UNIVERSAL ROBOTS
A Teradyne Robotics Company

Hardware

Software

Training & Certification

LMS & Curriculum

Education Program

Empowering tomorrow's workforce

Accelerate careers
in manufacturing

Manufacturing is changing faster than ever, and today's students need to master new technologies to prepare their careers. These technologies redefine ways of working in every industry and generates millions of new job opportunities along the way.

Without professionals specialized in different fields of automation, these industries will not grow to their potential. Offering students skills in manufacturing and automation does more than create exciting education experiences – it is essential for the global economy too.

Accelerate your students' careers in manufacturing by building their skills to deploy, program, and operate robotic systems, while building core competencies in programming and problem solving. Our Education Program puts real industrial collaborative technology in your classroom, offers a certification program for both teachers and students, and delivers modular course curriculum through UR Academy.

We will help your public or private school, college or university embrace the changing world of work and give your students hands-on experience of designing, implementing and maintaining robotics and automation solutions. Our quality training is adapted to the changing challenges of Industry 5.0 and the needs of tomorrow's employees in the industrial sector.

In 2008, we pioneered the first commercially viable lightweight collaborative robots. They are flexible, simple to program, and laid the foundation for affordable automation for companies of all industries and sizes. Today, with our 6th generation cobot on the market, we are a well established leader in collaborative robotics. Our robots continue to free employees from dangerous, dirty, and dull tasks, and create new and exciting career paths in industrial automation. Over **100,000 Universal Robots** work side by side with humans around the world, and over **3,500 educational institutions** trust Universal Robots technology for up-skilling the next generation of our global workforce.

> **Cobots are perfect in teaching environments, not just for safety reasons but also because of their easy programming software and flexible approach."**

Giacomo Palmieri
Professor, Università Politecnica delle Marche, Italy

Sign up to the Education Program:
universal-robots.com/industries/education-science

The Universal Robots Education Program:
What we offer

Our robotics program brings collaborative robotics to life in your classrooms. It gives your students hands-on, practical experience of designing, implementing and maintaining the kind of automation solutions that are redefining the world of work today.

The modular program contains everything you need to start delivering innovative and effective robotics courses:

> **The collaborative robots are benefitting our learners, the college and local manufacturers as we look to upskill and increase opportunities for the valued manufacturing workforce in the UK.**

Barry Skea
Head of Science & Technology, New College Lanarkshire, UK

Cobot & Hardware

Place innovative cobot technology into the hands of your students. Choose from a selection of UR recommended accessories like grippers, conveyors, sensors, and training parts to simulate different industrial environments and enable diverse reserach and education needs.

Software

Time in the classroom is precious, therefore ease of use is critical when introducing students to a new technology. UR's Polyscope provides an intuitive programming interface for beginner to advanced users. Enable teaching in the classroom with URSim and compatible UR+ partner software platforms.

Teacher Training & Certification

Our specialized teacher training program provides teachers with the opportunity to gain knowledge and confidence in robotics use and application in industry. Through the program, teachers become certified to train and certify their students with an industry recognized certification from UR.

LMS & Curriculum

We provide a range of industry leading training content, including course materials that address core competencies around robotics and automation, practical work and exercises, exams and solutions for teachers to track student performance. This content is accessed and managed through UR's Learning Management System (LMS) for easy course delivery and management.

Cobot & Hardware

Robotics isn't something abstract to be studied from a distance – it's something that requires hands-on experience, experimentation and play. That's why UR's modular hardware package makes it easy to reproduce a variety of common robot deployments in your learning environment. UR's hardware enables schools to teach technical knowledge about automation with practical and contextualized learning outcomes.

Students are eager to get their hands on a robot and play with it. They appreciate the easy setup – as well as how easy they can then attach their own hardware or software developments to it."

