of operation of commonly-encountered transducers
- Uncertainty analysis
- Sampling and spectral analysis
- Data acquisition systems

Skills: After completion of this course the students will have skills on:

- Confidently encounter a sensor or experimental system for the first time
- Planning and executing experiments
- Designing experiments
- Report writing

Teaching methods

Mini-labs, workshops, and experiments.

Assessment Methods

Part of Course	Total Weight
Mini-labs	30%
Experiment 1	20%
Experiment 2	30%
Oral exam	20%
Total 100%	

Course outline (subject to change)

Week	Day	Topic	Due
1	1	Workshop 1-Fundamentals of Measurement Systems	
		Mini-Lab 1- Potentiometer	
	2	Workshop 2- Data acquisition and signal processing	Mini-Lab 1 report
		Mini-Lab 2- Load cell	
	3	Workshop 3- Measurement uncertainty	Mini-Lab 2 report
		Workshop 4 – Apparatus encounter Experiment 1 – Activity Day 1	
	4	Workshop 5 – Documentation: Graphics guidelines	
		Experiment 1 – Activity Day 2	
	5	Workshop 5 – Documentation: Report critique Experiment 1 – Activity Day 3	
		Workshop 6 – Understanding transducer specs & outliers Experiment 1 – Activity Day 3	
2	6	Workshop 7 – Sampling & spectral analysis	Experiment 1 report
		Mini-Lab 3 - Accelerometer	
	7	Workshop 8 – Designing an apparatus	
		Workshop 8 – (cont.)	
	8	Experiment 2- Focus on design (Viscosity)	Mini-Lab 3 report
		Experiment 2 – work in class	
	9	Experiment 2 – work in class (Tech talk activity)	
		Experiment 2 – work in class	
	10	Experiment 2 – Workshop and lab resource assessment	
		Experiment 2 – work in class	
3	11	Experiment 2 – design talk	Experiment 2 presentation
		Experiment 2 – work in class	
	12	Experiment 2 – work in class	
		Experiment 2 – work in class	
	13	Experiment 2 – work in class	
		Experiment 2 – work in class	
	14	Experiment 2 – work in class	
		Experiment 2 – work in class	
	15	Experiment 2 – work in class	Experiment 2 memo
		Experiment 2 – work in class	Shakedown demo
Oral Exam			**December 18 and 19**

Notice: We reserve the right to make any and all changes to this course in order to ensure its success. This includes the course outline, subject matter, project deadlines (starting and ending dates), and weighting of assessment methods.

Space/Equipment check: At the end of the course one member of the group is responsible for the return of equipment as before.

Group: There will be groups containing four members. Students are expected to work as active team members and participate well in group work. Interpersonal problems are expected to be resolved well with each other's consent. Involve your instructor sooner rather than later.