

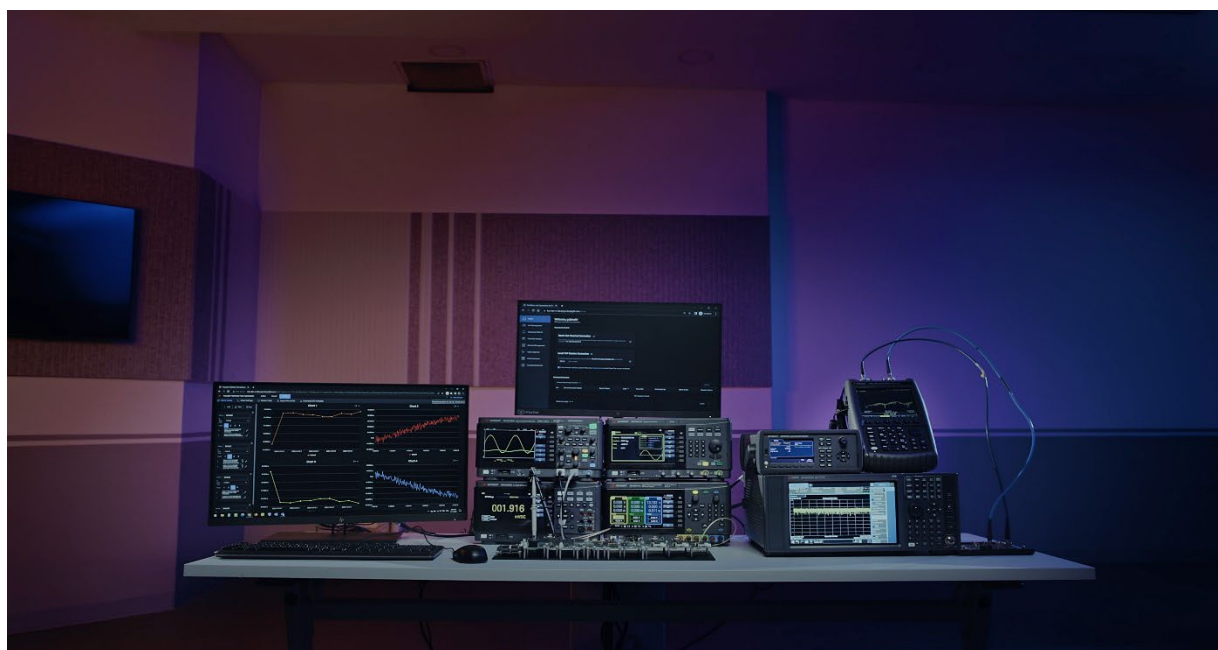
Keysight SR101EDUA Digital Learning Suite

A unified web-based digital learning suite

One Secured Access to All

With new EdTech being introduced almost every day and courses built towards career-focused learning and student-centric blended learning, educational institutes must rapidly transform to keep pace with this megatrend. However, this means that educators may be required to spend more resources on maintaining or managing these assets from different providers.

SR101EDUA offers a solution and a convenient way to make the switch to online learning and manage all engineering lab resources easily. It is a digital learning suite for both educators and students to access industry-relevant learning resources through a secure web interface. This unique digital learning suite transforms the learning experience by providing remote access and control to engineering lab resources as well as tools to visualize, compare, and analyze measurement data. It accelerates lab project completion time by up to 10x and increases up to 3x more lab resource utilization.



SR101EDUA is also able to enrich the learning experience with self-paced learning resources that can accelerate student development and help students explore adjacent fields for a holistic learning journey. Hands-on lab collaborative tools allow both educators and students to work together, learn, and build a lasting knowledge foundation. The digital learning experience starts here.

Streamlined Teaching Workflow

LMS integration



- With a built-in Learning Tool Interoperability (LTI) feature, you can easily plug and play the whole DLS solution into your LMS.
- DLS uses LTI Advantage Name and Roles Provisioning to authenticate users.
- DLS also uses the LTI Advantage Deep Linking allowing educators to easily integrate content from DLS into existing LMS courses.



Figure 1. Top 2 LMS Providers in the Market

DLS is certified with LTI compliance, allowing for seamless integration with the university LMS and providing easy access to a holistic end-to-end education journey from anywhere at any time via a secure SSO web interface. Visit <https://site.msglobal.org/certifications/keysight-technologies/keylab-digital-learning-platform> to find out more.