Christian Schlette
Professor, Vice section head, SDU Robotics, Denmark

Hardware options include:

- A Universal Robots Cobot:
  e-series: UR3e, UR7e, UR12e or UR16e
  UR series: UR18, UR15, UR30, UR8L, UR20

- A conveyor belt with corresponding sensors

- 3D printed training plates for simulating different applications

- An I/O simulator for digital inputs, outputs, and safety inputs

- Gripper of choice from the UR+ ecosystem of partners

- Other peripheral devices and accessories from the UR+ Ecosystem to meet your unique education goals
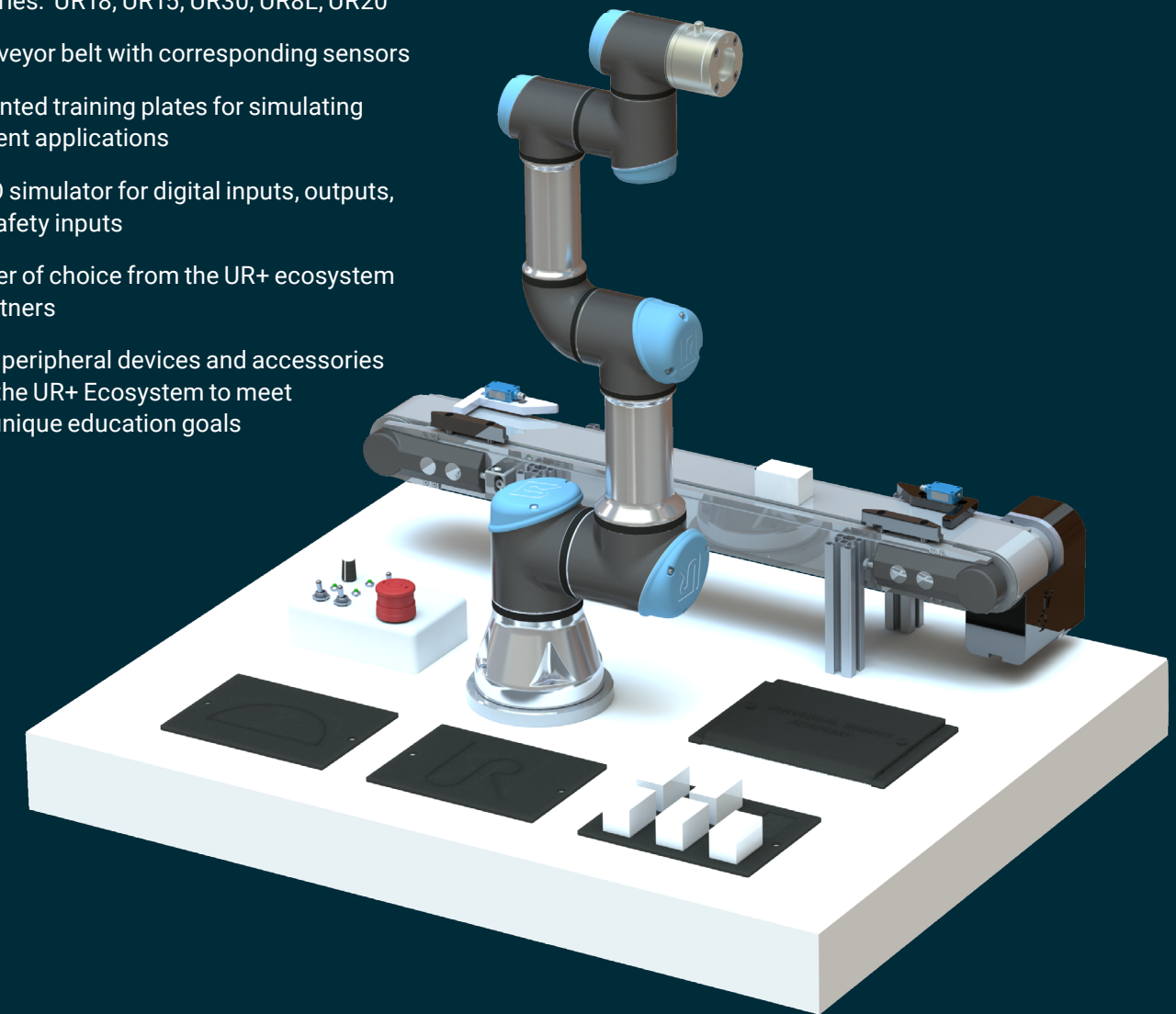
UR+ Ecosystem

Explore educational solutions, components, and kits from UR+ Ecosystem partners like:

SICK, Schunk, SMC, Festo Siemens, OnRobot, Robotiq, and more!

