UNIVERSITY OF GOTHENBURG

PHYSICS

FYD302 LabVIEW programming, 15 credits

LabVIEW-programmering, 15 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Physics on 2017-09-06 to be valid from 2017-09-06, autumn semester of 2017.

Field of education: Science 100%
Department: Physics

Position in the educational system

The course is given as part of the programme Computer-aided physical measuring techniques and as a freestanding course at University of Gothenburg. This course replaces FY0270, FYD300 and FYD301 and only one of these courses may be included in a diploma degree.

Main field of studies	*Specialization*
Physics	G1N, First Cycle, has only upper-secondary level entry requirements

Entry requirements

General entrance requirements for university studies and the Swedish upper secondary courses Physics B, Mathematics D or Physics 2, Mathematics 3c or equivalent.

Learning outcomes

The aim of the course is to give practically useful knowledge of graphical programming with applications on control and measurement systems as well as acquisition, analysis and simulation of signals. This course uses desktop/laptop Windows computers (also Linux and Mac OSX) and the graphical programming language LabVIEW.

Knowledge and understanding
On completion of the course, the student is expected to

- have basic knowledge of the graphic programming language LabVIEW.

- have knowledge of certain important program structures in LabVIEW.

- understand the difference between a good and a poor written LabVIEW program.

- understand the difference between a good and a poor user interface.

- have theoretical and practical knowledge of the possibilities of the personal computer to communicate with the measuring instrument via e g GPIB, USB, Ethernet and RS-232.

- have theoretical and practical knowledge of the functionality of, and the use of, data acquisition cards.

- have an understanding of the possibility for LabVIEW to communicate in a computer network and use LabVIEW for remote control.

Competence and skills
On completion of the course, the student should be able to

- write simple but clean and well-structured programmes in LabVIEW.

- use LabVIEW's integrated project environment.

- build a well functioning user interface.

- practically sample and generate real analogue and digital signals with computer-controlled measuring instruments.

- collect sample and generate real analogue and digital signals with data acquisition cards.

- analyse and process real and simulated signals practically.

- use LabVIEW in computer networks to build simple distributed applications.

- assess whether LabVIEW can be an appropriate tool to solve a current problem.

Judgement and approach
On completion of the course, the student has

- realised advantages and disadvantages with graphic programming compared with traditional text based programming.

- understood why the structure of a LabVIEW program is important.

- understood why the design of a user interface is important.

- understood the data flow principle and its consequences with regard to the order of execution.

- understood the possibility to easily parallelise appropriate problems in LabVIEW for improved performance.

- obtained an understanding of the possibilities and the difficulties when connecting the computer to the physically surrounding world.

- the ability to assess the suitability to use LabVIEW for a certain problem.

Course content

The course covers the graphic programming language LabVIEW and how it can be used practically as a tool in different situations, mainly in technical measurements. An major emphasis lies on applications in modern control and measurement systems through collection and generalisation of signals and automatic analysis and presentation of measurement data. The course has a large element of practical exercises.

The work is organised as a series of lectures, compulsory practical assignments (divided into an A, B and a C-part) of which quite a lot practical (laboratory sessions) and a final assignment for the possibility to earn the grade Pass with distinction (VG). The work with the compulsory assignments is presented continuously during the course. Some assignments are labeled with an asterix (*); these are mandatory for the Pass with distinction grad.

The course is formally divided into two components with different character:

Theoretical part (A and B), 7 credits

Experimental part (C), 8 credits

Many of the lectures are available as video recordings.

Form of teaching

The compulsory assignments are presented continuously during the course.

Language of instruction: Swedish

Assessment

The compulsory assignments are presented continuously during the course. For the grade Pass (passed) it is required that all assignments (except for asterix labeled) and the final assignment are approved. For the grade Pass with distinction (passed with distinction) is required first that all assignments are approved and second that the final

assignment, that is theoretical or practical/technically enough advanced, is approved. Furthermore, the * - labeled assignments and the final assignment must be solved individually.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).
For the grade Pass with distinction, the grade should be Pass with distinction on both the theoretical and the laboratory part. For the grade Pass, the grades should be Pass on both the theoretical and the laboratory part.

Course evaluation

At the end of the course, an evaluation questionnaire on the course homepage in the course portal is opened. The result of the questionnaire is published on the course homepage, and a compilation of the course evaluation and possible changes in the course structure are communicated to the students who start the course at the next course instance.

Additional information