Deployment

Web-based (with SSO and LTI). DLS is on-premises software that is typically installed on a server or a virtual machine. Users authorization and authentication can be made in 3 ways:

1. Single-Sign-On
2. Learning Tool Interoperability
3. Manual Registration and Sign In

Licensing

Floating (based on concurrent users).

Licenses are hosted and managed in the same server where the DLS is installed.

Lab management

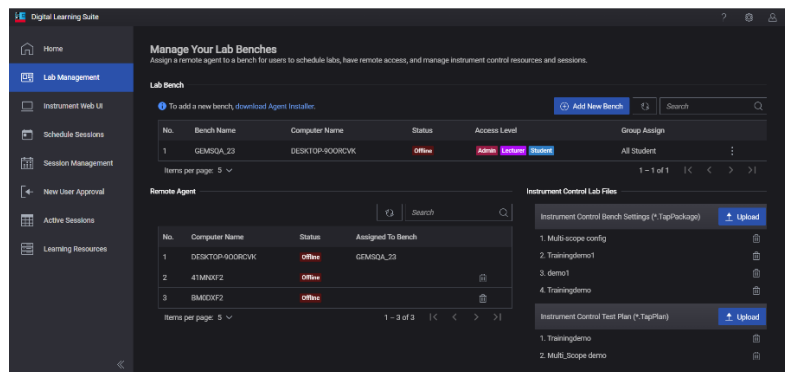


Figure 2. Available Lab Benches to connect

- Remote Lab Bench Management
- Bench Grouping and User-access Levels
- Multi-User Remote Access (Up to 5 concurrent users can remotely access a lab bench to work on projects remotely.)
- Chatroom features available
- File Transfer feature available
- Lab Scheduler
- Data Storage in Server

Lab Managers can add new and group benches for users to access remotely. Access levels can be set to enable or disable a group of students in accessing the bench and instruments remotely for collaboration.

DLS simplifies teaching in laboratories with multiple test benches. The Lab Management tab allows educators to have custom bench arrangements to configure lab layouts, number of benches, type, and number of instruments, and to name the benches accordingly to mimic the actual lab physical bench positions.

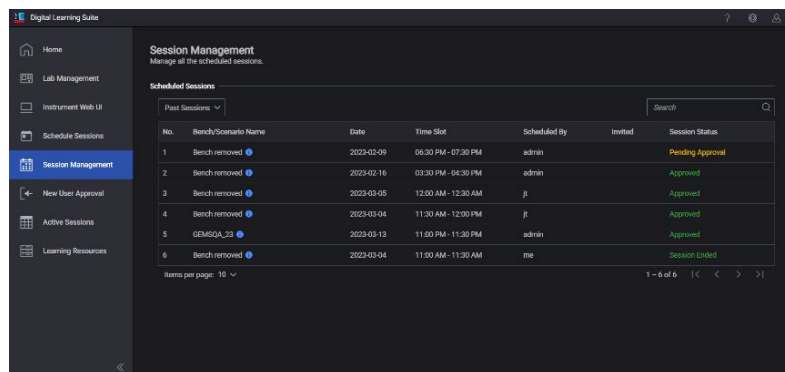


Figure 3. Admin View of Active Sessions or Past Sessions

Maximized Lab Resources Utilization

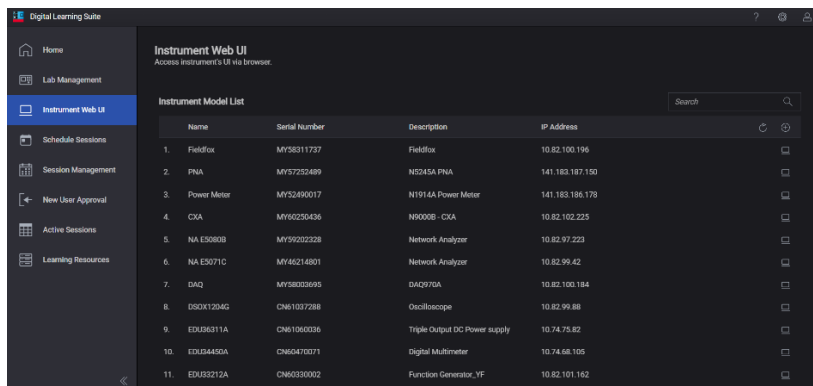
Instrument front panel

DLS has a built-in gateway to simplify access to these LXI instruments for both onsite and remote users. Users can now remotely access the instrument web server or access the application software in the instrument OS all through a browser without additional installations.