Scan to visit the UR Marketplace
Or visit: universal-robots.com/ marketplace/products

" In my opinion, the ability to connect the cobot with any other device, real or simulated, makes students customize the work they want to do, which increases their motivation."

Jose Maria Sabater Navarro
Teacher, Catedrático de Universidad, Universidad Miguel Hernández de Elche, Spain

" Having modern technology, such as robots, available at our university allows students to be trained in a field that is in high demand and it allows companies to use the university as a robotics training facility for their own staff."

Thomas Carron
Student, France

Collaborative robots are designed to transform manufacturing and production environments. They are also transformative tools for the classroom.

Fit for classrooms

UR's robot arms are designed to automate in tight spaces. We've removed many pinch points found in traditional robots, and our lightweight, small-footprint robot arms minimize the risks of working with robots in group settings, often eliminating the need for costly safety fencing required with traditional industrial robots. Universal Robots also runs on standard 110V / 230 V power, making it easy to move a cobot station between classrooms or across campus.

Modular & flexible

Build a flexible education solution that meets local industry needs and changes with them. Through the UR+ ecosystem, add on components and accessory kits to expand your teaching capabilities to meet beginner to advanced education needs.

Minimal maintenance

UR's cobot joints are sealed, self-contained, and self-lubricated for life, meaning teachers and students can focus on learning year after year and not on equipment maintenance.

Easy to use

Powered by UR's in-house developed software, Polyscope, programming robots has never been easier. The touchscreen teach pendant provides an interactive and intuitive interface for programming. Whether you are a beginner or an expert, users appreciate the real time interactive 3D models, program logic, and wizards. Not to mention Polyscope updates are free for life, so your students always have access to the latest software.

Industrial quality

Teach students on the technology used by industry to best prepare them for the modern workplace. UR is one of the original pioneers of cobot technology, and with over 100,000 cobots deployed globally, has remained one of the most trusted brands on the market.
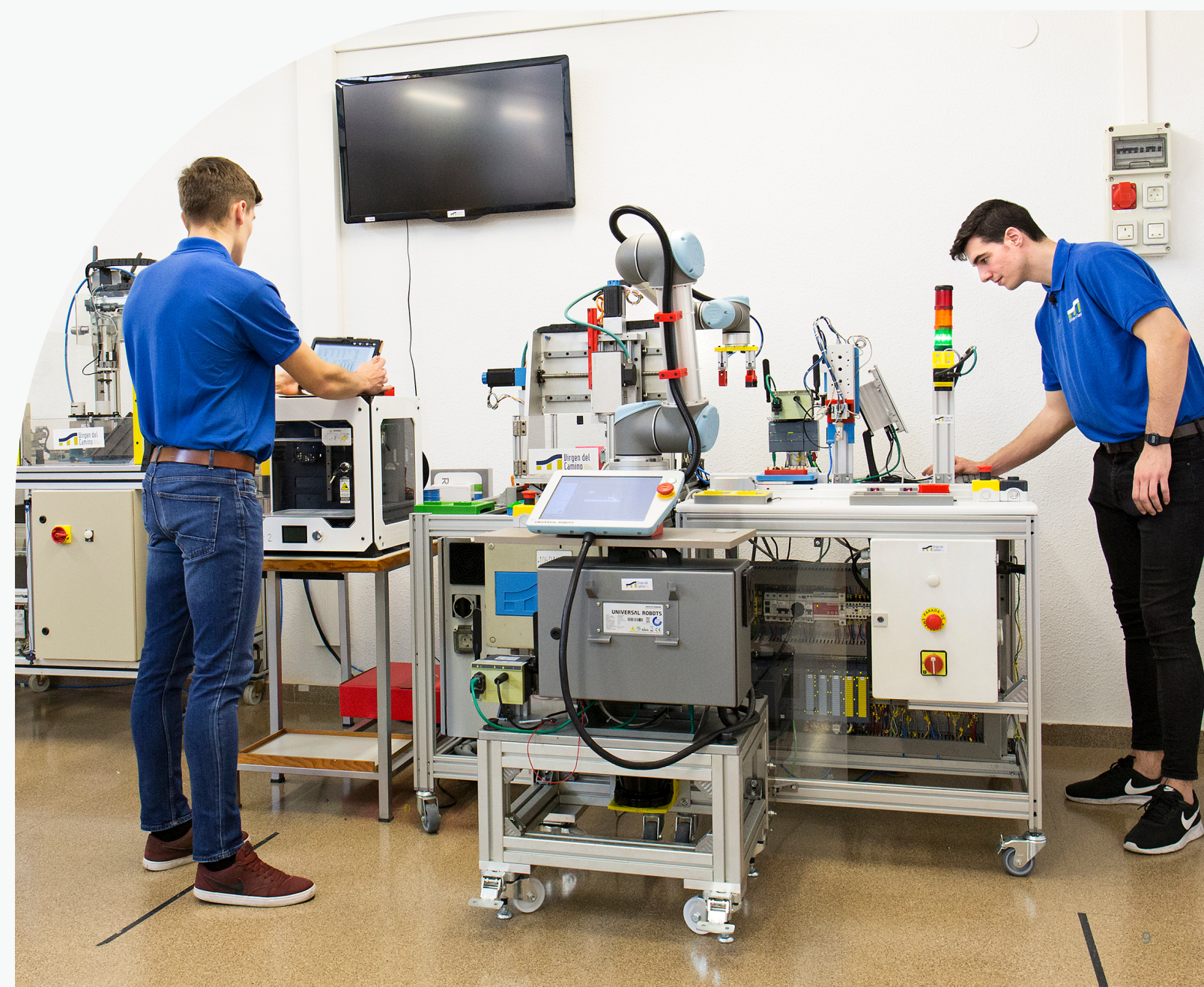
Software

