

Schneider Electric PlantStruxure

PlantStruxure Certified Engineer
Exam Guide

Edition 3.2



DISCLAIMER

Schneider Electric S.A. makes no representations or warranties with respect to this manual and, to the maximum extent permitted by law, expressly limits its liability for breach of any warranty that may be implied to the replacement of this manual with another. Furthermore, Schneider Electric S.A. reserves the right to revise this publication at any time without incurring an obligation to notify any person of the revision.

PlantStruxure Certified Engineer Exam Guide

INTRODUCTION AND LEGAL NOTICE

The contents of this manual are proprietary to Schneider Electric S.A. and all rights, including copyright, are reserved by Schneider Electric S.A.. You must not copy any part of the manual in hard or electronic form or make any adaptation or other commercial use of it without Schneider Electric's prior written consent. Schneider Electric S.A. will not accept any liability for action taken in reliance on this training manual.

COPYRIGHT

© Copyright Schneider Electric S.A. All rights reserved.

EDITION

Edition 3.1, June 2011

Content

| | |
|--|-----------|
| 1.0 Introduction to the PlantStruxure Certification | 5 |
| 1.1. Certification for Alliance partner and Schneider Electric Engineers | 5 |
| 1.2. Eligibility for the Schneider Electric PlantStruxure Certified Engineer Program | 5 |
| 1.3. Technology and Offer in evolution | 5 |
| 1.4. Your Contacts | 5 |
| 2.0 The Exam Process | 6 |
| 2.1. Examination Centers..... | 6 |
| 2.2. Exam Coordinators and Supervisors..... | 6 |
| 2.3. Exam Cost | 6 |
| 2.4. Prerequisites to take a PlantStruxure certification exam..... | 6 |
| 2.5. Modular Exam..... | 6 |
| 2.6. Exemptions from Exam Modules..... | 6 |
| 2.7. Registering for your exam | 7 |
| 2.8. Why Register? | 7 |
| 2.9. Exam Enrolment | 7 |
| 2.10. The Day of the Exam | 7 |
| 2.11. Open Book Exam | 7 |
| 2.12. Time Limit | 8 |
| 2.13. Passing the Exam..... | 8 |
| 2.13.1 Passing grade..... | 8 |
| 2.13.2 Failing grades and retaking an exam or part of it..... | 8 |
| 3.0 The Exam System | 9 |
| 3.1. Web-based Exams..... | 9 |
| 3.2. Logging In..... | 9 |
| 3.3. Select Your Exam | 10 |
| 3.4. In the Exam | 10 |
| 3.5. Exam Sections..... | 11 |
| 3.6. Inside a section..... | 11 |
| 3.7. Completing the module | 11 |
| 3.8. Checking Achieved Exam Grade..... | 12 |
| 3.9. Exam Question Types..... | 13 |
| 3.10. Exam Question difficulty and marks | 14 |
| 4.0 The PlantStruxure Certified Engineer Exam Structure | 15 |
| 4.1. Introduction to PlantStruxure™ | 15 |
| 4.2. The PlantStruxure Certification Exam Structure | 16 |
| 4.2. Depth of the examination | 16 |
| 4.3. Scope of the exam | 17 |
| 5.0 Preparation and Training Guide | 18 |
| 5.1. Training overview | 18 |
| 5.2. Module specific information and recommendations..... | 18 |

| | |
|---|----|
| 5.2.1 Architectures and Networking | 18 |
| 5.2.1.1 Introduction..... | 18 |
| 5.2.1.2 Topics covered in the exam | 19 |
| 5.2.1.3 Preparation: Additional Recommended Reading..... | 20 |
| 5.2.1.4 Preparation: Practical Experience..... | 20 |
| 5.2.2 Unity Pro and PAC Platforms | 21 |
| 5.2.2.1 Introduction..... | 21 |
| 5.2.2.2 Topics covered in the exam | 22 |
| 5.2.2.3 Preparation: Recommended Training..... | 22 |
| 5.2.2.4 Preparation: Additional Recommended Reading..... | 23 |
| 5.2.2.5 Preparation: Practical Experience..... | 23 |
| 5.2.3 Vijeo Citect..... | 24 |
| 5.2.3.1 Introduction..... | 24 |
| 5.2.3.2 Topics covered in the exam | 24 |
| 5.2.3.3 Preparation: Recommended Training..... | 25 |
| 5.2.3.4 Preparation: Additional Recommended Reading..... | 25 |
| 5.2.3.5 Preparation: Practical Experience..... | 25 |
| 5.2.4 Engineering tools - UAG | 26 |
| 5.2.4.1 Introduction..... | 26 |
| 5.2.4.2 Topics covered in the exam | 26 |
| 5.2.4.3 Preparation: Recommended Training..... | 27 |
| 5.2.4.4 Preparation: Additional Recommended Reading..... | 27 |
| 5.2.4.5 Preparation: Practical Experience..... | 27 |
| 5.2.5 Engineering tool sg ² | 28 |
| 5.2.5.1 Introduction..... | 28 |
| 5.2.5.2 Topics covered in the exam | 28 |
| 5.2.5.3 Preparation: Recommended Training..... | 28 |
| 5.2.5.4 Preparation: Additional recommended reading | 28 |
| 5.2.5.5 Preparation: Practical Experience..... | 29 |

1.0 Introduction to the PlantStruxure Certification

1.1. Certification for Alliance partner and Schneider Electric Engineers

The PlantStruxure CEP (Certified Engineer Program) distinguishes and recognizes engineers skilled in the integration of Schneider Electric technology-based automation projects.

The PlantStruxure CEP is at the heart of the Schneider Electric Alliance Partnership Policy: Maintaining a minimum number of PlantStruxure Certified Engineers is one of the prerequisites for a Schneider Electric Alliance Partner Company to reach the PlantStruxure Certified Alliance Partner Status.

It is also a prerequisite for any Schneider Electric Engineer who wants to join the SAE Master Program within the Industry Business Unit.

With the certification, Schneider Electric acknowledges to the market that the PlantStruxure Certified Engineer masters the Schneider Electric system offer / technology. The engineer should therefore be capable, to implement a given solution/application in the best possible way using Schneider Electric technology.

1.2. Eligibility for the Schneider Electric PlantStruxure Certified Engineer Program

The PlantStruxure Certified Engineer Program is available to employees of active Schneider Electric ALLIANCE partners. In case you're not sure whether your Company is an active Alliance partner, please confirm with your management or contact your local Schneider Electric Alliance program manager.

The PlantStruxure CEP is also available to any Schneider Electric engineer seeking wider competencies and certification.

1.3. Technology and Offer in evolution

PlantStruxure is Schneider Electric's collaborative control system and is an evolving technology. By signing up for the PlantStruxure Certified Engineer Program, participants commit themselves to passing update exams as the PlantStruxure offer evolves. The PlantStruxure Certification is valid for two years, and then the latest upgrade exam must be passed to maintain the status.

1.4. Your Contacts

As an employee of an Alliance Partner please contact your local **Schneider Electric Alliance Partner Manager** to sign up for a certification exam or for any question related to the PlantStruxure exam or the Schneider Electric Alliance Program.

As a Schneider Electric employee, please visit the PlantStruxure site on SWEBI for further information. In addition and for enrollment requests you can also send an email to PlantStruxure.certification@schneider-electric.com.

2.0 The Exam Process

2.1. Examination Centers

You can take Schneider Electric PlantStruxure Certification exams in selected Schneider Electric offices in your country. Please consult the PlantStruxure certified Engineer Program page on the Alliance Extranet or on SWEBI for further information. As Alliance Partner you can also contact your local Schneider Electric Alliance Program Manager.