Typically, LXI instruments are equipped with a web server or an operating system that has additional functions:

- Instrument information
- Soft front panel
- Application software
- Taking screenshots
- Firmware update
- Send/query commands

Educators can now take a screenshot, plot measurement data to XY plots, perform math functions to XY plots, and more. These graphical charting tools enable educators to engage with students to visualize, compare, analyze and share test results.



The screenshot shows the 'Instrument Web UI' interface. On the left is a sidebar with navigation options: Home, Lab Management, Instrument Web UI (selected), Schedule Sessions, Session Management, New User Approval, Active Sessions, and Learning Resources. The main area is titled 'Instrument Model List' and contains a table with 11 instruments. Each row includes a number, name, serial number, description, and IP address. To the right of each row are icons for screenshot, zoom, and refresh.

	Name	Serial Number	Description	IP Address
1.	Fieldfox	MY36311737	Fieldfox	10.82.100.196
2.	PNA	MY37352489	N1245A PNA	141.183.187.150
3.	Power Meter	MY32490017	N1914A Power Meter	141.183.186.178
4.	CXA	MY60256436	NR000B - CXA	10.82.102.225
5.	NA E5080B	MY90222328	Network Analyzer	10.82.97.223
6.	NA E5071C	MY46214801	Network Analyzer	10.82.99.42
7.	DAQ	MY38030995	DAD275A	10.82.100.184
8.	D50X120AG	CN61037288	Oscilloscope	10.82.99.88
9.	EDUB6311A	CN61060036	Triple Output DC Power supply	10.74.75.82
10.	EDUB4490A	CN60470371	Digital Multimeter	10.74.68.105
11.	EDUS2212A	CN60330002	Function Generator_YF	10.82.101.162

Figure 4. Lab Instruments connected to Digital Learning Suite

DLS can connect to instruments linked to lab benches in the local network or directly connect to the instrument's soft front panel as shown below.

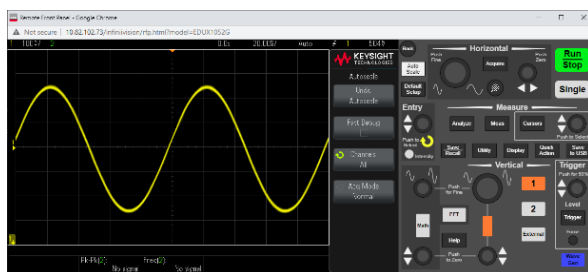


Figure 5. Oscilloscope Web UI

Keysight instrument

Pre-defined Instrument Controls and EDA:

TrueVolt DMM
DC Power Supply
Trueform Waveform Generator
InfiniiVision Oscilloscope
DAQ97x

Fieldfox A/B (SA, NA Mode)

Signal Analyzer X-Series (SA Mode)
Signal Generator X-Series / RF
Network Analyzer (NA Mode)
SystemVue, ADS, VSA

Adding non-Keysight instrument with Python, SCPI, C#

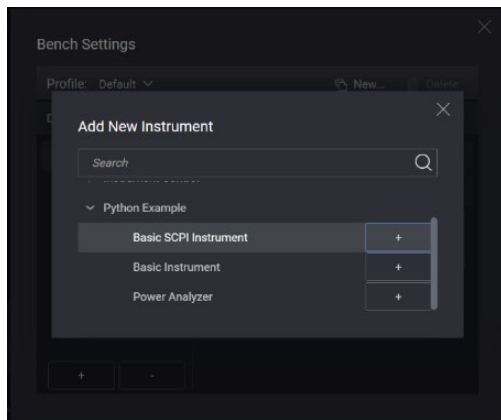


Figure 6. Add-in Non-Keysight Instrument with SCPI

One of DLS's key strengths is that it does not have instrument restrictions to connect. DLS supports non-Keysight instruments and achieves the same actions via SCPI commands. The built-in test sequencer (Open Tap EditorX) allows for repetitive commands like taking multiple screenshots, plotting multiple data points, or performing math operations to be completed with just a touch of a button.

