



Faculty of Health, Science and Technology
Physics

Syllabus

Experimentation and data analysis

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| Course Code: | FYGA25 |
| Course Title: | Experimentation and data analysis <i>Experimentell problemlösning och dataanalys</i> |
| Credits: | 7.5 |
| Degree Level: | Undergraduate level |
| Progressive Specialisation: | First cycle, has only upper-secondary level entry requirements (G1N) |

Major Field of Study:
FYA (Physics)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2017-02-22, and is valid from the Autumn semester 2017 at Karlstad University.

Prerequisites

Field-specific eligibility A9

Learning Outcomes

Upon completion of the course, students should be able to:

- plan and carry out simple experiments in science and technology based on an open question,
- use to investigate a relation between observables,
- analyse measured data using curve fitting, error analysis and dimension the scientific method analysis and thereby derive a mathematical formula for the measured correlations,
- use MATLAB to analyse, model and present measured data,
- write and interpret technical instructions and laboratory reports,
- seek, interpret and evaluate information sources,
- conduct work in a laboratory with consideration of safety.

Content

Instruction is in the form of lectures, computer exercises and mandatory laboratory sessions.

The course treats the theoretical foundations and general methods of the scientific method and general techniques for experimental work and analysis of measured data. MATLAB is introduced as a tool to use in the analysis of experimental data, visualisation and presentation. Documentation of results and safety in the laboratory are treated. The major part of the course consists of mandatory exploratory experiments in classical physics and technology. Students investigate a physical system and by analysing measured data formulate a mathematical model describing the relation between the measured data and the variables in question. This involves curve fitting, error analysis, unit analysis and dimension analysis. The results of the experiments are presented in lab reports. The course includes a specialisation component in the students' major.

Reading List

See separate document.

Examination

Assessment is in the form of written exam, written reports on hand-in assignments and reports. The course laboratory components are mandatory.

Grades

Master of Science engineering students are awarded one of the grades 5 (Distinction), 4 (Some Distinction), 3 (Pass) , or U (Fail) in the examination of the course. Other students are awarded one of the grades Distinction (VG), Pass (G), or Fail (U).

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.