PolyScope5

An intuitive programming interface for first time robotics users, and deep functionality & features for advanced applications.

- **Node programming** - visualize the program through a tree diagram. Add icon represented elements to define motions, waypoints, and commands

- **Free Drive** - interact with the robot by manually moving the arm to the perfect position to define waypoints

- **Safety features** - use one of the preset safety configurations or customize using the safety toolbox

- **Force-Torque Sensor** - program the robot to sense or apply a user-defined force using the integrated sensor

- **UR Caps** - add advanced functionality into Polyscope for components and applications. Develop your own or access the library of UR Caps available through our UR+ partners

- **UR Script API** - a python based script language allowing users to write advanced functions

PolyScope X

Universal Robots latest software operating system launched in 2024. PolyScope X features:

- **Enhanced user interface** - designed to reduce the learning curve and improve workflow efficiency

- **Advanced programming capabilities** - enhancing scripting options and support for more complex automation tasks

- **Seamless integration** - connect and manage various automation components though a single platform

Simulation

While UR prioritizes hands-on experience, we also know that classroom time can be limited for students. UR's free offline simulator enables writing and testing of programs away from the robot. The programs created in URSim on a PC can be transferred to the cobot and tested in real-life.

Access the free URSim Docker
Or visit: hub.docker.com/u/ universalrobots

- **UR Studio (NEW!)** - web-based digital twin environment for offline programming and simulation on the PolyScope X platform

Try UR Studio for free
Or visit: universal-robots.com/ products/ur-studio

External Interfacing

Universal Robots are built on an open source platform, enabling interfacing with 3rd party tools so that you can program the robot your preferred way:

Python, C++, ROS, ROS2, MATLAB, RoboDK

> " It's quite ergonomic, like a phone app for example. I am familiar with all programming, scripting, where you work step by step. On the cobot, we program the steps, movement, gripping systems, etc… It's quite interesting. It's much easier and faster to implement than traditional robots."

