DEdan Kimathi University of Technology

Started in 1972 as KIT

DeKUT Student Population 6500 (BSc, MSc, PhD)

Dr. Jean Bosco (PhD, Reg.), Coordinator Siemens Training Center
SCHOOL OF ENGINEERING

✓ Bachelor students 2000 per academic year.
✓ Masters students 55 per academic year
✓ Doctoral Students 10 per academic year
GRADUATION STATISTICS IN THE LAST 3 YEARS

- In 2014-----**271 Students** both Undegraduate and Postgraduate
- In 2015-----**215 Students** both Graduate and Postgraduate
- In 2016-----**332 Students** both Graduate and Postgraduate
Undergraduate
✓ BSc. Mechatronic Engineering
✓ BSc. Mechanical Engineering & Bed. Techn. (Mechanical Eng.)
✓ BSc. Electrical Engineering & Bed. Techn. (Electrical Eng.)
✓ BSc. Civil Engineering & Bed. Techn. (Civil Engineering

Postgraduate
MSc. Advanced Manufacturing & Automation Engineering
MSc. Mechanical Engineering
MSc. Industrial Engineering & Management
PhD Mechanical Engineering

Staff
59 Academic Staff (Professors, Lecturers, Tutorial fellows)
21 Technologists
6 Office support staff
RESEARCH PROJECTS & COLLABORATION

✓ SoE and **Numerical Machine Complex** (Kenya)
✓ SoE and **KENGEN** (Kenya)
✓ SoE and **KeBS** (Kenya)
✓ SoE and **KENET** (Kenya)
✓ SoE and **TH-Wildau** (Germany)
✓ SoE and **University of SIEGEN** (Germany)
✓ SoE and **Gifu University** (Japan)
✓ SoE and **University of Leuven** (Belgium)
EXCHANGE PROGRAMS

- Undegraduate and Postgraduate students
- University professors (Visiting Professors)
AWARDS

2016 Robotics Contest 1st position
MECHATRONIC ENGINEERING
The Mechatronics Incubation Center (MIC)
In this center R & D will be focusing in the following areas:

- System Modeling & Instrumentation
- Control systems
- Drone & Robotics
- PCB Fabrication

The SIEMENS Mechatronic Systems Certification Center (SMSCP)

The Siemens Mechatronic Systems Certification Program is designed to be integrated into existing forms of study, and is divided into 3 levels.

- Level 1 (Siemens Certified Mechatronic Systems Assistant)
- Level 2 (Siemens Certified Mechatronic Systems Associate)
- Level 3 (Siemens Certified Mechatronic Systems Professional)
VIEW OF MECHATRONICS LAB
MOTOR CONTROL TRAINING SYSTEM

[Image of a motor control training system with various circuit components and switches.]
Each certification is based upon a specified, industry-driven job profile which helps an employer determine where this person can be best placed within the organization.
LEVEL 1 JOB PROFILE

- A Siemens Certified Mechatronic Systems Assistant will function as a well-grounded machine operator in a complex system

- Responsible for efficient operation of the equipment with minimal down-times
He/she will be able to:

- Localize, identify causes and sources, correct where possible and/or document malfunctions to be passed on to the appropriate experts for resolution, or (where appropriate) exchange or replace defective components.

- Recognize potential or impending malfunctions and contact expert assistance in order to keep the production line functioning and to prevent production loss.

- Perform routine, preventive maintenance.
The main foci of the courses are:

- Course 1: Electrical Components
- Course 2: Mechanical Components and Electrical Drives
- Course 3: (Electro) Pneumatic and Hydraulic Control Circuits
- Course 4: Digital Fundamentals and PLCs

These 4 courses require a maximum of 240 hours.
Level 2 (Mechatronic Systems Associate)
LEVEL 2 JOB PROFILE

• A Siemens Certified Mechatronic Systems Associate will function as a highly skilled operator who can work with modules and components in complex mechatronic systems as well as be able to access and analyze the system as a whole.

