

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

NSDA REFERENCE

To be added by NSDA

QUALIFICATION FILE – CONTACT DETAILS OF SUBMITTING BODY

Name and address of submitting body:

NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY (NIELIT),
NIT CAMPUS POST,
CALICUT, KERALA.
PIN – 673601.

Name and contact details of individual dealing with the submission

Name: Shri. Arumugam J
Designation: Principal Technical Officer
Mobile: +91 9447445165
Email: arumugam@nielit.gov.in / arumugam@calicut.nielit.in

List of documents submitted in support of the Qualifications File

- a) Annexure – I– Course Curriculum
- b) Annexure –II– Number of Trained candidates List (from 2006 to 2016)
- c) Annexure – III – Placement Details
- d) Annexure IV – Industry Validation
- e) Evidence of job market / Industry requirement given in the file.

Since the proposed jobrole has not been identified by SSC, the industry mapping will be as per progression pathways as indicated in the QF

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

SUMMARY

Qualification Title:	Post Graduate Diploma in Industrial Automation System Design
Qualification Code	
Nature and purpose of the qualification:	<ul style="list-style-type: none"> ➤ This Qualification is aligned to Level 8 (PG Diploma course). ➤ The purpose of this qualification is to train the students to be professional for Industrial Automation System Design Engineer Job.
Body /bodies which will award the qualification:	Examination Cell, National Institute of Electronics and Information Technology (NIELIT)
Body which will accredit providers to offer courses leading to the qualification:	National Institute of Electronics and Information Technology (NIELIT)
Body /bodies which will Be responsible for assessment:	Examination Cell, National Institute of Electronics and Information Technology (NIELIT)
Occupation(s) to which the qualification gives access:	Industrial Automation Engineer
Licensing Requirements	N/A
Proposed level of the qualification in the NSQF	Level 8
Anticipated volume of training/learning required to complete the qualification	840 Hours
Entry requirements/ Recommendations	BE /B.Tech in Electrical/ Electronics/ Instrumentation/ Chemical Engineering/ Applied Electronics and Instrumentation/ Instrumentation & Control/ Electronics & Communication/ Mechatronics / Computer Science.

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

Progression from the Qualification	<p><u>Professional:</u> Industrial Automation Engineer → Project Leader → Project Manager → Senior Manager</p> <p><u>Academic:</u> MTech in VLSI / Embedded System Design / Electronics System Design → Integrated PhD involving application research.</p>
Planned arrangements for RPL.	<p>➤ It will be incorporated once RPL strategy is finalized</p>
International Compatibility where Known.	NA
Date of Planned review of the Qualification	June 2019

Formal Structure of the Qualification			
Title of Component and Identification Code	Mandatory/ Optional	Estimated Size (Learning hours)	Level
<i>Measurements with Industrial Field Instruments, Data Acquisition Systems, Process Plant Control & Automation System Design, Programmable Automation Controllers (PAC), Automation System Integration & Engineering Concepts (IASD101)</i>	Mandatory	260	8
<i>PLC & PID Controllers, Industrial Data Communications (IASD102)</i>	Mandatory	160	8
<i>Industrial Drives (IASD103)</i>	Mandatory	80	8
<i>SCADA/HMI System Development (IASD104)</i>	Mandatory	90	8
<i>Distributed Control System–DCS (IASD105)</i>	Mandatory	90	8
<i>Project Work (IASD106)</i>	Mandatory	160	8
	Total	840	

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

Detailed Curriculum attached as – **Annexure I**

SECTION -1

ASSESSMENT

Name of Assessment body:

Examination Cell,
National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan
Lodhi Road, New Delhi. 110003.

Name of body checking or verifying Assessments:

Examination Cell,
National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan
Lodhi Road, New Delhi. 110003.

Name of Qualification Awarding body:

National Institute of Electronics and Information Technology.

Will the assessment body be responsible for the RPL assessment?