Thibault Tunzin
Bachelor student, BTS, lycée Pierre–Emile Martin, France

Learning Management System (LMS)
& Curriculum

In addition to the UR Academy free e-Learning content, UR offers educators an in-house Learning Management System (LMS) – a product exclusively developed to support our customers in education. The LMS provides a web-based platform for teachers & students to access and manage learning content.
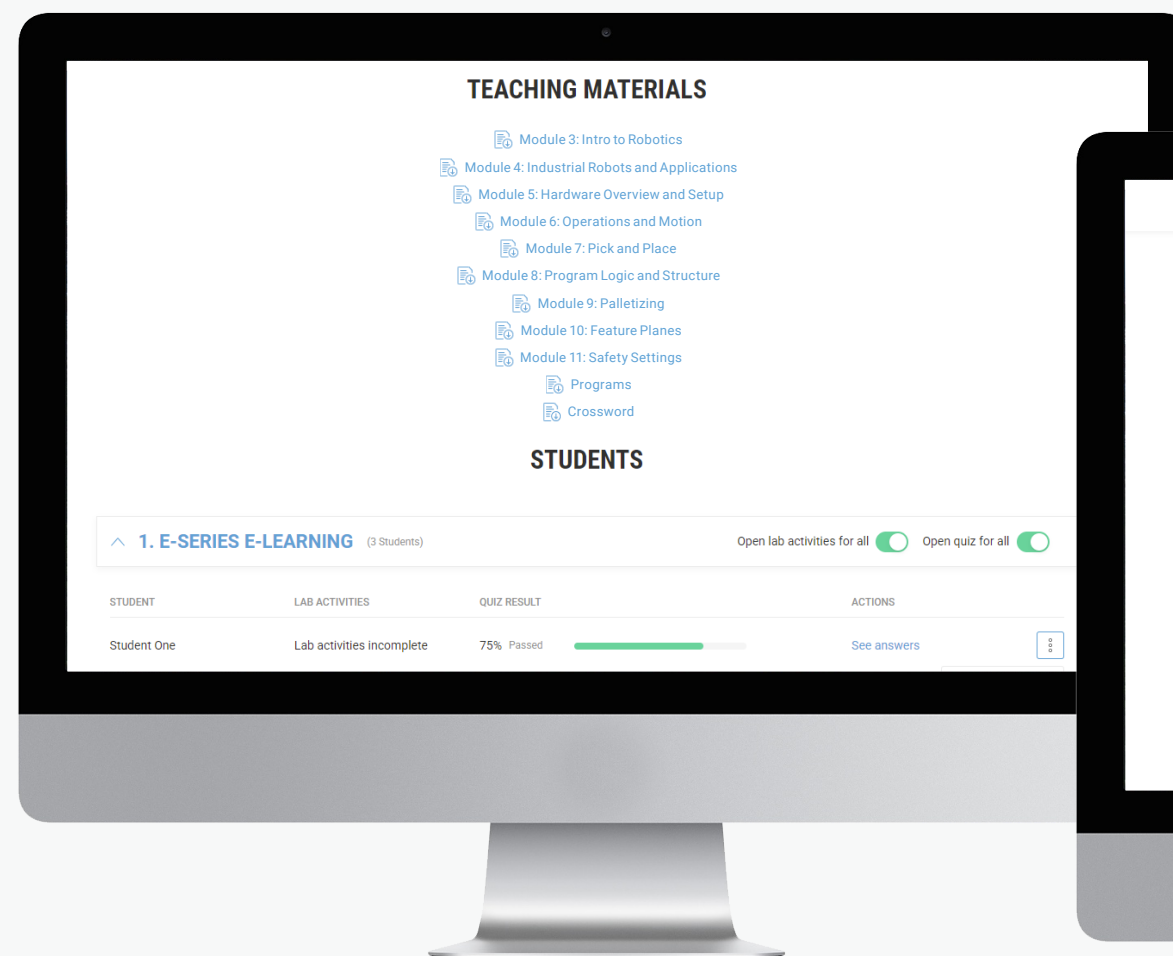
Its features include:

