Reg No: FYGA25/20232

Faculty of Health, Science and Technology
Physics

Syllabus

Experimentation and data analysis

Course Code:	FYGA25
Course Title:	Experimentation and data analysis *Experimentell problemlösning och dataanalys*
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 2023-01-31, and is valid from the Autumn semester 2023 at Karlstad University.

Prerequisites
General admission requirements plus Physics 2, Chemistry 1, and Mathematics 4/D, or equivalent

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 scientific method to investigate correlations,
- analyse measured data using curve fitting, error analysis, and dimension analysis and thereby derive a mathematical formula for the measured correlations,
- use MATLAB to analyse, model, and present measured data,
- formulate and interpret technical instructions and laboratory reports,
- identify, interpret, and evaluate sources of information, and

- work in a laboratory in accordance with safety regulations.

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

The course treats the theoretical foundations 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 experiments and projects are presented in written reports.

The course includes a specialisation component.

Reading List
See separate document.

Examination
Assessment is based on a written exam, written presentations of hand-in assignments, and reports. Laboratory components are mandatory.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades
One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course. For Engineering students, one of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), U (Fail) is awarded in the examination of the course

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.