HI-TEC 2010 Workshops

Monday, July 26, 1:00–4:30 P.M.

The ABCs of Networking, LANs, and WANs
$75

This hands-on workshop will focus on building local area networks (LANs) using wired and wireless connections, grouping LANs into virtual local area networks (VLANs), and interconnecting LANs and VLANS using routers with T1 serial interfaces. The workshop will illustrate how networks and internetworks pass information from sources to destinations and how networks provide services to hosts. The routers will be configured to communicate with each other. A number of servers will be available to provide services including HTTP, HTTPS, MAIL, and SSH. The traffic will be analyzed with packet sniffing software to show how traffic moves over networks. As time permits, participants will configure network security schemes such as network address translation (NAT), port address translation (PAT), and virtual private networks (VPN). (ICT)

Biotechnology in the Field: Molecular Tools, Microarrays, and Modern Agriculture
$75

While many factors that affect agricultural outcomes cannot be controlled—such as temperature, rainfall, and soil types—molecular diagnostics enables biologists to identify crops that are resistant to pathogens and perform best in diverse climates and soil conditions. Biotechnology tools such as microarrays and next generation DNA sequencing techniques support high-throughput data collection, while bioinformatics tools help biologists interpret the results. This workshop will focus on the application of these new technologies in agriculture and viticulture. Participants will work through examples in which microarray data are used to gain new insights into crop production. (Bio-Link)

Computer Forensics in an Afternoon
$75

Participants in this workshop will use their own laptop computers in trying their hands at memory acquisition, finding hidden passwords, and carving data to determine their computers' usage and history. Participants will also take a journey through case examples highlighting "smoking gun" evidence and the tools used to find it. (BATEC)

A Systems View of Electronics
$75

If you are a technician who is looking to improve your understanding of electronics systems or a technology faculty member who is looking for ways to revitalize your electronics program, you will want to attend this workshop. Participants will hear from and conduct hands-on learning activities with a panel of electronics systems subject matter experts from the NSF-funded project eSyst: A Systems View of Electronics. (eSyst)

The Toothpick Factory
$75

Looking for a new job? The Toothpick Factory is hiring! Manufacturers everywhere need qualified employees. As difficult as it is to find and hire new employees, retaining them is an even greater challenge, not only because they lack technical skills or aptitudes but because of inadequate soft skills. FLATE, Center for Advanced Technology Education, has developed a game—The Toothpick Factory®—that is designed to help close the soft skills competency gap.

The Toothpick Factory® is a hands-on simulation in which players become aware of, exercise, and reflect on soft skills that affect teamwork. In this workshop, teams of participants will be challenged to apply their teamwork, communication, and flexibility skills. The presenters will share ideas that participants can incorporate into their classrooms. (FLATE)

Tuesday, July 27, 8:30 A.M.–Noon

Applications of Real-Time PCR for Community College Programs

Although PCR (polymerase chain reaction) has been adapted in many ways for the detection of specific nucleic acids in cells, real-time PCR is becoming the most widely used application of PCR in the research lab for genomic and gene expression analysis, and is rapidly establishing itself as a technique in the clinical diagnostic lab. The need for faster, more accurate, and more economical systems with high throughput has fueled the popularity of real-time PCR. It is the most sensitive technique available for mRNA detection and quantification. Applications include microarray validation, gene expression studies, disease diagnosis and management,

food testing, and forensics. Real-Time PCR is a "need to know" technology for today's biotechnology workforce. (NBC2)

An Exploration of the Intersections of Geospatial and Information Technologies

Participants in this workshop will join experts from business and industry in exploring opportunities for increased interaction between geospatial and information technologies. The workshop's goal is to identify and investigate the accessibility and usability of geospatial technologies and how the intersections of geospatial and information technologies may enhance and influence the future directions of both disciplines. Both technologies aid scientific investigations, support multidimensional business and government activities, and provide capabilities for visualization and understanding of complex problems. However, in order to fully recognize their potential, geospatial and information technology practitioners must collaborate to develop efficient new ways to access, manage, and analyze ever-increasing quantities of data. (BATEC and GeoTech)

Improving Technician Education Through E-Materials and Innovative Online Teaching Strategies

The cost of textbooks limits many students' access to postsecondary technical education. One way to reduce the cost of textbooks is to offer them in ebook format. This eliminates the expense of production, inventory, and shipping. These savings, which may reduce the costs by 3550%, can then be passed on to students. This workshop will explore formats, software, online delivery options, and costs associated with the conversion of print-based teaching materials to ebooks. Ebooks provide access to other web-based tools that can improve students' Internet search skills, introduce contextual examples, and measure and track student progress.

