COURSE PROSPECTUS

**Name of the Group: Control & Instrumentation**
**Name of the Course: Certificate course in Industrial IoT/PLC-SCADA**
**Course Code: PC600**
**Starting Date: 20th April 2020**
**Duration: 6 Weeks (180 hours)**

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**Preamble:** Stiff competition, higher quality standards and growing concerns of safety & environmental damage have pushed the Industrial sector to adapt state-of-the-art Automation Techniques for effective utilization of resources and optimized performance of the process plants. Automation applications span plant automation, discrete and batch process control, embedded machine control and manufacturing production line automation. In Industrial Automation the present trend is for closer integration of IT and OT. Operational Technology (OT) refers to computing systems that are used to manage these industrial operations. Most Industrial control systems (ICSs) fall into either a continuous process control system, typically managed via programmable logic controllers (PLCs), or discrete process control systems, that might use a PLC or some other batch process control device. Supervisory Control and Data Acquisition (SCADA) systems display the process under control and provide access to control functions through Human Machine Interfaces (HMI).

The focus of the Industrial Internet of Things (IIoT) is on connecting industrial assets, such as turbines, jet engines, and locomotives, to the cloud and to each other in meaningful ways. Field devices in process plants gather valuable additional data on their own condition and environment. Industry4.0 approaches like condition monitoring and predictive maintenance require this information. Both SCADA & IIoT platforms are used to increase overall productivity by integrating smart maintenance, reduce wastage, increase in efficiency and a decrease in downtime. Industrial IoT can effectively detect failures and trigger maintenance processes, autonomously reacting to unexpected changes in production. IIoT can provide ways to integrate legacy devices and legacy software seamlessly into the new technology landscape thereby improving cost and productivity. The growth of IIoT market is driven by increasing adoption of automation by small and midsized companies. SCADA along with IIoT enables monitoring, controlling, analysis and improvement of the industrial enterprise.

**Objective of the Course:** This course is aimed at equipping an Engineer /Diploma holder /M.Sc holder (in specific streams) with appropriate knowledge and skills required in configuring, programming, deploying and operating Industrial automation systems with the use of Industrial Field Instruments, Industrial IoT, PLCs, and SCADA/ HMI.

**Outcome of the Course:** Qualified automation engineers to meet the requirements of designing appropriate industrial automation systems.

**Expected Job Roles:**

- Industrial Automation Engineer
- Project Engineer, Assistant Engineer
- Control & Instrumentation Engineer
- Instrumentation Engineer

**Course Structure:**

| Sl. No | Module Title | Duration (Hours) | | | Credits | |
|---|---|---|---|---|---|---|
| | | Theory | Lab | Total | Theory | Lab |
| 1 | PLC&PID Controllers &Industrial Networking | 20 | 40 | 60 | 1 | 1 |
| 2 | Industrial IOT&Analytics | 20 | 40 | 60 | 1 | 1 |
| 1 | SCADA/ HMI System Development | 20 | 40 | 60 | 1 | 1 |
| | Total Duration/Credits | | | 180 | 6 | |

*Other Contents*

**I. Course Fees**:

**General Candidates**: Course fee is Rs. 25,000/- + all taxes as applicable

**SC/ST Candidates**: Tuition Fees are waived for SC/ST students admitted under SCSP/TSP. However they are required to remit an amount of **Rs. 3,000/- as Advance caution/ Security deposit.** This amount will be considered as caution/ security deposit and will be refunded after successful completion of the course. If the student fails to complete the course successfully, this amount along with any other caution/security deposits by the student will be forfeited.

**II. Registration Fee:** An amount of Rs.1,000/- (including all taxes as applicable) (nonrefundable) should be paid at the time of registering for the course.

This fee shall be considered as part of course fee, if the student joins the course. If a student register and pay for more than one course and join for any one course, all such amount will be adjusted against the course fee payable.

If the student does not join for the registered course / any of the registered courses, fee paid shall be forfeited.