2.2. Exam Coordinators and Supervisors

The local exam supervisors will be appointed during the registration process.

2.3 Exam Cost

The cost for Alliance Partner SW engineers to take a PlantStruxure certification exam is included in the Alliance Partner Annual Subscription Fee.

For Schneider Electric employees the exam is provided at no costs.

2.4. Prerequisites to take a PlantStruxure certification exam

1. Be a salaried employee (not subcontractor) of an active Alliance Partner Integrator or Schneider Electric.
2. You have followed training delivered by Schneider Electric as listed in the recommended curriculum or have achieved equivalent knowledge through extensive project experience.
The recommended curriculum is shown in the Preparation and Training Guide section of this document.

2.5. Modular Exam

The exam is modular (details are described in further sections of this document). It is allowed, although not recommended, to take the complete exam in multiple sessions only taking 1 or 2 exam modules at a time. Indicate which modules you want to take on your exam registration form.

2.6. Exemptions from Exam Modules

If you have a valid Schneider Electric SCADA Certification, you are exempt from passing the SCADA module of the PlantStruxure exam. In detail, you need to have passed the modules of the Citect SCADA exam (1) Configuration + (2) Architecture & Redundancy + (3) Diagnostics & Troubleshooting. For more details, please contact your local Exam Coordinator.

2.7. Registering for your exam

To be able to take any exams in the Schneider Electric PlantStruxure Certified Engineer program, you must enroll.

For Alliance Partner employees this may be done by a simple request to your local Schneider Electric Alliance Partner manager.

Schneider Electric employees either fill the online form on the SWEBI page or send the request to PlantStruxure.certification@schneider-electric.com.

When you submit your request, your local Exam Coordinator will contact you regarding the details of your exam.

2.8. Why Register?

The registration process not only allows your local office to coordinate exams but is the first step in the exam process.

When you register for the first time, the unique *Student Login* and *Student Password* will be created within the examination system. The login credentials that you receive will be used in all of your Certification Exams. We will need an email address so that your exam results may be sent to you.

The Student Password is a computer generated random selection of characters. The username and the password are case sensitive.

The password will generally not be revealed to you; instead the examination supervisor will log in on your behalf.

2.9. Exam Enrolment

Your exam enrolment is created prior to the day of the exam. When the Exam coordinator registers you to sit for a particular exam your Username is entered into the Enrolled User Group for that exam. The enrolment is disabled until the day of your exam.

2.10. The Day of the Exam

The Exams are supervised by Exam Coordinators. When you arrive at the Examination Centre you will need to identify yourself to the Exam Coordinator. If this is your first exam the Exam Coordinator will supply you with your Exam Username. You will then be escorted to the Examination Room and the coordinator will perform the login for you. The location of the testing room is most likely to be a Schneider Electric Training Room.

2.11. Open Book Exam

All exams are open book with some limits as described below. The computers in the Examination room are loaded with appropriate versions of Unity Pro, Vijeo Citect, UAG and sg2 for the exam being taken, and all relevant user guides for those software products. You are NOT permitted to take any Training Manuals into the examination room, neither are you permitted to bring any other material, including this Exam Guide, into the Examination Room.

The exams are supervised by the Exam Supervisor. Whilst you are allowed to refer to the on-line documentation and to create test projects on the installed SW system, no speaking is allowed and peeking at someone else's computer is also prohibited.

Blank paper for writing notes will be supplied; any used sheets will be destroyed by the Exam Supervisor.

2.12. Time Limit

All certification exam modules allow a certain maximum amount of time in which to complete your work.

The available time is fixed for each exam and is also subdivided into allotments for each section of the exam. You cannot "bank" time - at the end of a section, any spare time is lost, nor can you backtrack once a section is completed.

The available time for the current section is indicated on the exam by an onscreen counter/clock in the top right-hand corner of the screen, so you can check the time remaining whenever you like.

2.13. Passing the Exam

2.13.1 Passing grade

The passing grade is defined per module and is stated in the "module overview" section at the beginning of each exam.

Once you pass all exams, the PlantStruxure Certification Administrator will be automatically advised. Please allow 8 weeks for your certificate to be mailed to you.

2.13.2 Failing grades and retaking an exam or part of it

As indicated above, passing marks are defined per module, so only the modules for which you have a failing grade you will have to retake in order to become a Certified Engineer.

Prerequisites to retake one or more exam modules:

- At least 3 months between 2 examination sessions
- To have done self studies or participated in formal training delivered by Schneider Electric on the subject matter covered in the module.

2.14. Dispute Resolution Process

There may be situations where examinees might wish to dispute either specific questions or their overall grading. The following procedures will apply.

The examinee expresses his complaints or concerns to the local Exam Supervisor either verbally, written or by email. The Supervisor will forward the request together with his comments to the email address plantstruxure.certification@schneider-electric.com.

The Dispute Resolution Committee of the PlantStruxure Competency Centre, will investigate and respond latest within four weeks with a final assessment which cannot be contested further

3.0 The Exam System

3.1. Web-based Exams

All Exams are web-based. Before you start your exam, the Exam Coordinator will have Internet Explorer loaded with the Exam web page.

3.2. Logging In

The Examination system "DOTS" is hosted on the Schneider Electric website and can be accessed from a web browser. Depending on the local network – whether being within the Schneider Electric network or an external one – the URLs are different. The local Exam Coordinator will have navigated to the correct site upon your arrival already. He will also perform the login for you with your username and password.



PLEASE LOGIN BELOW ↓

| | | |
|-----------|--|-----------------------------------|
| USERNAME: | <input type="text" value="PSX Exam"/> | <input type="button" value="GO"/> |
| PASSWORD: | <input type="password" value="*****"/> | |

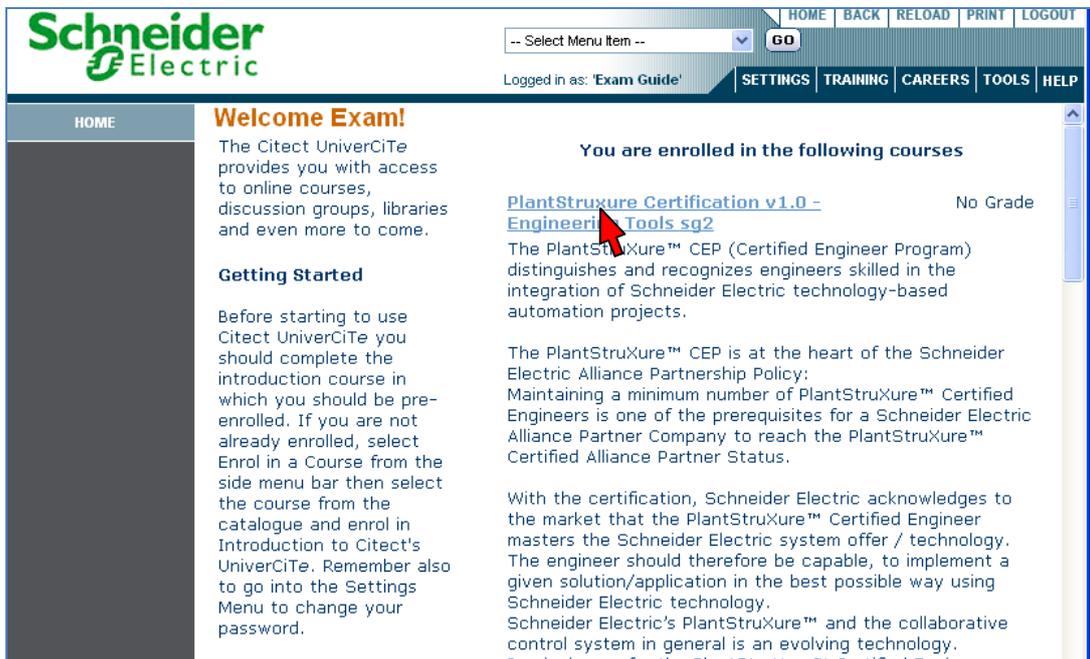
TO SEE DOTS MINIMUM REQUIREMENTS CLICK [HERE](#)
FORGOTTEN YOUR PASSWORD? CLICK [HERE](#)