RPL Policy will be described as and when available

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of NSQF:

This course would lay more emphasis on developing the practical skills of the student. His overall knowledge shall be tested based on a comprehensive written assessment, his practical skills shall be equally measured with a detailed practical assessment. The communication/technical skills of the student and his ability to express himself shall be tested in Viva Voce assessment. Each assessment shall define an outcome and marked separately. Student shall be required to pass in all outcomes individually and marks shall be allotted for each outcome along with final aggregate marks in course.

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

Following assessment methodologies may be used:

- A. Written Assessment
- B. Practical Assessment
- C. Viva Voce Assessment

Supporting evidences for Assessment

The assessment results are backed by following evidences.

1. The assessor collects a copy of the attendance for the training done under the scheme. The attendance sheets are signed and stamped by the In charge / Head of the Training Centre.
2. The assessor verifies the authenticity of the candidate by checking the photo ID card issued by the institute as well as any one Photo ID card issued by the Central/Government. The same is mentioned in the attendance sheet

ASSESSMENT EVIDENCE

Job Roll: Industrial Automation Engineer					
Outcomes	Assessment Criteria for the outcome	Means of Assessment			
		Total Marks	Written	Practical	Viva
<u>Module 1:</u> <i>Will learn to design a Process Plant Control & Automation Systems/project with Industrial Field Instruments & automation projects using DAS and PAC systems, Automation System Integration & Engineering projects.</i>	a. Complete the system study task and prepare a report about industrial automation projects. b. Identify/Develop a team for implementing automation project and manage it. c. Selection of a suitable field instruments as per Industrial automation project requirements. d. Manage the configuration team and configure all the field instruments using	100	40	50	10

**QUALIFICATION FILE: PG Diploma in Industrial Automation System Design
(Level 8)**

	<p>corresponding Hardware/software tools.</p> <p>e. Design and develop an industrial automation projects and implementing with Data Acquisition (DAS)/ PAC systems.</p> <p>f. Identify different control strategies and design/ implementing to varies automation projects</p> <p>g. Conduct appropriate discussions with within the team and prepare a report</p>				
<p><i>Module 2:</i></p> <p><i>Will learn designing & develop a project using PLC & PID Controllers, Implement and inspect Industrial Data Communications networks.</i></p>	<p>a. Selection of a suitable controller (PLC) with IO cards as per project requirement.</p> <p>b. Connect & configure the field instruments to the controller I/O cards.</p> <p>c. Design and develop a PLC projects using IEC-61131-3 programming language.</p> <p>d. Design and Implementing varies control strategies (PID, FB-FF, Ratio, cascade etc..) in automation projects.</p> <p>e. Design and Implementing industrial networking using varies industrial protocols (Profibus, Modbus, TCP/IP, CAN etc..) and manages the networks.</p>	100	40	50	10

**QUALIFICATION FILE: PG Diploma in Industrial Automation System Design
(Level 8)**

<p><u>Module 3:</u></p> <p><i>Will acquire skills to create a team and lead that for selecting/ configuring the Industrial Drives.</i></p>	<p>a. Select suitable AC/DC motor drives as per project/application requirement.</p> <p>b. Verify and configure all the drive parameters.</p> <p>c. Design and Implementing control strategies as per industrial application and supervise the team.</p>	100	40	55	5
<p><u>Module 4:</u></p> <p><i>Will acquire skills to design and develop a SCADA/HMI Systems and implementing/commissioning in different process plants.</i></p>	<p>a. Create a team and conduct appropriate discussions with within the team and manage.</p> <p>b. Design and develop supervisory control and data acquisition (SCADA)/ Human machine interface (HMI) panels for automation projects using software and hardware tools.</p> <p>c. Configure and Interface the panels /windows to industrial controllers (RTU – MTU connections using OPC servers)</p> <p>d. Collect all the alarms and plant data/information and store in database, from the database prepare a report based on query.</p>	100	30	60	10
	<p>a. Create a development team for implementing the</p>	100	30	60	10