**For SC/ST candidates, the registration fee is Rs.500/-** and will be considered as part of caution/security deposit and will be refunded after successful completion of the course. If the candidate does not join or fails to complete the course the amount will be forfeited

However above the registration fee shall be refunded on few special cases as given below

- Course postponed and new date is not convenient for the student
- Course cancelled in advance, well before the admission date

**III. Course Fee Installment Structure**:

Students can pay the full fees of Rs. 29,750/- (25,000/- + 18%GST+1%KFC) in advance or as installments as given below

| **Fees** | ***Amount for General Candidates** | **Amount for SC/ST Candidates. (considered as caution/security deposit)** | **#Due Date (on or before)** |
|---|---|---|---|
| Registration Fee | Rs.1,000/- | Rs.500/- | During Registration |
| **Advance Fee | Rs.10,000/- | Rs. 2,500/- | 17/04/2020 |
| 1st Installment | Rs.18,750/- | Nil | 20/04/2020 |
| Total Fee | Rs. 29,750/- | Rs. 3,000/-(refundable after successful completion of course) | - |

*Above fees is inclusive CGST 9%, SGST 9% and KFC 1% and revision if any by Government shall be applicable at the time of payment.

# Fine will be applicable to late fee payment.

** Advance fee - After publication of first selection list, the students in the first selection list have to pay the Advance Deposit within the due date to take the provisional admission. Students in the additional selection list should pay both Advance and First installment fee together on or before counseling day

IV. **Eligibility**:

BE /B.Tech Degree or Diploma passed in the following discipline:

Electrical/Electronics/Electronics&Communication/Instrumentation/IndustrialElectronics/ChemicalEngineering/AppliedInstrumentation/Control\&Instrumentation/Mechatronics/Computer Science
M.Sc in Electronics/ Instrumentation/ Industrial electronics

On the date of counseling/ admission, **final year students** have to produce the originals of course completion certificate & mark lists up to and including the last semester/ year examination. **Only those candidates who have passed all the semesters/ year examinations of their qualifying degree on or before the date of counseling are eligible for admission.**

The Certificates shall be issued to only those who produce the original or provisional degree certificate, the original mark lists and complete all the modules of PC600 program successfully as per the course requirements.

V. Number of Seats : 25

VI. Selection of candidates: Selection of candidates who have the requisite qualifying degree will be based on the percentage of marks in their qualifying degree subject to eligibility and availability of seats. Selection of candidates who have completed the course but expecting the results shall be based on the aggregate percentage of marks mentioned in their final mark list and on the availability of seats. In case the aggregate percentage of marks is not given in the final mark list, the sum of marks from the first to last for all the semesters/ years shall be considered as the aggregate marks.
***The selection lists are prepared based on the details given by the applicant at the time of submitting the application.***

**<u>The admission to the course shall be based on the following criteria:</u>**
The applicants should have the requisite eligibility criteria as mentioned under the heading "Eligibility". **In the case of final year students, they must have passed all the semesters/ year examinations of their qualifying degree at the time of counseling.** Selection list of students will be prepared and published in our website as follows.

**First selection list** will be prepared based on the applications received on or before 03rd April 2020. The **additional selection list** will be prepared,

if there are vacant seats, based on the applications received on or before 09th April 2020 and excluding the applicants included in the first selection list

**First selection list:**

The first selection list of applicants will be finalized and published in our website on 07th April 2020 ( http://nielit.gov.in/calicut ). After that seats will be available only against any vacancy that arises and will be published in the additional selection list.

**The students have to verify their selection to the program from our website. No separate call letters will be sent to the students for admission.**

The selected students in the first selection list have **to take provisional admission on or before 17th April 2020, by paying the advance fee Rs.10, 000/- (The mode of payment and how to submit proof of payment will be given in the respective selection lists).** Their admission shall be confirmed only after verifying their original certificates on the counseling date (20/04/2020).

**Additional selection list:**

The additional selection list of students will be finalized and published in our website on 13th April 2020, based on the vacancy that arises from the first selection list.

The students in the **additional list** have to come directly to the center on the date of counseling for admission. Their admission shall be confirmed only after verifying their original certificates/ mark lists and after payment of the Advance &first instalment of fees, on the counseling date (20/04/2020).