Following login, you will see a list of the exam modules in which you are currently enrolled

The screenshot shows the Schneider Electric exam system interface. At the top, there is a navigation bar with the Schneider Electric logo, a menu dropdown, and links for HOME, BACK, RELOAD, PRINT, and LOGO. Below the navigation bar, the user is logged in as 'Exam Guide'. The main content area is divided into two columns. The left column contains a 'Welcome Exam!' message and a 'Getting Started' section. The right column is titled 'You are enrolled in the following courses' and lists two courses: 'PlantStruXure Certification v1.0 - Engineering Tools sg2' and 'PlantStruXure Certification v1.0 - Engineering Tools UAG'. Each course entry includes a brief description and a 'No Grade' status.

3.3. Select Your Exam

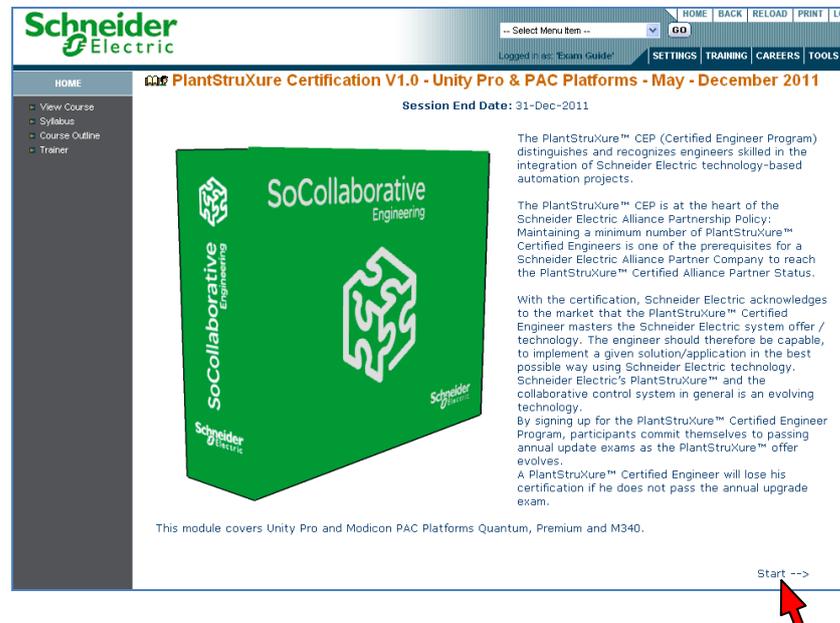
From the list of enrolled exam modules (typically, you will be enrolled in all modules when you register), choose the exam module you wish to attempt.



The screenshot shows the Schneider Electric website interface. At the top, there is a navigation bar with links for HOME, BACK, RELOAD, PRINT, and LOGOUT. Below this, a dropdown menu is set to "-- Select Menu Item --" with a GO button. The user is logged in as "Exam Guide". The main content area is titled "Welcome Exam!" and includes a sidebar with "HOME" and "Getting Started" sections. The main content area lists enrolled courses, with "PlantStruXure Certification v1.0 - Certified Engineer Program" highlighted. A red arrow points to the course title.

3.4. In the Exam

Once you open your exam, you will see a short description of the program and the topics the chosen module covers. Clicking on the "Start -->" link at the right bottom will continue and start the exam.

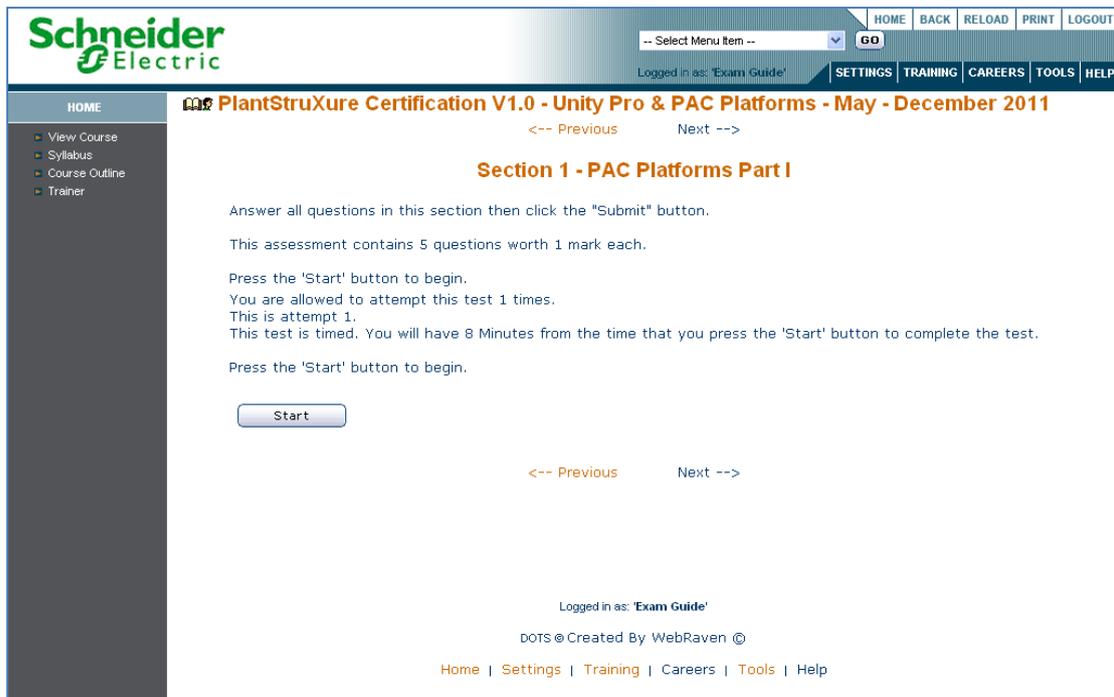


The screenshot shows the Schneider Electric website interface for the "PlantStruXure Certification V1.0 - Unity Pro & PAC Platforms - May - December 2011" exam. The page displays a description of the exam and a "Start -->" link. A red arrow points to the "Start -->" link.

3.5. Exam Sections

Having clicked on the start link, you will then be presented with further info on the module. After clicking the "Next -->" link brings you to the exam instructions page with info on the different sections of the module. Another click on next finally brings up the start page of the module. This is your last opportunity to make sure you're not attempting the wrong exam!

Please make sure to click the Start button and not the "Next -->" link to start the module!



Once you click the Start button, timing commences for the first section.

3.6. Inside a section

You will be given the name of the section and advised the value of each section and the total number of points available in the section. The timer in the top right corner of the screen will start counting down.

Click on "submit" at the bottom of the screen to complete the section. You will be warned if there are uncompleted questions and the section will not close.