**QUALIFICATION FILE: PG Diploma in Industrial Automation System Design
(Level 8)**

<p><u>Module 5:</u></p> <p><i>Will learn to develop creative solutions for Industrial automation problems with Distributed Control System (DCS)</i></p>	<p>distributed control system networks in varies industry projects.</p> <p>b. Develop creative solutions to the industrial automation problems using DCS.</p> <p>c. Configuring all DCS servers and hardware.</p> <p>d. Manage and complete the DCS project task within specified time. Explain about time management to your team.</p>				
<p><u>Project work / Thesis</u></p> <p><i>Ablity to create an automation project teams and manage it. Assign tasks to different teams and monitor it.</i></p>	<p>a. Develop a project and implement using different control strategies /algorithms as per plant requirement.</p> <p>b. Preparation of presentation and thesis/reports.</p> <p>c. Manage and good communication/presentation skill about entire project.</p>	100	NA	80	20
	Total Marks	600	180	355	65

Pass/Fail

Following Grading Scheme (on the basis of total marks) will be followed:

Grade	S	A	B	C	D	E	Fail
Marks Range (in %)	≥90%	80%-89%	70%-79%	60%-69%	50%-59%	40-49%	<40%

**QUALIFICATION FILE: PG Diploma in Industrial Automation System Design
(Level 8)**

SECTION 2:

EVIDENCE OF LEVEL

Title : PG Diploma in Industrial Automation System Design (IASD)			Level : 8
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF Level Descriptors	NSQF Level
Process required	After acquiring this qualification the candidate will be able to design/develop a team and manage projects in an automation field instruments, DAQ/PAC systems, PLC, SCADA/HMI systems, Designing DCS, Drives (AC/DC) and Industrial data communications.	A wide range of specialized technical skill in the area of Field instruments, PLCs, SCADA/HMI,DCS, Industrial drives (AC/DC), Industrial Data communications and protocols and PAC/DAQ systems , clarity of knowledge and practice in broad range of activity involving standard and non-standard practices. Knowledge of facts and principles of process automation, requirements, configuring, programming, installing, operation, trouble shooting and maintenance.	8
Professional knowledge	Factual ,comprehensive, cognitive, theoretical	Able to manage/ supervise do in Field	8

**QUALIFICATION FILE: PG Diploma in Industrial Automation System Design
(Level 8)**

	<p>knowledge and practical skills in broad contexts of work / study of Industrial Field Instruments, PLCs, SCADA/HMI Systems, DCS, industrial Drives(AC/DC), PAC/DAQ systems and Data communications in varies process industries.</p>	<p>instruments installation, configuration and commissioning, Designing and developing PLC, SCADA/HMI systems projects, PAC/DAQ/DCS system designing and implementations in varies industrial automation works/projects.</p>	
Professional skill	<p>A range of cognitive and practical skills to generate solutions to Industrial automation problems in a field of work or study in the area of industrial automation projects using different field instruments, PLC, SCADA/HMI system programming, AC/DC drives, PAC/DAQ systems in industrial automation applications</p>	<p>They have broad factual and theoretical knowledge applying to practice in PLC, SACAD/HMI, and DAQ/PAC systems programming, industrial drive applications using different motor drives (VFDs & others). They will be able to generate solutions to problems which arise in automation projects/ works</p>	8
Core skill		<p>Reasonable good in mathematical calculation,</p>	8

**QUALIFICATION FILE: PG Diploma in Industrial Automation System Design
(Level 8)**

	<p>After acquiring comprehensive, cognitive, theoretical and practical knowledge in Field instrumentation, PLC, SCADA/HMI, DCS, PAC/DAQ Systems and Industrial networking protocols, the candidate able to manage and supervision of industrial automation projects. Full responsibility for own and the work of team.</p>	<p>understanding of industrial automation problems/ projects and reasonably good in data collecting/system study information about industrial automation projects/ works. Design and developing an industrial automation projects using PLC, SCADA/HMI, DCS, DAQ/PAC Systems and industrial data communications.</p>	
<p>Responsibility</p>	<p>After acquiring Knowledge/ skills in PLCs, SCADA/HMI using Industrial communication protocols the candidate will able to design and implementing automation projects and have sufficient knowledge of Field instruments, DAQ/PAC systems, Industrial drives and different industrial networking protocols</p>	<p>The candidate Manage and supervision of industrial automation projects. Responsible for managing the work of a industrial automation project team and developing the team. Comprehensive, cognitive, theoretical knowledge and practical skills in the area of Industrial field instruments, PLCs, SCADA/HMI, DAQ/PAC Systems,</p>	<p>8</p>