VII. Test/Interview : *Not Applicable*

VIII. Counseling/Admission : 20th April 2020 @ NIELIT Calicut, 9:30 AM

IX. Important Dates :

| | |
|---|---|
| **Last date** for receiving completed application forms | **First selection list** will be prepared based on the applications received on or before 03rd April 2020**.** The **additional selection list** will be prepared based on the applications received on or before 09th April 2020 and excluding the applicants included in the first selection list. |
| Publication of **First selection list** in our website | **07th April 2020** (Candidates must verify their selection from our web site only. **No other individual intimation** will be send to the candidates separately) |
| **Last date** for taking p**rovisional admission** by paying the **Advance fees** for applicants in the **First selection list** | **on or before 17th April 2020** |
| Publication of additional **selection list** in our website (if there are vacant seats) | **13th April 2020** (Candidates must verify their selection from our web site only) **No other individual intimation** will be send to the candidates separately |
| Counseling date | 20th April 2020 |
| Payment of **First installment fees** for applicants in first selection list | On 20th April 2020 |
| Payment of **Advance & First instalment fees** for applicants in **Additional selection list** | On 20th April 2020 |
| Course commencement date | On 21st April 2020 |

X. Course Timings : The classes and labs are from 9:30 AM to 12:30 PM and 2:00 PM to 5.25 PM, Monday to Friday

XI. Placement: Usually students contact companies directly by sending resumes in response to job advertisements and get placed. Students can also register with Model career center.

The placement assistance provided is the following:

a) We will be forwarding the collected resumes of students to companies, who approach us for their manpower requirements,
b) We can provide recommendation letters to specific companies of your interest mentioning your performance (percentage of marks/ grades) in the course

XII. **Lab Facilities:**

Industrial process controllers& Smart Field instruments with HART/ Foundation Fieldbus interface

SIEMENS SIMATIC S7 controllers (CPU 400, 300, 1200, 1500 series)

SIEMENS IM151-1 High Feature, Siemens TP 177B, Siemens IoT2040 platform and associated hardware,

SIMATIC STEP 7 Professional Software, S7-PLCSIM, ABB AC500 PLC System,

PM 581-ETH CPU, ABB Software PS501-PROG Control Builder,

FOUNDATION Fieldbus, Profibus, Profinet, DH 485, HART based Devices, Intellution iFIX SCADA Software,

NI LabVIEW Professional Development System (Academic License),

NI Data acquisition systems with PCI Interface/ USB interface,

Programmable Automation Controller (PAC),

NI Compact RIO,

Training Plants set up with real sized industrial instruments and controlled through PLC and PC

XIII. Course Contents :

**PLC & PID Controllers & Industrial Networking:**

- Programmable Logic Controllers & IO modules interfacing Techniques
- Implementation of control techniques using PLCs
- SIEMENS SIMATIC S7 controllers
- SIMATIC STEP 7 Professional programming Software, S7-PLCSIM
- ABB AC 500 Controller / CoDeSys
- Programming with IEC 61131-3 Languages (LD,FBD &ST)
- Fundamental process control techniques & Controller tuning methods
- Introduction to Industrial Networking
- Analog and Digital Communications on Plant Floors
- RS232-422-485 standards & PLC to PC communication
- HART, MODBUS, Profibus-DP and Industrial Ethernet
- ProfiNET (SIEMENS IM151-1 High Feature, Siemens Touch Panel) and Foundation fieldbus(FF)

**Industrial IoT & Analytics:**

- Introduction to Industrial Internet of Things
  - Understanding IT and OT convergence: Evolution of IIoT
  - IIoT reference architectures and design considerations
  - IIoT Architectures - Device, Network and Cloud Networks, communication technologies and protocols
- Industrial cloud platforms
  - Siemens IoT2040 platform and associated hardware
  - The intelligent industrial gateway to connect the field level to the IT level/cloud
  - Cloud components and services
  - NI-Compact RIO
  - How to use Node-RED node
  - Device Management, Databases, Visualization, Reporting, Notification/Alarm management, Security management, Cloud resource monitoring and management
  - Interface with industrial cloud platforms like MindSphere, IBM Whatson, and GE Predix etc..,
  - Data acquisition, storage and analytics

- Industrial IoT security
  - Standards and Best practices
  - Hardware and Software solutions
  - Network and protocol security features

**SCADA/ HMI System Development:**

- Introduction to SCADA and SCADA components
- iFIX from GE Digital - SCADA Software
- Network Communications protocols, Communication with RTUs
- Data Acquisition with PLCs/RTUs
- SCADA and Database Connectivity
- OPC (OLE for Process Control) Configuration
- Historical data collection using SCADA software
- Industrial Data Analytics: Use of collected data for decision making, maintenance, remote monitoring and control, etc..,
- IIoT and edge nodes: Basics of IIoT enabled devices and applications
- Connectivity using OPC UA: Information exchange with different layers of automation

For General Terms and Conditions – Applicable to all courses