

# **Development of Industrial Control Interfaces and Human-Machine Interfaces (HMI) for large scale plasma facility**

## **Abstract**

This project aims to develop a comprehensive control and monitoring framework for industrial and scientific instrumentation using Siemens PLC and LabVIEW platforms. The selected student will work for design, implement, test, and document operator interfaces for various control systems used in a high power plasma facility.

The primary objective of the project is to develop a Human-Machine Interface (HMI) using Siemens WinCC for a Siemens S7-400 PLC-based control system. The HMI will provide real-time monitoring of process parameters, alarm management, status indication, data visualization, and operator control functions. The interface will be designed to ensure reliable and user-friendly operation of the PLC-controlled subsystems. Apart from HMI development, student will also work on control logic implementation.

In addition to PLC-HMI development, the student will develop communication interfaces in LabVIEW for various field instruments and controllers that use serial communication protocols (RS-232/RS-485). These devices may include cryogenic controllers, temperature controllers, power supplies, and other laboratory or industrial instruments. The LabVIEW applications will enable parameter acquisition, command transmission, data logging, and graphical display of operational data.

The project will also involve integration testing, communication validation, software debugging, and preparation of technical documentation to facilitate future maintenance and expansion of the control system.

## **Academic Project Requirements:**

**1) Required No. of student(s) for academic project: 1**

**2) Name of course with branch/discipline: M.E./M.Tech Electronics and Instrumentation Engineering**

**3) Academic Project duration:**

**(a) Total academic project duration: 40 Weeks**

**(b) Student's presence at IPR for academic project work: 4 Full working Days per week**

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