Section 1 of 3

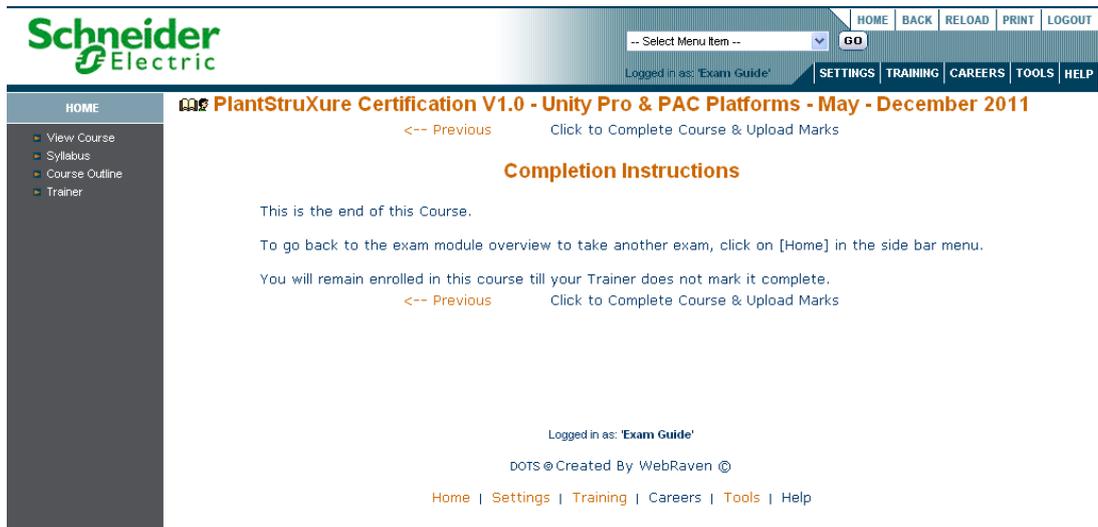
Answer all questions in this section then click the "Submit" button.

Each question in this section is worth 3 marks. The maximum number of marks for this section is 6 marks.

3.7. Completing the module

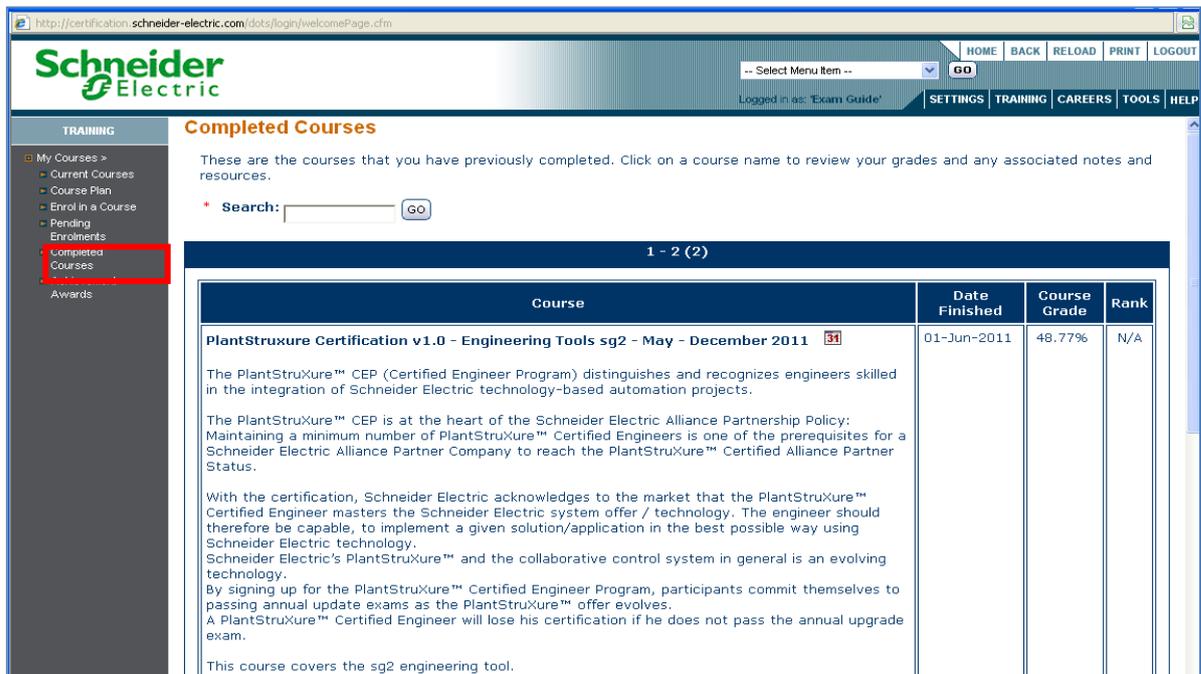
After finishing all sections of the module, you must click on the "Click to Complete Course & Upload

Marks" link to submit all your answers and finalize the assessment.



3.8. Checking Achieved Exam Grade

Once you completed the module and uploaded your marks, you can check the grade you achieved by clicking on the "Completed Courses" link in the menu tree at the left.



3.9. Exam Question Types

The exam consists of several different types of questions as described below.

Single Answer Read the question and select your response from the list of options. Select the radio button beside your choice.

1. How many people live on the moon?

Select the correct answer

- A. 0
- B. 1
- C. 50
- D. 100

True or False Answer These questions offer a simple choice between two responses. Occasionally, the responses will also be expressed as a choice between two specific possibilities.

4. Jupiter is the largest planet in our solar system.

Select True or False

- True False

Multiple Answers These questions are expecting at least one response, possibly as many as four. Checkboxes are provided for you to choose as many or as few responses as you think appropriate.

There will be no partial credit awarded for these questions. You must choose exactly the correct set of responses.

2. Which planets in our solar system have no moons?

Select all that apply

- A. Venus
- B. Jupiter
- C. Mercury
- D. Pluto

Typed Responses A small number of questions expect a typed response

5. Type the correct answer in the space provided

The planet is closest to the sun.

3.10. Exam Question difficulty and marks

Exam modules contain a mix of easier and more difficult questions.

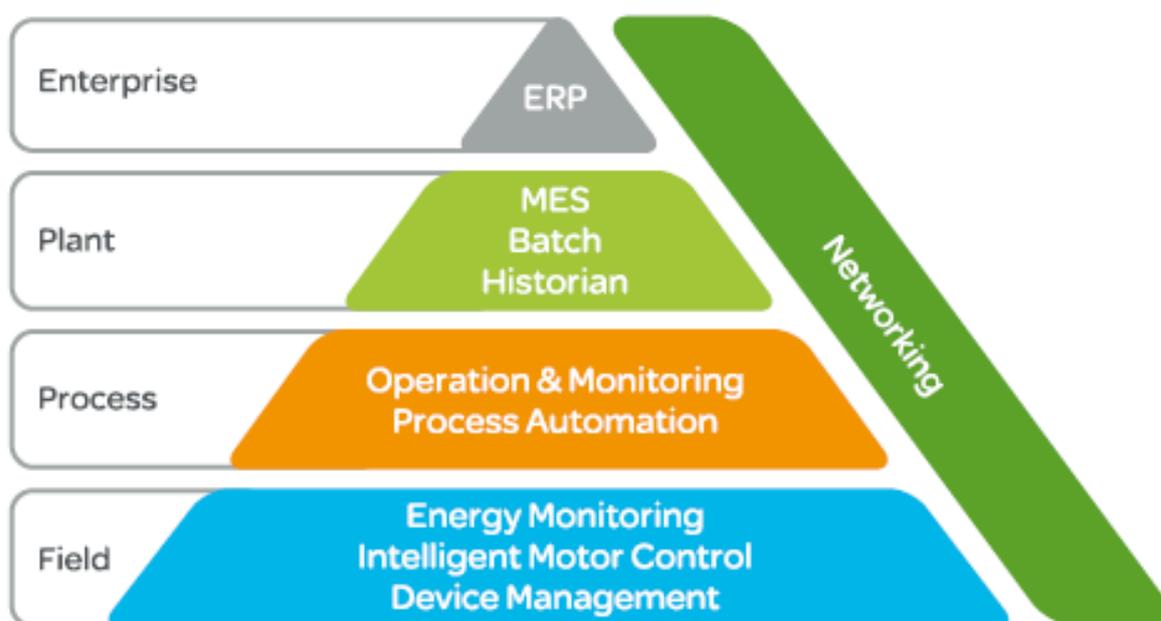
More credit is allotted to the more difficult questions.