• Create classes with start/end date duration

• Assign learning modules to students

• Student and teacher access to training materials and lab activities

• Monitor learning modules, student progress, and knowledge checks
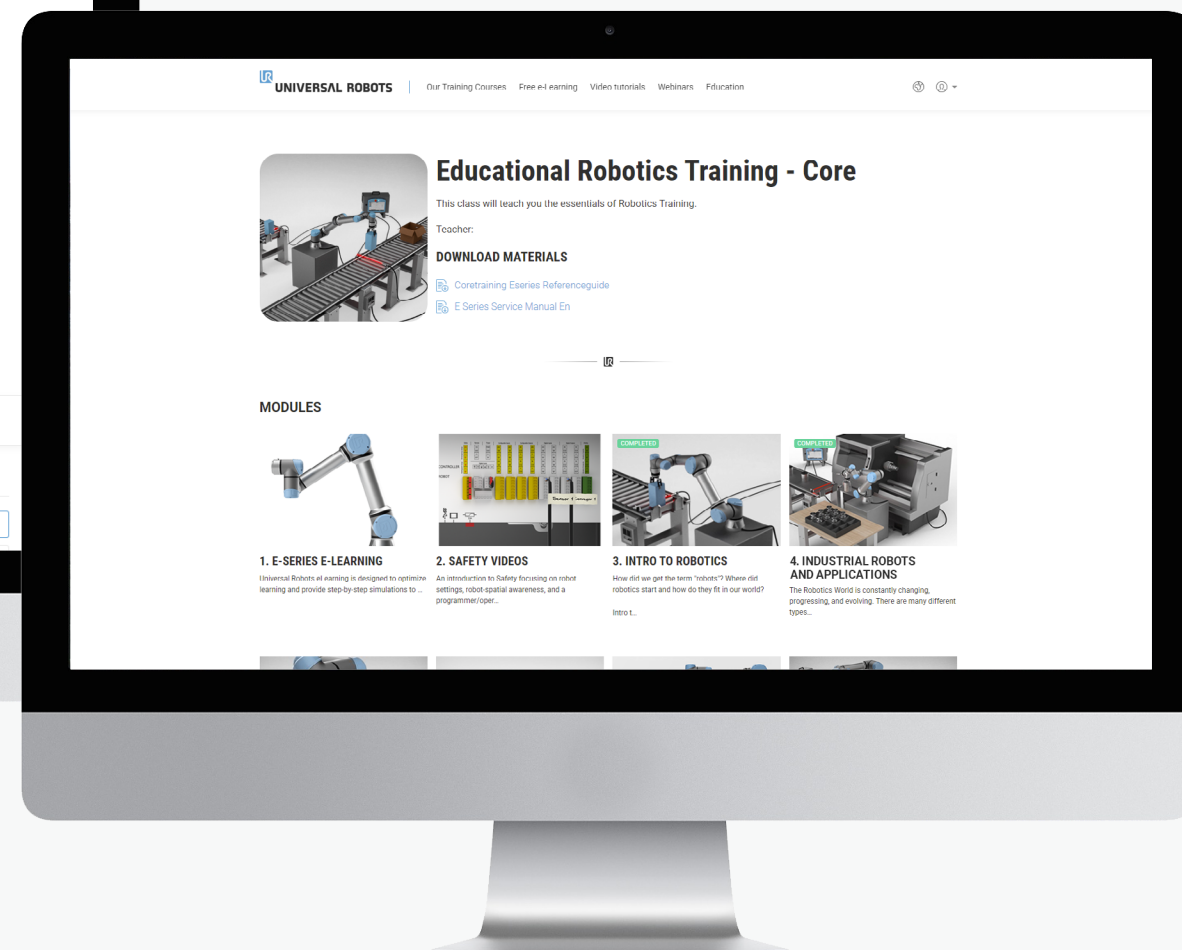
• Traceable certification of successful students

The UR Academy team is continually updating and adding more features and content to the LMS platform to ensure schools, teachers, and students are provided with industry relevant knowledge.

> Teachers to access teaching material and follow the progress of students enrolled in the class.

< Students to see their available training modules and their progress.

TEACHING MATERIALS

Module 3: Intro to Robotics
Module 4: Industrial Robots and Applications
Module 5: Hardware Overview and Setup
Module 6: Operations and Motion
Module 7: Pick and Place
Module 8: Program Logic and Structure
Module 9: Palletizing
Module 10: Feature Planes
Module 11: Safety Settings
Programs
Crossword

STUDENTS

1. E-SERIES E-LEARNING (3 Students)
Open lab activities for all
Open quiz for all

STUDENT	LAB ACTIVITIES	QUIZ RESULT		ACTIONS
Student One	Lab activities incomplete	75% Passed		See answers

Educational Robotics Training - Core

This class will teach you the essentials of Robotics Training.