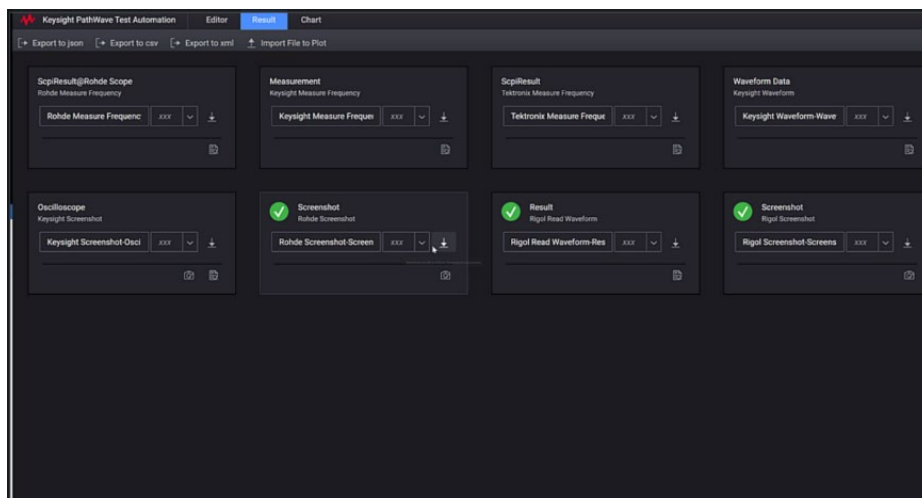


Figure 7. List of Different Brand Instruments Added into Bench

Enhance Teaching Workflow

Learning resources

There are a lot of hidden operating costs when running a university like a headcount, time, and program maintenance. It is not an easy task for the lead program to keep its program up-to-date and on par with Industry standards, especially when resources spent on developing effective programs are not negligible.

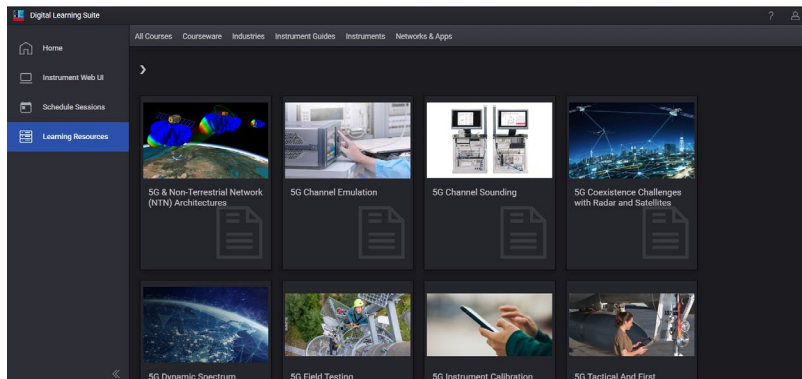


Figure 8. Learning Resources Page in Digital Learning Suite

With DLS, educators and students can now have access to thousands of on-demand industries-relevant learning resources from Keysight technical experts.

- Keysight University Courses
- Instrument User Manuals
- Premium Lab Sheets (RF, IoT, Digital Communication, etc.)

All content can be easily integrated into University LMS via **LTI Deep Linking**

The rich library consists of content in various formats such as videos, application notes, and lab lessons, among others. As a one-stop platform that provides an end-to-end teaching journey to educators, DLS allows educators to save time when designing their syllabi through these resources.

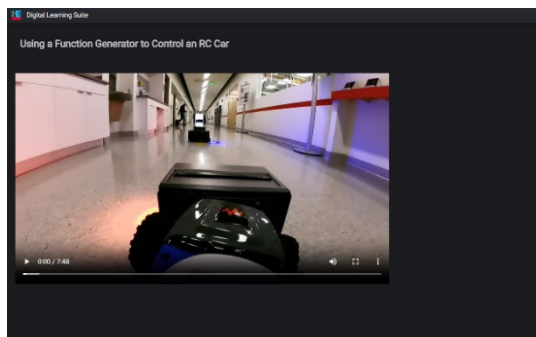


Figure 9. Content in Video Format

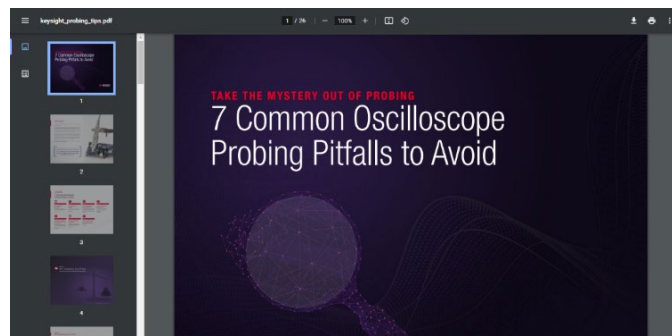


Figure 10. Content in Document Format

Result viewer, result analysis and plotting

- An integrated result viewer to view and export your measured results, screenshots, or files.
- A versatile charting tool to visualize your measurements from different instruments, apply mathematical operations, and compare your results with simulated data (CSV, SNP, MAT)