At the beginning of each exam module section, the total possible number of points is indicated

4.0 The PlantStruxure Certified Engineer Exam Structure

4.1. Introduction to PlantStruxure™

PlantStruxure is a collaborative system that allows industrial and infrastructure companies to meet their automation needs and at the same time deliver on growing energy management requirements. In a single environment, measured energy and process data can be analyzed and used to yield a holistically optimized plant.



PlantStruxure covers a both very broad and very deep scope of functionalities, technologies and components:

Energy Management

- iPMCC to optimise energy consumption
- Smart power and energy meters
- Variable speed drives for better energy efficiency
- Energy management software to measure and analyse

Manufacturing Execution System

- Real-time access to plant and business information allowing key personnel to identify and act on opportunities to maximize plant and process efficiency and to correct problems before they impact on supply chain, regulatory compliance and production.

Transparent Ready Networking

- Transparent communication between all system components
- Standard Ethernet technology and industrial protocols

- Dedicated device network support including Modbus TCP, EtherNet/IP, Profibus, CANopen,, AS-Interface
- Support for dedicated instrumentation buses such as Profibus PA, Foundation Fieldbus & HART.

Operation

- The link between the operator and the process
- Easy system navigation
- Powerful alarm management
- Advanced trending and process visualisation
- A range of client options including web clients, PDAs, smart phones.

Control

- Scalable family of programmable automation controllers to meet all control requirements
- Integrated SIL2 safety
- Hot-swappable processors, I/O and communications modules and power supplies
- Advanced process control functionality
- Configuration based on IEC61131-3 standard.

Engineering

- Engineer and modify your entire system from a single location
- Flexible engineering tools in order to support your efforts to be more efficient
- Reusable and extensible object libraries for standardisation
- Off-line simulation to reduce testing and commissioning.

4.2. The PlantStruxure Certification Exam Structure

The PlantStruxure certification aims to certify professional broad technical experts, covering an important part of the breath of PlantStruxure. Important to note is that he PlantStruxure certification is not covering the entire scope (breadth and width) of PlantStruxure.

We believe that in the industrial automation business, design and engineering is a team effort and the engineering team is likely to contain a mix of both deep and broad technical experts. The broad technical experts have the important role of bringing all the pieces together to ensure a consistent and coherent architecture and application, thereby relying on deep technical expert colleagues for specific technical details when required.

The PlantStruxure certification aims to certify those broad technical experts.

4.2.1 Depth of the examination

The exam modules will not go in an extremely deep technical detail at any moment: be it on product, technology or system level.

For that level of expertise, we propose other, more specialized certifications, which are much narrower in scope, but which will go much deeper in detail, e.g.: SCADA certification

4.3 Scope of the exam

The certification focuses more on advanced architectural and connectivity aspects of PlantStruxure and less on the system and related functionality aspects, such as information, instrumentation, motor and energy management.

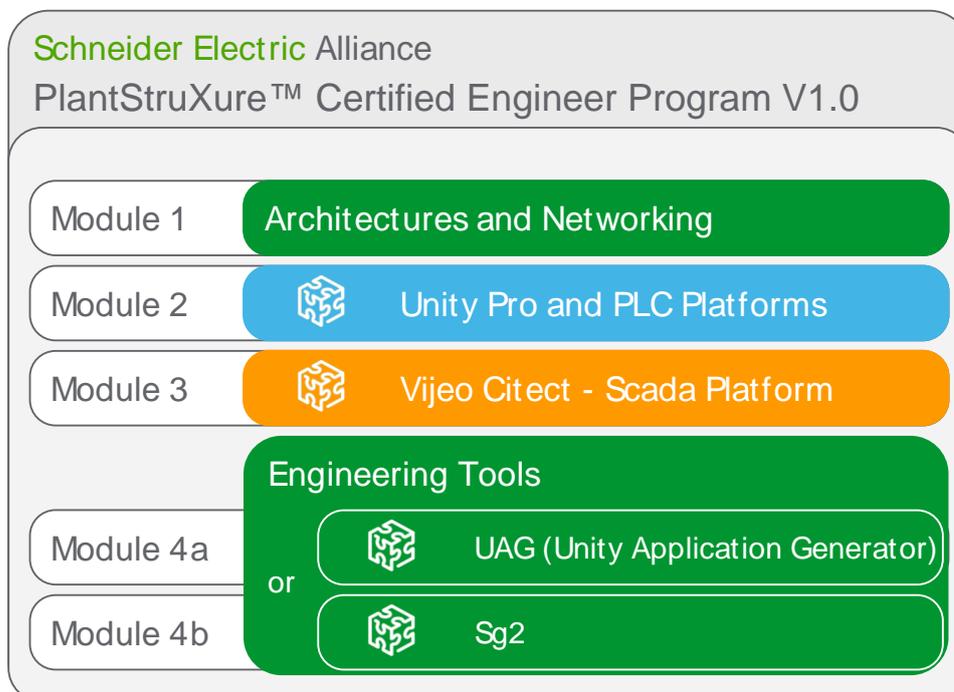
Some important system aspects are excluded from the PlantStruxure certification, as they will be subject for specific, separate, certifications at a later time: MES (Manufacturing Execution System), Asset Management, Batch Management, Historian.

Today the Schneider Electric Alliance PlantStruxure Certified Engineer Exam is structured around 4 main axes:

- Module 1: Schneider Electric Architectures and Networking
- Module 2: Unity pro and PAC Platforms
- Module 3: SCADA : Vijeo Citect
- Module 4: Engineering Tools.

Modules 1 through 3 are mandatory, and passing grades on each module are required to be eligible for certification.

Module 4 contains two sub modules - one for UAG and one for sg². A passing grade on only one of these two modules is sufficient to be eligible for certification. A candidate can choose to take either one or both of these. No additional credit is given to candidates passing both sub modules.