Workshop participants will be introduced to online interactive applications, explore ways to use those applications in their fields, and examine options for integrating ebook components and supplementary technology tools, such as remote labs, into interactive teaching practices. (OP-TEC)

Teaching Interactive Control Design, Mechatronics, and Robotics Concepts With NI LabVIEW and NI ELVIS

Robotics and mechatronics are becoming increasingly popular applications in industry. This trend presents an opportunity for engineering technology programs to teach controls, mechatronics, and robotics concepts. In this workshop, participants will explore multiple control plants from Quanser that can be used to demonstrate and teach control and robotics concepts. The plants will be based on the NI ELVIS design and prototyping platform and NI LabVIEW, which provide state-of-the-art instrumentation tools and programming capabilities that are essential in teaching controls, mechatronics, and robotics concepts to budding technicians. (National Instruments)

Turnkey Labs to Implement Green IT and Other ICT Concepts

During this session, participants will complete four or five "turnkey" labs that are ready to use in information and communication technology programs. Emphasis will be on virtualization (desktop, server, and storage), voice over IP, and DHTI. (CTC)

The World of Microsystems Fabrication: Teaching How Microelectromechanical Devices Are Made

Microsystems technologies rely on a plethora of microfabrication processes used to create small electromechanical devices. These devices are used in products such as game controllers, crash and navigation systems, smart phones, biomedical and microchemical sensors and actuators, cell phones, printers, and projectors, to name a few. Technicians who work in these and related fields must not only have a basic knowledge of electronics, packaging, and systems integration technologies but must understand what it takes to manufacture these cutting-edge components.

This workshop will cover fabrication methods including surface, bulk, and LIGA micromachining. Because these technologies are multidisciplinary, they give students a reason to apply themselves in all STEM disciplines. (SCME)

Tuesday, July 27, 1:00–4:30 P.M.

Bridging the Gap Between Educators and Employers: Developing a Skill Standards Based Curriculum

Employers need workers who possess the knowledge and skills required by their industries. This workshop will provide how-to information on the development of skill standards for high-tech industries and the use of those standards in generating curricula that meet employer requirements. Participants will learn about processes for forming employer groups, leading employer groups in defining the skills and knowledge required in their industries, and using knowledge and skill requirements as a base for developing curriculum. The workshop will emphasize hands-on activities that enable participants to apply these processes and determine how they can integrate them into campus curriculum initiatives. Technicians will learn

how to use skill standards to assess their work readiness and select educational pathways for enhancing their skills. (OP-TEC)

Halo World: A Hands-On Introduction to Microsoft XNA Game Studio

This workshop will provide an introduction to game development using Microsoft XNA Game Studio 3.0, a downloadable software development kit of prebuilt components for use with Microsoft Visual C#. Participants will learn how to get started in creating games for the Xbox 360, Zune, and PC. Topics will include introductions to the C# and XNA platforms and the XNA Game Studio 3.0 development environment. Attendees will create and run a game program and learn how to set up both a PC and an Xbox 360 to run XNA games. (ICT)

Life Support and Sustainable Living Project: Professional Skills, Industry, and Higher Ed

Participants in this workshop will learn how to integrate professional skills such as team building and project management into technology projects that use real-world applications. The workshop will provide a snapshot of an ATE project in which teams of community and four-year college students learn professional skills while working on industry-driven assignments involving rescue pods, space suit designs for NASA, and biomedical devices. (The project has been expanded to a summer workshop for teachers that is offered in partnership with the U.S. Coast Guard Academy.) Participants will be provided with problem-based learning examples and curricula that the project has developed. (RCNGM)

Sensor Networks: The Enabling Technologies of the Smart Grid

This hands-on workshop will present an overview of the basic architecture and functionality of the Department of Energy's Smart Grid initiative (funded in part by the American Recovery and Reinvestment Act of 2009) and discuss the underlying enabling technology—sensor networks. After a brief introduction to the Smart Grid and its relationship to alternative energy sources, basic sensor network technology concepts will be presented. Participants will construct simple hardwired (LAN) and wireless sensor networks and sensor network systems like those envisioned for the Smart Grid using both LAN connectivity and ZigBee wireless technology. The workshop will wrap up with a quick look into the future of intelligent infrastructure. Emphasis will be given to building automation and transportation applications (VANET). (MATEC)

Teaching Circuit Design, Sensors, and Instrumentation With LabVIEW, Multisim, and NI ELVIS

Sensor measurements, instrumentation, and circuit design and analysis form a key area in today's engineering technology programs. In this workshop, participants will explore the leading integrated platform for teaching and using sensors measurements, instrumentation, and circuit design in a hands-on environment—NI LabVIEW, NI Multisim, and NI ELVIS. Participants will build and simulate commonly taught circuits with NI Multisim, a SPICE simulation and schematic capture tool. They will then implement the circuits using real-world components on the NI ELVIS, a design and prototyping platform with integrated instruments, and test the system with NI LabVIEW. Participants will come away from the workshop with the ability to use these industry standard tools in providing relevant laboratory experiences to budding technicians. (National Instruments)