Teacher:

DOWNLOAD MATERIALS

Constraining Esenies Referenceguide
E Series Service Manual En

MODULES

1. E-SERIES E-LEARNING
Universal Robots eLearning is designed to optimize learning and provide step-by-step simulations to …

2. SAFETY VIDEOS
An introduction to Safety focusing on robot settings, robot spatial awareness, and a programmer/oper…

3. INTRO TO ROBOTICS
How did we get the term "robots"? Where did robotics start and how do they fit in our world?
Intro t…

4. INDUSTRIAL ROBOTS AND APPLICATIONS
The Robotics World is constantly changing, progressing, and evolving. There are many different types…

Curriculum

We want to make it easy for you to show your students the possibilities that robotics offer. That's why we offer high quality learning resources - developed by Universal Robots team of expert application engineers and trainers. Our resources range from Free e-Learning content to structured curricula.
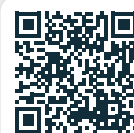
Your Learning Journey Starts Here

You and your students can sign up for UR Academy to access 35 FREE e-Learning lessons - 8 hours of on demand, self-paced, interactive lessons are available in 14 languages.

Recommended learning tracks:

- e-Series Core Track
- e-Series Pro Track
- e-Series Application Track
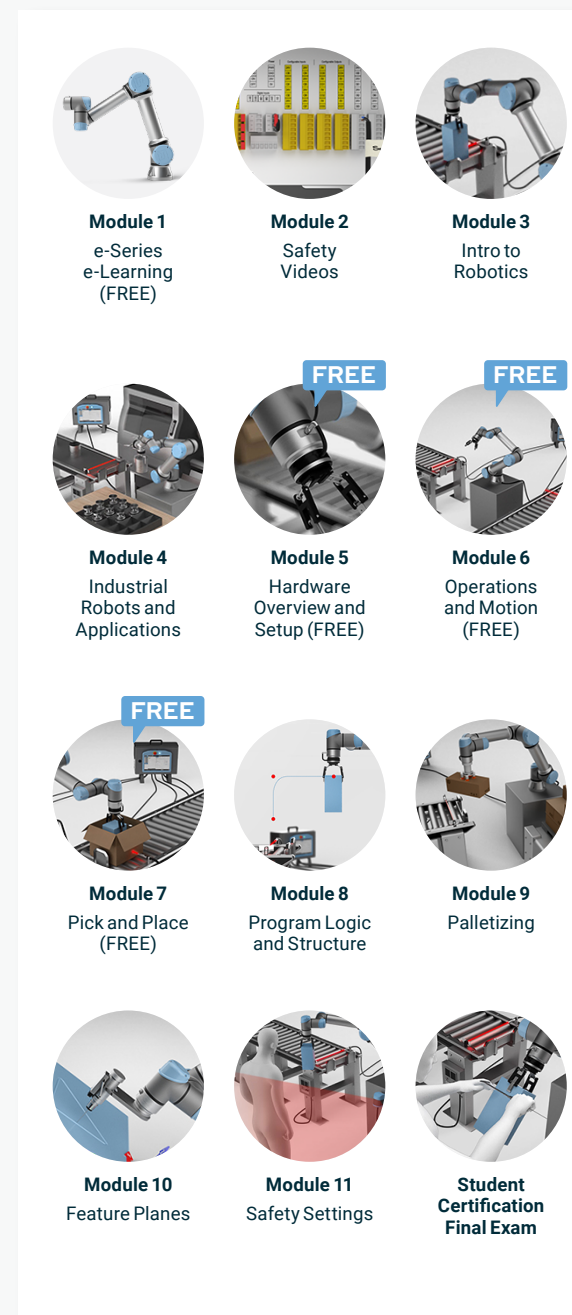- Risk Assessment

FREE e-Learning

Scan to access FREE e-Learning
Or visit: academy.universal-robots.com/free-e-learning/

> **The Academy has added a considerable number of resources over the past few years. The online access, Power Point Presentations, quizzes, videos, notes and the labs that integrate the UR platform online and in the remote academies is awesome. The video tutorials are another excellent resource to use in the classroom."**