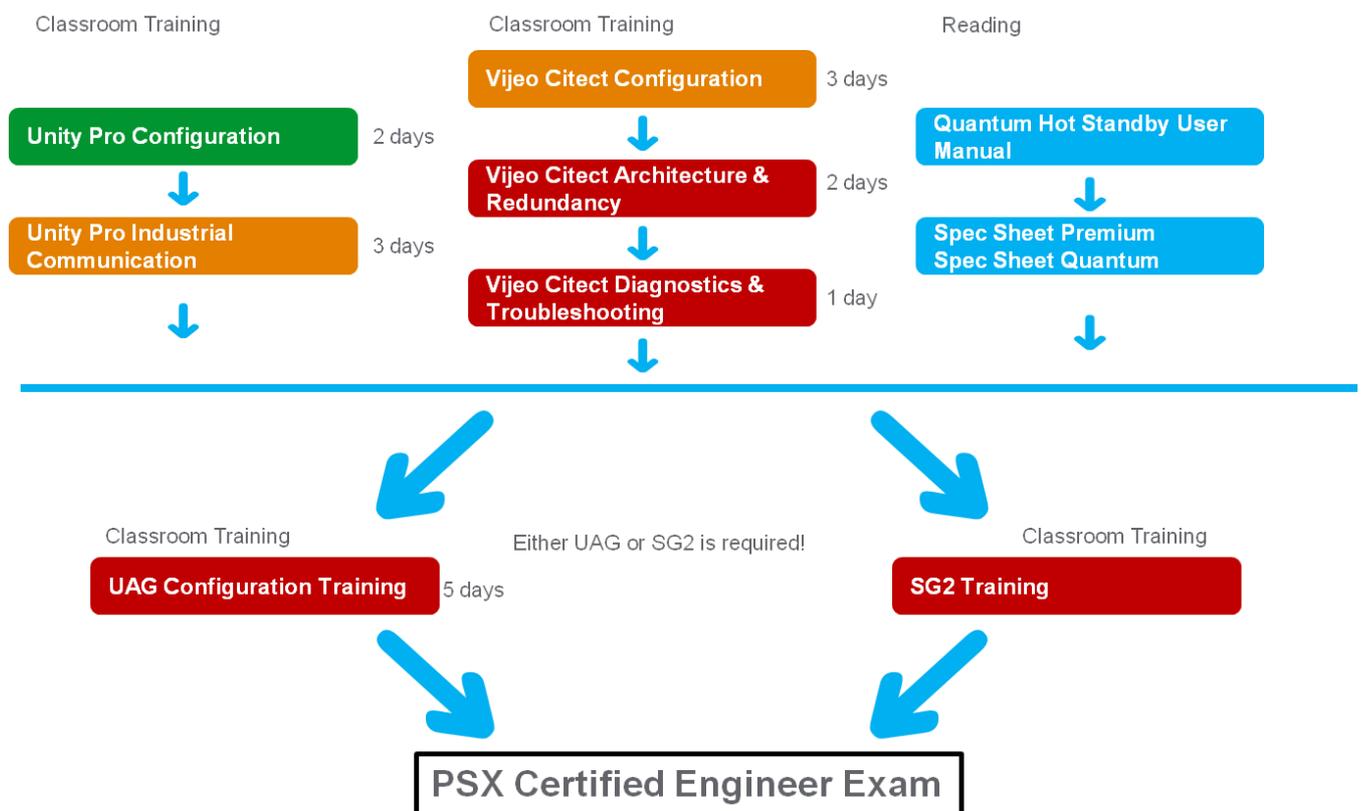


5.0 Preparation and Training Guide

5.1. Training overview

The sections and questions of the PlantStruxure Certified Engineer exam are matching the knowledge being delivered by training courses listed on the Industry Business Training Offer Catalog. Thus the participants can easily acquire the knowledge required to become certified by attending the trainings being conducted in the local Schneider Electric training centres.

The recommended curriculum is shown in the figure below.



Please contact your local training representative for locations and schedules.

5.2 Module specific information and recommendations

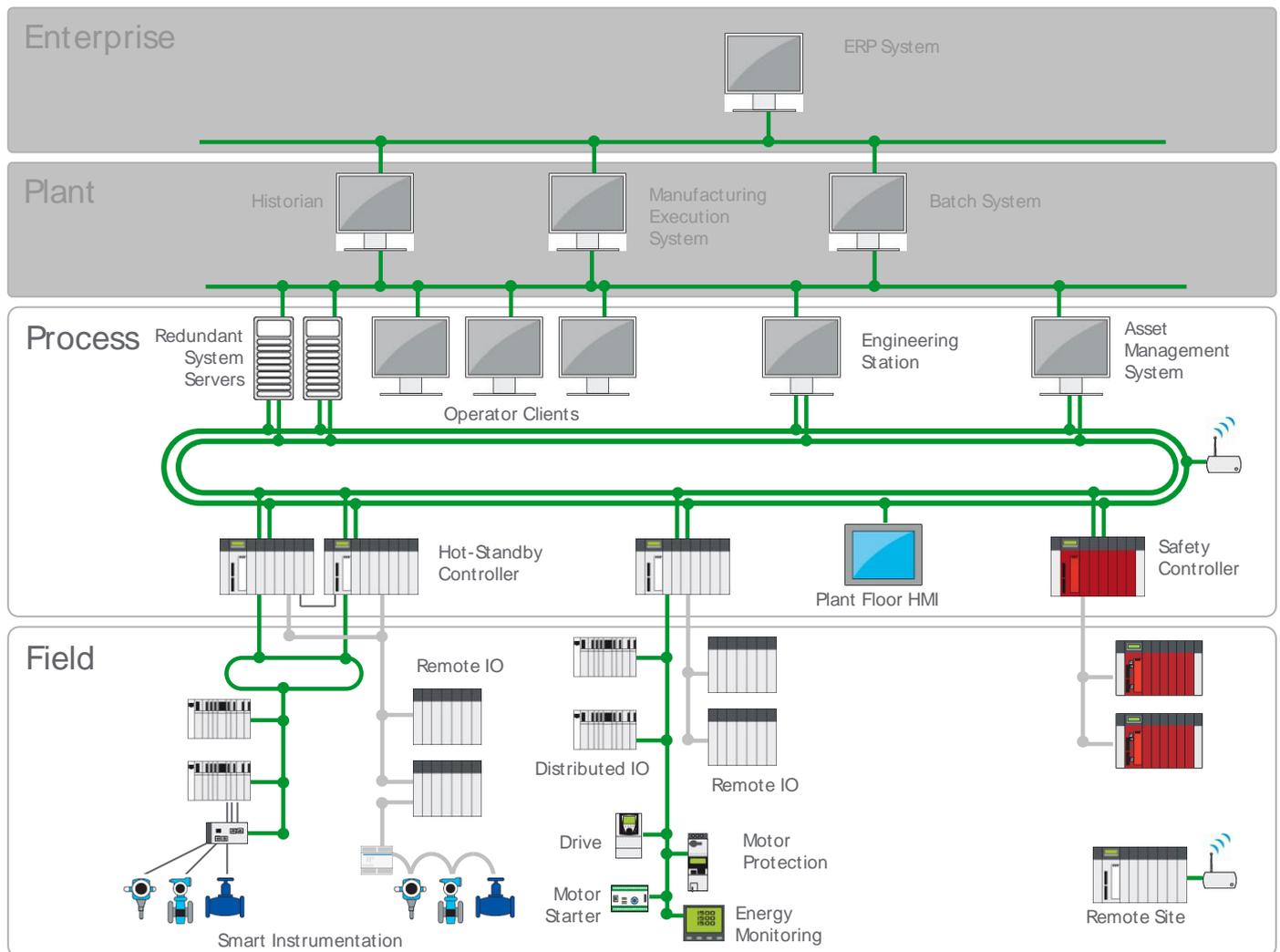
5.2.1 Architectures and Networking

5.2.1.1 Introduction

Building effective and cost efficient architectures is a challenging task and requires knowledge of a broad range of components and technologies.

This exam module covers exactly that: without delving into deep technical details of individual

components or networking standards, Schneider Electric expects PlantStruxure Certified Engineers to master this broad portfolio of knowledge in order to be able to build the best possible architecture which meets the customer and application requirements.



5.2.1.2 Topics covered in the exam

Configuring networks and networking principles based on following networks:

- Modbus TCP
- CANopen
- S908 bus
- Profibus DP / PA

Building architectures based on Schneider Electric technology

- PAC Platforms M340, Quantum, Premium and remote I/O
- Advantys STB & TesysU
- Network equipment: Connexium switches

Questions in the exam may cover features, possibilities and constraints directly related to interconnecting and integrating these components into effective architectures

Note: Questions on Variable Speed Drives (Altivar), Softstarters, Intelligent Motor Starters (TeSys), HMI, W@de RTU and other components typically part of architectures built on Schneider Electric technology are not included in this exam.

