NI LabVIEW - Centre of Excellence (CoE)

ITS Engineering College, Greater Noida

Standard Operating Procedure (SOP)

1. Objective of the Centre

The NI LabVIEW Centre of Excellence (CoE) at ITS Engineering College aims to provide students and faculty with practical, industry-aligned skills in virtual instrumentation, data acquisition, test & measurement, control systems, and automation using NI (National Instruments) hardware and LabVIEW software. The Centre bridges theoretical learning with hands-on lab experience to prepare students for careers in instrumentation, embedded systems, industrial automation, and research.

Key objectives:

- Develop competency in LabVIEW graphical programming and NI hardware platforms (DAQ, cDAQ/cRIO, myRIO, PXI, CompactRIO).
- Train students to design, implement, test and deploy measurement and control systems.
- Promote interdisciplinary projects (ECE, EEE, Mech, CSE, Instrumentation) using virtual instrumentation.
- Build industry connections for internships, projects and placements in test & measurement and automation sectors.
- Encourage research, publications and participation in competitions using LabVIEW and NI toolchains.

2. Courses & Training Offered

Course / Workshop	Duration	Level	Key Focus Areas
LabVIEW Fundamentals	4–6 weeks	Beginner	LabVIEW IDE, dataflow, VI structure, front panel/block diagram
Data Acquisition with NI-DAQmx	4 weeks	Beginner → Intermediate	Analog/digital I/O, signal conditioning, sampling, DAQ hardware
Embedded Control with myRIO / cRIO	6–8 weeks	Intermediate	Real-time targets, FPGA basics, control loops
Test & Measurement	4–6 weeks	Intermediate →	Automated test sequences, timing/synchronization,

using PXI		Advanced	instrumentation
Signal Processing & Analysis in LabVIEW	6 weeks	Intermediate	Filtering, FFT, spectrum analysis
Industrial Automation & PLC Interfacing	4–6 weeks	Advanced	Fieldbuses, Modbus, OPC UA, SCADA basics
Capstone Project (Virtual Instrumentation)	4–8 weeks	Project	Real-world project: data logging, control, HMI, report & demo

3. Eligibility & Pre-requisites

Eligibility:
Open to B.Tech students of ECE, EEE, Mech, CSE, Instrumentation and allied branches. Faculty, research scholars, and industry trainees may also enroll.

Pre-requisites:

- Basic knowledge of programming concepts (C/C++/Python) helpful but not mandatory.
- Understanding of circuits, signals & systems, and control fundamentals recommended for intermediate/advanced courses.
- Willingness to follow safety and lab usage protocols.

4. Course Timeline & Roadmap

The CoE's academic roadmap aligns teaching with progressive skill building:

Year / Semester	Focus Area	Outcome
1st Year	Introduction to measurement systems & LabVIEW basics	Build simple VIs and perform basic DAQ
2nd Year	Data acquisition, signal conditioning	Acquire and analyze sensor data; basic logging
3rd Year	Embedded real-time control (myRIO/cRIO)	Implement control loops; FPGA exposure
4th Year	Projects, automation & industrial interfacing	Deploy HMI, automated test benches, publish/compete

5. Certifications & Recognition

Students will be guided to pursue NI and related industry certifications where applicable:

- **NI Certified LabVIEW Associate Developer (CLAD)** — foundational LabVIEW credential.
- **NI Certified LabVIEW Developer (CLD)** — intermediate/advanced credential.
- **NI Certified LabVIEW Architect (CLA)** — advanced system architecture credential.
- Workshops on related certifications (PLC vendors, industry 4.0 fundamentals) will be organized.

6. Lab Activities & Guidelines

Lab Activities

- Hands-on Labs: building VIs, DAQ experiments, signal measurement, HMI development.
- Projects: mini/major projects on domains such as motor control, condition monitoring, automated testing, biomedical signal acquisition.
- Competitions & Hackathons: participate in NI-sponsored and external events.
- Research & Publications: encourage paper writing, conference submissions and industry partnerships.

Guidelines

- Maintain a lab record/log for each experiment or project (digital or physical).
- Book equipment in advance via the lab booking system; respect allotted time slots.
- Use GPU or compute resources (if any) responsibly and only through authorized accounts.
- Follow version control (Git) for project code and maintain backups.
- Cite and respect software/hardware licensing: use only institution-licensed LabVIEW and NI drivers.
- Follow AI/ML ethics and data privacy rules when handling recorded data (if applicable).

7. Contact Information

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