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

		DCS and industrial data communications in varies industrial automation projects/ works.	
--	--	---	--

SECTION 3

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

Industrial Automation industry is one of the fastest growing in the region and also in country. There is ample jobs are being created for the skills acquired through above course work. The opportunities in Industrial Automation are immense for fresh engineers as well as experienced professionals. Entry-level roles vary widely depending on the company, products and geographies. Opportunities exist in design, testing, maintenance and assembly domain for engineers interested in these fields. This means, one must understand and appreciate the importance of practical work experience before progressing in this field and making long-term career. This all aspects are covered in the course work.


After having successful completion above course by candidate, will have wide and diverse opportunity in the field of Industrial Automation Industry, either directly or through ancillary producers. The biggest employers are Process Industry, Pharmaceutical companies, all are based in and around Chennai, Bengaluru, Pune and Delhi. The course provides opportunity for excellent learning and hands-on experience which will definitely improves one's growth prospects with adequate exposure.

This course has been designed to meet the increasing man power requirements in Indian Industrial Automation sectors.

(Market Survey files are attached)


1. Ken Research announced its latest publication on "India Industrial Automation Market Outlook to 2020" - Dec 14, 2015
(<http://www.news.kenresearch.com/post/135169875223/india-industrial-automation-industry-is-expected>)

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

 **KEN RESEARCH**
YOUR SEARCH ENDS WITH OUR RESEARCH

Ken Research is a leading global industry research and information service company operating with a network of partner firms across the US, Asia and Europe. The company provides bespoke industry intelligence, equity research reports and business consulting services on gamut of sectors.

Contact-US Ken Research.com Twitter linkedin Google+ Facebook

 Share

India Industrial Automation Industry is Expected to reach INR 197 billion by 2020 with Growth Driven by Rapid Adoption of Modern Technology backed by Cost Saving Features: Ken Research

2. Electronics for You - November 2013
(<http://www.wipro.com/documents/EFY-Times-a-career-in-control-and-automation.pdf>)
3. Industrial automation and control market in India - www.electronicb2b.com
(<http://electronicb2b.efytimes.com/industry-buzz/industrial-automation-and-control-market-in-india/>)
4. Reasons to start a career in Industrial automation - www.controleng.com
(<http://www.controleng.com/single-article/reasons-to-start-a-career-in-industrial-automation/3c17cdd5c859b3aa3e7cc51bb883de62.html>)
5. Industrial Control and Factory Automation Market by Technology - Global Forecast to 2022
(<http://www.marketsandmarkets.com/Market-Reports/factory-industrial-automation-sme-smb-market-541.html>)

Market survey Attached files:

1. [Market Research Reports - India Industrial Automation Industry is Expected](#)
2. [The Future of Industrial Automation](#)
3. [A and D April May 2013 India](#)

13

QUALIFICATION FILE: PG Diploma in Industrial Automation System Design (Level 8)

4. [Career in Automation, Eligibility Criteria, Automation Career Salary](#)
5. [Times-a-career-in-control-and-automation](#)
6. [Scope of PLC & automation](#)

What is the estimated uptake of this qualification and what is the basis of this estimate?

Estimated uptake is 40 students / Batch with 2 Batches / Year and on the basis of market survey /other reports.

What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

This qualification has comprises both technical and analytic skills and can be linked to any qualification higher than this one, existing or to come.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

Based on feedback by participants, employers and based on market survey the qualification will be reviewed in every 2 years.

SECTION 4

EVIDENCE OF PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

This course structure is designed in such a way that, the qualification acquired will meet the prerequisites of higher level courses in Industrial automation system Design domain. (Market Survey files are attached)

SECTION 5

EVIDENCE OF INTERNATIONAL COMPARABILITY

**QUALIFICATION FILE: PG Diploma in Industrial Automation System Design
(Level 8)**

List any Comparisons which have been established – NIL.