Recommended Trainings

| Training name | Delivery | Duration |
|------------------------------------|-----------|----------|
| Unity Pro Industrial Communication | Classroom | 3d |
| Connexium Wireless Switches | Classroom | 2d |

5.2.1.3 Preparation: Additional Recommended Reading

- Automation Solution Guide, section 1 Automation Selection Guide
- Automation Solution Guide, section 9 Industrial Networks
- “Transparent Ready, User Manuel”, Aug 2008, Ref: 31006929
- “Transparent Factory Network Design and Cabling Guide”, Mar 2005, Ref: 35002987.01
- “Modicon M340, Premium, Atrium and Quantum Using Unity Pro Communication Services and Architectures Reference Manual”, Apr 2009, Ref 35010500.06
- “TCSESM Managed Switch Redundancy, Manual”, Aug 2008, Ref: 31007126
- “ConneXium Ethernet Cabling System TCSESM Managed Switch Configuration Manual”, Aug 2008, Ref 31007122
- System User Guide “CANopen Characteristics”, Feb 2006, Ref 33003798.00
- System User Guide “Premium or Micro on CANopen, Master - Master Communication”, Jun 2005, Ref 33003569
- System User Guide “Premium, Magelis, Altivar, Advantys STB on Ethernet”, Mar 2006, Ref 33003800
- System User Guide “Premium and Advantys STB on Profibus DP”, Mar 2006, Ref 33003548

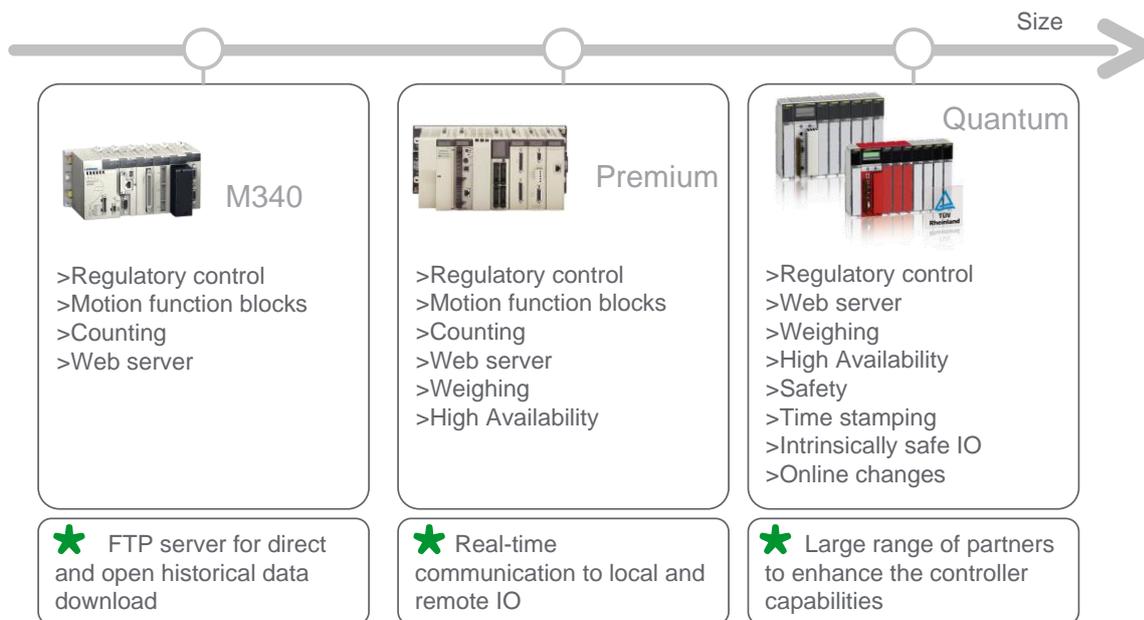
5.2.1.4 Preparation: Practical Experience

We strongly recommend a relevant amount of practical experience working hands-on designing and implementing above mentioned architectures and networks before attempting the certification exam, as experience during designing, programming, debugging and commissioning is key to truly mastering those topics.

5.2.2 Unity Pro and PAC Platforms

5.2.2.1 Introduction

>> PAC Platforms



>> Unity Pro

Unity Pro is designed for IEC61131-3 programming, debugging and operation of Modicon M340, Premium and Quantum programmable automation controllers.

Easy to use

Unity Pro makes best use of the graphic and context-sensitive interfaces of Windows XP® and Windows Vista®.

- Direct access to tools and data
- 100% graphic configuration
- Customizable toolbar and icons
- Extended drag-and-drop and zoom functions
- Integrated diagnostics window
- FDT/DTM container.

Five IEC61131-3 languages to mix as you wish

Each section of code can be programmed in the language of your choice, best adapted to each processing operation. All edit, debug and operation tools are accessible no matter which language is used.

All the advantages of standardization

Benefit from a complete set of functions and tools enabling modeling of application structure on your machine or process structure. The program is split into organized function blocks grouping: program sections, animation tables, operator screens and hyperlinks. Basic functions used repetitively are encapsulated in user function blocks (DFB) in IEC61131-3 language.

Time saving by reuse

Tested and qualified, your standards reduce on-site development and installation times. Quality and deadlines are optimized.

- Function modules reusable in the application or between products by means of XML import/export
- Function blocks instanced by drag-and-drop from the library
- Instances can automatically inherit library modifications
- Specific libraries can be reused in Vijeo Citect.

Off-line simulation

The simulation function built into the system enables engineers to replicate the functionality of the application in a PC environment. This helps to identify any errors in the application programming and decreases testing and commissioning time.

5.2.2.2 Topics covered in the exam

Unity Pro

- Security
- Project environment & settings
- Configuration editor
- Variables
- Application Structure
- Libraries management
- Languages: FBD, LD, ST, IL, SFC
- Application testing & debugging

PAC HW Platforms

- Modicon M340 PACs
- Modicon Premium PACs
- Modicon Quantum PACs
- Advantys Remote I/O
-

5.2.2.3 Preparation: Recommended Training

| Training name | Delivery | Duration |
|-------------------------------------|-----------|----------|
| Unity Pro Configuration | Classroom | 2d |
| Advantys STB Configuration Overview | Online | 20m |

| | | |
|--|--------|-----|
| Advantys STB over Ethernet Modbus TCP/IP | Online | 20m |
| Advantys STB over Modbus Plus | Online | 20m |

5.2.2.4 Preparation: Additional Recommended Reading

- Automation Solution Guide, section 10 – “Data Processing and Software”
- Unity Pro
 - “Program Languages and Structure, Unity Pro”, Apr 2009, Ref 35006144
 - “Communication Services and Architectures, Unity Pro Reference Manual”, Apr 2009, Ref 35010500.06
 - System User Guide: “Application Diagnostics with Unity”, Mar 2006, Ref 33003586
- Premium PAC Platform:
 - “TSX57/PCX57, Hardware PAC Implementation, Communication, Network and Bus Interfaces”, May 2007, Ref 35009581
- Quantum PAC Platform:
 - “Quantum - Hardware Reference Manual, Unity Pro”, Apr 2009, Ref 35010529
- Modicon M340 PAC Platform:
 - “Modicon M340 - Processors, Racks and Power Supply Modules, Unity Pro”, Apr 2009, Ref 35012676
 - “Modicon M340 for Ethernet Communications Modules and Processors User Manual”, Apr 2009, Ref 31007131.04
- Advantys Remote I/O:
 - “Advantys STB, System Planning and Installation Guide”, Feb 2009, Ref: 31002947
 - “STBNIP2212 Standard Ethernet Modbus TCP/IP Network Interface Module”, Feb 2009, Ref: 31003688
 - “STBNCO2212 Standard CANopen Network Interface Module”, Feb 2009, Ref: 31003684
 - “STBNDP2212 Standard Profibus DP Network Interface Module”, Feb 2009, Ref: 31002957

5.2.2.5 Preparation: Practical Experience

We strongly recommend a relevant amount of practical experience working hands-on with Unity Pro and the mentioned PAC platforms before attempting the certification exam, as experience during designing, programming, debugging and commissioning is key to truly mastering the topic.

