

LSKI

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0.1 Control Systems and Instrumentation Laboratory

The Control Systems and Instrumentation Laboratory's main hall is divided into 4 (four) laboratory sections, namely (see Figure ??):

- Laboratory Section for Instrumentation Systems
- Laboratory Section for Process Control Systems
- Laboratory Section for Robotics
- Workspace for Laboratory Courses

One corner of the main hall is designated as a room for undergraduate students who take research and development courses for their final projects. At the other corner accross the hall are small rooms for professors' and technician's offices, a meeting room, a room for graduate students and a storage room for laboratory equipment.

For the undergraduate teaching and learning process, our laboratory provides supporting facilities for the research and development activities related to the students' undergraduate final projects and also - more importantly - supports the delivery of the following courses:

- 375D4103–Electronic Instrumentation Systems
- 330D4112–Process Control Technology
- 329D4113–Control Systems + Laboratory
- 374D4122–Control System Design
- 371D4123–Digital Control Systems + Laboratory
- 331D4112–Industrial Robotics

The laboratory's main purpose is to facilitate students to learn how to build mathematical and physical models of several types of control systems. The models help the students to understand, define and formulate the control problems usually found in the real industrial world. A miniaturized boiler drum plant is available to give insights on a process control system

and technology in the real industrial plants with liquid materials, while another miniaturized plant is built as a physical model of industrial processes involving solid materials.



Figure 1: Room Facilities

To emphasize the importance of understanding the models of control system's plants, modular sets of a standard servo motor training system and a miniaturized room temperature control system's plants are also available.

Sensors and transducers are essential to provide feedback functions in automatic control systems. Modular instrumentation training sets are available to give the students hands-on experience with real sensors and transducers and know-how to convert physical quantities into electrical signals, both analog and digital.

The ultimate engineering work in the area of control system studies is to design the controller. Four units of microcontroller-based universal digital controller module are prepared for students to practice with the development

of simple control algorithms for digital control systems.

The laboratory section for robotics takes the space of more than one-fourth of the main hall's area, mostly used for robotic line-tracks. It becomes the homebase of the "*Cyber Tech Community*", a student organization routinely participating in several regional and national events on robotics, such as *The Annual Indonesian Robotics Contest*, etc.