• A certified Associate can manage, investigate, repair and troubleshoot mechatronic systems, with the aim of operational efficiency and cost and process control.
Job skills and activities include:

- Deriving and determining parameters for mechatronic systems and system elements;
- Measuring, interpreting and analyzing electrical, PLC/microcontroller and mechanical values;
- Assembling and installing tools and hardware systems;
- Performing scheduled and preventive maintenance
• Modifying software tools used in mechatronic systems;

• Using troubleshooting skills to identify, prevent possible problems

• Programming mechatronic modules and systems, especially PLCs

• Implementing PLC networks, including configuration and data transfer using bus systems;
The main foci of the courses are:

- Course 1: Process control technologies
- Course 2: Introduction to Totally Integrated Automation (TIA) portal
- Course 3: Automation systems
- Course 4: Motor control
- Course 5: Mechanics and machine elements
- Course 6: Manufacturing processes

These 6 courses require a maximum of 300 hours.
Level 3: Professional

Level 1
Assistant (Machine Operator)

Level 2
Associate (Technician)

Level 3
Professional (Designer)
JOB PROFILE

- A Siemens Certified Mechatronic Systems Professional will function as a skilled designer of and expert on complex mechatronic systems.

- He/she will be able to apply selected project and system engineering practices, like requirements engineering, project management, process management, quality assurance & management, etc. in a project with the goal to design or improve a mechatronic system upon customer and user needs.
• Level 3 (Professional) Certification consists of two main content areas.

• Project and process management
• Mechatronic system project

These 2 courses require Maximum of 240 Hours
• Inspection of valve bodies for
  - correct port orientation
  - correct body thickness

• Part transferred to the next station if
  - ports are positioned correctly, **and**
  - part’s height is within a specific tolerance

• Part rejected to a reject bin if
  - ports are not positioned correctly, **or**
  - part’s height is not within a specific tolerance
PART TRANSFER APPLICATION
STROKE SPEED CONTROL

FLOW CONTROL VALVES

TRANSFER CYLINDER

LIFT CYLINDER

FLOW CONTROL

QUICK EXHAUST VALVE

345 kPa / 50 psi
FLOW CONTROL VALVE (FCV)

COMBINES ...

THROTTLE VALVE

NON-RETURN VALVE

CHECK VALVE
• The symbol is a ball which is pressed against a sealing seat.
• Seal is drawn as an open triangle in which the ball rests.

NON-RETURN VALVE (CHECK VALVE)
Flow control valve influences the volumetric flow of pressured air in both directions.

Cross section can be set or changed via an adjustment screw and the setting can be locked in position.
ADJUSTABLE FLOW CONTROL VALVE

- ADJUSTMENT SCREW
- LOCKING SET SCREW
Mode of Operation

- Air flow throttled in one direction only
- Pressured air from port 1 to port 2: flow only through regulated cross section in the bypass leg
Mode of Operation

• Pressured air can flow freely through the open non-return valve from port 2 to port 1.
• Pressure from port 2 acts on the sealing ball: sealing ball is lifted from its seat to open the valve.
Pneumatic Circuit Diagram of the Transfer Device
ANALOG PRESSURE SENSOR (MODULE 1) ASSEMBLY LINE
DEKUT is working closely with National Instruments to develop a training center for Labview and other NI certification programs.
WHAT IS LABVIEW?

• LabVIEW is an integrated development environment designed specifically for engineers and scientists.

• Native to LabVIEW is a graphical programming language (G) that uses a dataflow model instead of sequential lines of text code, empowering you to write functional code using a visual layout that resembles your thought process.

This means you spend less time worrying about semicolons and syntax and more time solving the problems that matter.
National Grid UK
An NI Premier Case Study
APPLICATION

• National Grid UK, the transmission system operator for nearly 20 million people in the United Kingdom, is using LABVIEW to upgradable grid measurement system to provide better operational data for the condition of the UK grid.
COMPACT DAQ

- CompactDAQ is a portable, rugged DAQ platform that integrates connectivity and signal conditioning into modular I/O for directly interfacing to any sensor or signal. From in-vehicle data logging to benchtop research, the breadth of bus, chassis, controller, and I/O conditioning options combined with the customizable nature of LabVIEW software provide the best solution to meet the needs of any medium-channel-count application.
The CompactRIO platform features highly integrated software, a range of performance and form factor options, and extensive I/O to reduce risk, boost system performance, and simplify the design of advanced embedded control and monitoring systems.
LABVIEW CERTIFICATIONS

Architect
- Mastery of LabVIEW
- Expert in large application development
- Skilled in leading project teams

Developer
- Advanced LabVIEW knowledge and application development experience
- Project management skills

Associate Developer
- Proficiency in navigating the LabVIEW environment
- Some application development experience
Thank You for Your Attention