Hands-On Learning with FPGA Lab Platforms and all-in-one Portable Lab

Basys 3 and Analog Discovery

Presenter: Prof.Dr. Mircea Dabacan,

Event Organizer: Beti Bilisim and Digilent

 Goals of the Workshop:

1) to demonstrate ways in which student-owned lab approach can be used not only to teach many of the fundamental of digital circuits, but also to challenge, engage, and excite students with engineering design problems. Students own their personal FPGA lab boards to solve open ended problems with unlimited access. Through demonstrations performed during the workshop, participants will leave with instructional materials that will enable them to easily incorporate these activities into their own courses.

2) to demonstrate how active learning modules using portable compact electronic instrumentation can be integrated into undergraduate circuits and electronics courses for majors and nonmajors as well as into outreach programs for high-school students,

3) to discuss approaches to include active learning modules in lecture in the classroom or as hands-on homework assignments/projects. Introduce the learn.digilentinc.com materials

4) to provide supporting instructional materials that will enable participants to rapidly incorporate hands-on activities into their existing courses. Research on active hands-on pedagogy has shown that students are more engaged in learning, develop an intuitive understanding of key concepts instead of just memorizing facts, and gain self-confidence about their knowledge of the subject.

Description: In this workshop we will demonstrate how students can learn about digital circuits through hands-on, project-based, open-ended exercises. A key component to enhancing the learning experience is the use of student-owned equipment where the students are freed from the constraints associated with traditional laboratory environments. We will discuss how low-cost, student-owned hardware along with free programming software can be used to teach digital design in an attractive yet challenging way, demonstrating the high abstraction level of theory with spectacular and fun projects.

Basys 3 board from Digilent and the free WebPack version of Vivado from Xilinx expose students to the newest technologies both in HW (the Artix 7 FPGA family from Xilinx) and software. The examples will use VHDL language and will demonstrate RTL design flow, IP core usage, simulation and HW debugging.

Active hands-on learning pedagogy in electrical engineering, electrical engineering technology, and physics has been facilitated by the recent availability of inexpensive portable compact electronic

instrumentation. This instructional approach has been shown to stimulate student interest in engineering, technology, and physical sciences and promote greater understanding of circuits and electronics, particularly in students who struggle when presented with abstract and highly mathematical concepts. The design of hands-on activities, the value of supporting instructional materials, and methods to incorporate these activities into the curriculum will be illustrated through these activities.

Time: Saturday Sept 12   9AM-5PM 20+ attendees

Place : Gazi University Technology Faculty Electric-Electronic Engineering Dept. Beşevler - Ankara

Qualifications of Presenter:

Dr. Mircea Dabacan is Professor at Technical University of Cluj-Napoca, Applied Electronics Department. Mr. Dabacan works in data acquisition systems, digital design and embedded systems, and was formerly a visiting professor at Washington State University, Pullman, USA. He also manages the Romanian branch of DigilentInc USA.

Audience: The anticipated audience includes faculty members, instructors, and laboratory staff in Electrical and Computer Engineering and Engineering Technology, Mechanical Engineering and Engineering Technology, First Year Engineering Education, Engineering Physics, Physics, and middle and high school teachers in the physical sciences. Participants need to have basic knowledge about VHDL and digital design. They will leave the workshop with instructional materials so that participants can easily adopt this innovative technique in their own courses.

The workshop will be held in English.

Take-Away Skill, Knowledge, and Material: Participants will learn about the active hands-on learning pedagogy, see how others have integrated hands-on learning modules into the engineering and engineering technology courses, and labs and suggestions on ways in which the participants can adapt the pedagogical approach for their use. Flash drives will be distributed that will include the workshop presentation.

HW

20 PCS Basys 3 kit
20 PCS Analog Discoveries
20 PCS Solderless Breadboard KIT Small

No HW donation during the workshop.

Beti provide lunch and coffee break

Venue: There are 20 computers available, projector and screen available for the presenter