Measurement, plotting, math equation

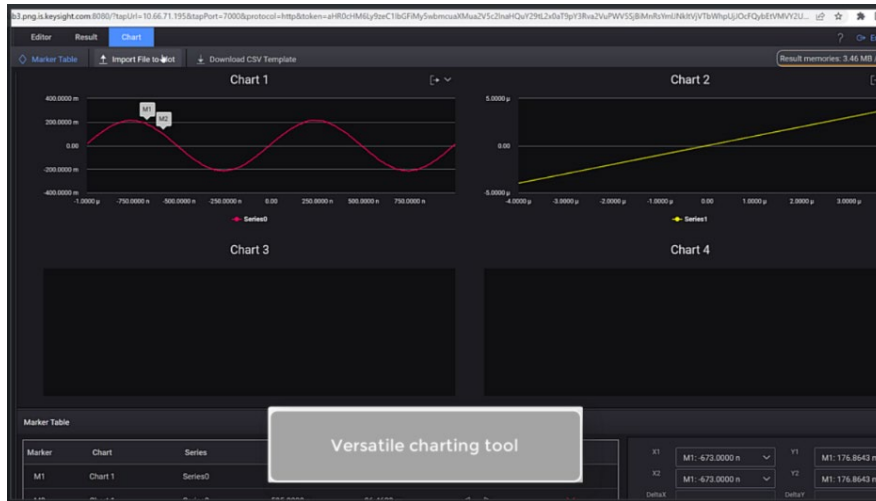


Figure 11. Test Sequencer with Charting Tool

DLS improves the lab workflow by up to 10x faster compared to the traditional lab setting. It also gives educators up to 3x more asset utilization via a streamlined process, as all lab equipment can be seamlessly managed through DLS.



Figure 12. Calculate Delta Value from the Graph

System Requirements

Item	Recommended	Minimum
RAM	32 GB RAM or higher	16 GB RAM or higher
Hard Disk Space	256 GB free disk space for the general operating system	30 GB free disk space for the SR101EDUA installation directory
Processor	64-bit, Quad-core CPU	
Operating System Requirements	Ubuntu Linux 20.04 LTS	
Virtual Machine Hypervisor Supported	Oracle VM VirtualBox Manager (Windows 10)	
Others	Requires Internet access	

Software Requirements

SR101EDUA deployment tool (contact your local Keysight representative)

NOTE

You will need a Microsoft Windows 10 machine to run the SR101EDUA deployment tool. Use the Keysight SR101EDUA Install Wizard to install all required software.

Software System requirements

Required 3 rd party software for installation	Ubuntu ISO (https://releases.ubuntu.com/20.04.5/ubuntu-20.04.5-live-server-amd64.iso) FileZilla (https://filezilla-project.org/download.php?type=client) VirtualBox (https://www.virtualbox.org/)
Supported LTI compliant LMS platforms integration	Moodle v3.9 and above Blackboard Canvas For other LTI compliant LMS platforms, please contact Keysight Technologies for further information
Supported web browsers	Microsoft Edge v107.0.1418.62 and above Google Chrome v108.0.5359.94 and above Mozilla Firefox v107.0.1 and above

Ordering Information

Solution number	Description
PW9300EDU	SR101EDUA Hybrid Collaborative Learning Module
KS8400EDU	SR101EDUA Test Sequencing & Control Module

SR101EDUA – License Types and Terms

Model number	Description	
PW9300EDU	R-X4Y-002-L	Floating (single site) license, 12-months subscription-based with KeysightCare software support
	R-X4Y-002-X	Floating (single site) license, 24-months subscription-based with KeysightCare software support
	R-X4Y-002-Y	Floating (single site) license, 36-months subscription-based with KeysightCare software support
KS8400EDU	R-X4Y-002-L	Floating (single site) license, 12-months subscription-based with KeysightCare software support
	R-X4Y-002-X	Floating (single site) license, 24-months subscription-based with KeysightCare software support
	R-X4Y-002-Y	Floating (single site) license, 36-months subscription-based with KeysightCare software support

Further Information

Please visit our solution page for more information:

<https://www.keysight.com/us/en/product/SR101EDUA/digital-learning-platform.html>



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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