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## NI Developer Zone

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# XIOS Hogeschool Limburg uses LabVIEW and LabVIEW FPGA to teach FPGA Applications class

## LabVIEW FPGA in the classroom

### Educational situation in Flanders (Flemish speaking part of Belgium)

Flanders has, by tradition, an international outlook. A succession of occupying powers over many centuries in history have made it quite clear to the Flemish people that they should not restrict their interest to what goes on within their own borders, but rather that Flanders is very much dependent on what is happening in Europe and the rest of the world. It is far from being an introspective country.

One of the most potent elements for success in Flanders is the exceptionally high standard of education of its population. All children between the ages of 2 ½ and 18 years are educated free of charge. School attendance is compulsory up to the age of 18. After that, students can go to the university or to an institute of higher education, a university college (such as the XIOS Hogeschool Limburg).

### Bachelors Degree

After the successful completion of at least 180 ECTS credits (equal to a full time study period of 3 years) students obtain a Bachelor's degree.

*Profession-oriented Bachelor's programs* prepare students for specific professions. Courses are therefore practice-oriented and may include periods of work placement. These degrees are only awarded by university colleges.

*Academic Bachelor's programs* are based on scientific research and mainly prepare students for further studies at Master level. These degrees are awarded by universities and some university colleges in the framework of an association.

[\[+\] Enlarge Image](#)

**Figure 1. Students working with Spartan-3E Board**

### Masters Degree

Master programs are characterized by the integration of education & research and aim to lift the students to an advanced level of knowledge and competencies. A Master's dissertation is a substantial component of the Master program. The study load is at least 60 ECTS credits.

### Doctorate (PhD)

The degree of 'doctor' (Ph D) is awarded after the public presentation of a doctoral thesis which confirms that the candidate has acquired new scientific knowledge based upon independent scientific research. Only universities may award the degree of 'doctor' (Ph D).

### How do we use NI LabVIEW?

At our university college LabVIEW is used in the courses we teach and in some practical research projects such as FPDA-1 (FPGA Platform with DSP capabilities for industrial and educational Applications-1).

In the study program of the Profession-oriented bachelor electronics-ICT LabVIEW is integrated in the class on "Process control".

Subjects of this LabVIEW course:

- 6-hours introduction course to LabVIEW
- Communication with Devices by use of their dll driver (LabJack devices)
- Communication with Measurement Instruments (Tektronix Oscilloscopes)
- LabVIEW FPGA on Xilinx SPARTAN3E starter boards.



[\[+\] Enlarge Image](#)

**Figure 2. Spartan-3E Board**

The students first get an introduction to programming in G by use of the courseware from NI called "6-hours introduction course". Afterwards they are given some time to get used to (and started with) communication with the real world. They learn how to use ActiveX and DLL's in their vi's, since this will be an everyday work in the automation industry. Furthermore, they communicate with our Tektronix scopes to carry out some measurements. Another topic that fits into this communication topic is serial communication between the computer and another device.

The students who are subject to the course "Process control" are already familiar with embedded systems; they know how to program a micro-controller in Assembler and C. They also know how to build their own projects on Xilinx FPGAs in VHDL. This is what the latest topic of this "Process control" course is about: programming a Xilinx SPARTAN3E in LabVIEW FPGA. In this last topic everything comes together. They can embed their own VHDL code into a LabVIEW FPGA Project, and they can use LabVIEW to program a PC application that can monitor their FPGA project.

Many students are also confronted with LabVIEW during their training period in a company. Our university college is also working on LabVIEW based projects with international students. For more information (e.g. opportunities with regard to international student exchange) you can always contact us.

### **LabVIEW FPGA**

Nowadays there is a wide offer of developing environments for an FPGA Embedded system. Unlike some years ago, when there used to be quite a range of developing environments with software and hardware components of their own, this market now rather seems to focus on generating hardware-independent and synthesizable HDL. Graphic developing environments are increasing in scope so much that the developer need not be a software or hardware specialist at all. The result of this trend is that companies wanting to use an FPGA as an embedded system are likely to overcome their initial hesitation. This is thanks to environments like LabVIEW.

Despite this positive evolution we have noticed, throughout our research, some less favorable tendencies on behalf of the developer. Mutual exchangeability between developing environments of different manufacturers is far from unproblematic. New software versions and service packs succeed one another very rapidly. The usage of FPGAs as an embedded system and the graphic developing environment presented for that purpose enable the software and hardware developers to market a reliable product within a short lapse of time.

### **About XIOS Hogeschool Limburg**

The XIOS Hogeschool Limburg is an autonomous institution of higher education. In Flanders, the term "hogeschool" means an institution of higher education (university college).

The XIOS Hogeschool Limburg is a partner in the Association of University and Hogescholen Limburg (AUHL), Universiteit Hasselt being the leading university.

The XIOS Hogeschool Limburg offers programs leading to profession-oriented bachelor degrees, academic bachelor degrees, master degrees and postgraduate certificates.

### **Profession-oriented Bachelor electronics-ICT**

The XIOS Hogeschool Limburg provides a manifold set of courses, dealing with all possible aspects of electronics-ICT. The development, installation and maintenance of intricate electronic systems is part of the principal key-tasks. During this 3 year program students obtain a profound education in electricity, electronics, digital techniques, information science, automation, measurement and control techniques, micro-controllers, telecommunication, data-processing and networks. Also some general, basic subjects with support function, such as mathematics, applied physics and chemistry, and technical language (French and English) are implied.

In the course of the numerous practical lab sessions, projects and training periods in a company, the students acquire a great number of general skills, such as analytical and plan-oriented thinking, as well as communicative skills and creativity, all this combined with a sense for neatly arranged work and quality.

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[2] The XIOS Hogeschool Limburg: Introduction and Study programs

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