5.2.3 Vijeo Citect

5.2.3.1 Introduction

Vijeo Citect is the system of choice when you require a reliable, flexible and high performance system for any industrial automation monitoring and control application.

Whether you need an easy-to-use operator interface with networked reporting capability, or an entire client/server HMI/SCADA system spanning multiple plants on different continents, you can do it all with Vijeo Citect.

Vijeo Citect comes with powerful features including:

- Graphical process visualization
- Superior alarm management.
- Advanced clustering options for control when and where you want.
- Historical and real-time trending.
- Built-in reporting.
- Statistical Process Control.
- Multi-threaded CitectVBA and Cicode programming languages.
- Powerful analysis tools.

Vijeo Citect is designed to provide industrial companies of all sizes with agile control over both engineering and runtime operations to significantly improve performance and achieve a lower cost of ownership. The advanced clustering technology help companies safeguard plant reliability. The rapid-change deployment helps increase security and maximizes engineering productivity

Vijeo Citect is a part of the fully integrated Schneider Electric Automation System Platform that will help you increase your return on assets by delivering a reliable, flexible and high performance supervisory control and data acquisition system. Easy-to-use configuration tools and powerful features enable you to quickly develop and deploy solutions for any size application.

5.2.3.2 Topics covered in the exam

- Vijeo Citect Configuration
 - The Citect SCADA Environment
 - Managing Projects
 - Setting Up Communications
 - Graphics
 - Commands and Controls
 - Genies and Super Genies
 - Devices
 - Events, Alarms
 - Trends, Process Analyst

- Navigation
 - Reports
 - Security
- Vijeo Citect Architecture & Redundancy
 - Client/Server, Clustering
 - Redundancy with Vijeo Citect
 - Web Client
 - System Security
 - Diagnostics & Troubleshooting
 - Tag extensions
 - Network management & the kernel
 - Publish & Subscribe Model
 - Logging tools
 - Communication Analysis

Note: Trainings and exam questions are aligned and covering Version 7.20 of Vijeo Citect. Topics covered in the Vijeo Citect Customization & Design, and in the Vijeo Citect Cicode trainings, are not covered in the PlantStruxure exam.

5.2.3.3 Preparation: Recommended Training

| Training name | Delivery | Duration |
|---|-----------|----------|
| Vijeo Citect Configuration Training | Classroom | 3d |
| Vijeo Citect Architecture & Redundancy Training | Classroom | 2d |
| Vijeo Citect Diagnostics & Troubleshooting | Classroom | 1d |

5.2.3.4 Preparation: Additional Recommended Reading

- Relevant topics in the Vijeo Citect Help
- Relevant articles in the Vijeo Citect Knowledge Base

5.2.3.5 Preparation: Practical Experience

We strongly recommend a relevant amount of practical experience working hands-on with Unity Pro and the mentioned PAC platforms before attempting the certification exam, as experience during designing, programming, debugging and commissioning is key to really master the topic.

5.2.4 Engineering tools - UAG

5.2.4.1 Introduction

Unity Application Generator is an advanced design and generation software tool that integrates multiple PACs and HMI/SCADA systems to provide an automation solution similar to a Distributed Control System.

Structured Project Design - bridge from the process engineer to the control/automation designer (from the P&ID to the automation system). Capture and re-use of the Customer's best practices within application specific libraries that reduce the dependency on experts, enable standardization and increase software robustness.

Single Database entry avoids duplication of efforts and the resulting errors. Automatic Application Generation including the automatic configuration of networks in multi-device systems increases efficiency, improves software quality, speeds commissioning while simultaneously reducing project risk. Integrated change tracking and automatic documentation generation reduces engineering effort and enables system validation.

UAG integrates best in class products from Schneider Electric and leading partners into an advanced automation platform based on International Standards ISA-88, GAMP, IEC61131-3:

- Unity PACs (Premium / Quantum)
- Leading HMI/SCADA systems
- Modbus TCP/IP communication
- OFS/OPC

5.2.4.2 Topics covered in the exam

- The UAG project development process
- Designing the physical model
- Designing the topological model
 - Networks
 - Data Servers
 - HMIs
 - PACs
- Generating the PAC/SCADA application(s)
- Applying customer standardization elements to UAG
- Definition and creation of user defined control modules (SCoDs) within UAG

5.2.4.3 Preparation: Recommended Training

| Training name | Delivery | Duration |
|---------------|-----------|----------|
| UAG Training | Classroom | 3 days |

5.2.4.4 Preparation: Additional Recommended Reading

- “Unity Application Generator 3.1, Basic User Manual”, Sep 2008, Ref 33002830
- “Unity Application Generator 3.1, Extended User Manual”, Sep 2008, Ref 33003669
- “SCoD Editor 3.1, User Manual”, Sep 2008, Ref 33002608

(*): All System User Guides, reference manuals and other indicated documents are accessible and downloadable from the Alliance Extranet through the technical Library

5.2.4.5 Preparation: Practical Experience

We strongly recommend a relevant amount of practical experience working hands-on with the Unity Application Generator before attempting the certification exam, as experience during designing, programming, debugging and commissioning is key to really master the topic.

5.2.5 Engineering tool sg²

5.2.5.1 Introduction

sg² is a tool that quickly configures projects with Unity Pro and Vijeo Citect using pre-built objects for Schneider device integration and process control functionality.

sg² is an essential tool for anyone developing automation projects using Schneider Electric equipment

sg² provides the following benefits for System Integrators:

- Reduced costs through decreased engineering time
- Decreased project risk by providing preconfigured and tested object libraries
- Flexibility to develop specific objects to meet their own standards, or end user specific standards
- Ability to deliver increased system functionality to the End User in the form of better diagnostics, easier maintenance and greater system aesthetics (graphics)

sg² contains the following components:

- SGS Workbench – the user environment with which to build the sg² configuration
- SGS Guardian – the link (database exchange) between Vijeo Citect and Unity Pro
- sg² Object Libraries – objects that provide the ability to easily connect Schneider Electric devices and process control functionality to the automation system
- SG Builder – a tool that can be used to create user defined objects to work with sg²

5.2.5.2 Topics covered in the exam

- The sg² Project Development Process
- The sg² Framework
- Working with the SGS Workbench Working with SGS Guardian
- Working with the SG Builder
- Working with the SGCU Editor

5.2.5.3 Preparation: Recommended Training

| Training name | Delivery | Duration |
|---------------|-----------|----------|
| Sg2 Training | Classroom | xxxxx |

5.2.5.4 Preparation: Additional recommended reading

- Sg2 User Manual

5.2.5.5 Preparation: Practical Experience

We strongly recommend a relevant amount of practical experience working hands-on with sg2 before attempting the certification exam, as experience during designing, programming, debugging and commissioning is key to really master the topic.

Schneider Electric

PlantStruxure

Schneider Electric
Head Office
35 Rue Joseph Monier
CS 30323
92506 Rueil-Malmaison, France
www.schneider-electric.com