Nils Anderson
Robotics Instructor, ONC BOCES, USA

Module 1 — e-Series e-Learning (FREE)
Module 2 — Safety Videos
Module 3 — Intro to Robotics

Module 4 — Industrial Robots and Applications
Module 5 — Hardware Overview and Setup (FREE) — *FREE*
Module 6 — Operations and Motion (FREE) — *FREE*

Module 7 — Pick and Place (FREE) — *FREE*
Module 8 — Program Logic and Structure
Module 9 — Palletizing

Module 10 — Feature Planes
Module 11 — Safety Settings
Student Certification Final Exam

Educational Robotics Training – CORE

Deepen your students learning with the UR Educational Robotics Training - CORE curriculum, which builds on the free e-Learning resources & UR Core industrial training class and is accessible through the UR Academy LMS platform. The UR Educational Robotics Training - CORE curriculum provides 11 learning modules, complete with lecture content for educators, and hands on lab activities & quizzes for students. Teach all 11 modules in sequence to deliver the entire curriculum - approximately 32 contact hours of training - or choose to teach less modules if you have limited time.

The UR Educational Robotics Training - CORE covers fundamental concepts from configuring end effectors, connecting inputs and outputs, writing basic programs, and applying safety functions to robotics.

3 Sample Modules

Gain access to 3 FREE instructional PowerPoint modules to teach your students the basic operation of the robot and how to build a basic pick and place program.

Sign Up Here

Scan to sign up for UR Academy as an Educator to access 3 free ppt modules from the Educational Robotics Training - CORE
Or visit: academy.universal-robots.com/education/free-materials

Hands-on activities and quizzes

Activities are designed to replicate real-world scenarios and cobot applications to help your students be as prepared as possible for their careers. Lab activities include a quiz at the end to validate your students learning progress. Enable or disable lab activities and quizzes for a given module and track each students progress in the LMS.
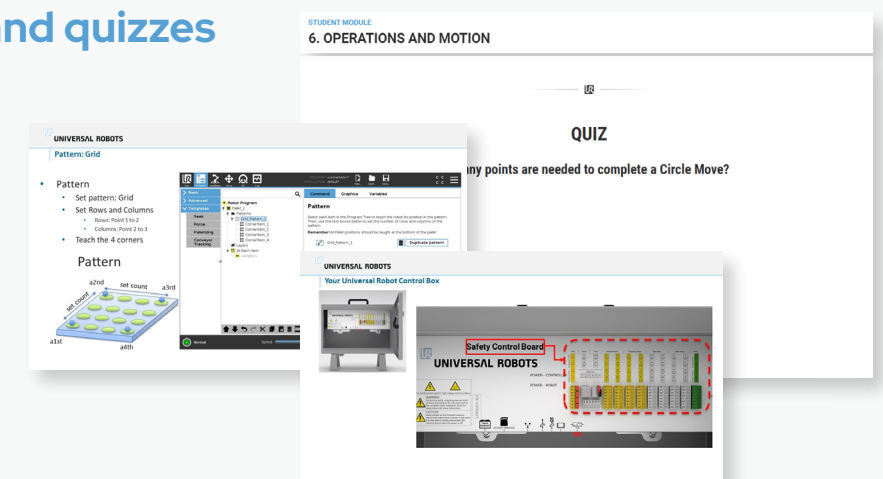
Teacher Training & Certification

The UR Education Program provides educators with the opportunity to upgrade their knowledge and teaching skills. Understanding that our customers in education have different needs from industry, the teacher training course is designed to help teachers to become cobot experts fast. The training is structured into a 2-part training course for a total of 4 training days:

- 2 days UR Core Training - completed in person at Universal Robots or a local Authorized Training Partner (ATP) or online – the industry recognized technical training offered to all UR customers

- An additional 2 days of Teacher Training - completed in person or online - an exclusive class offered to educators who want to learn how to effectively apply their teaching skills on Universal Robots. Delivered by a certified UR trainer, teachers are coached on how to use and teach the different characteristics and functions of cobots in real industrial environments. Throughout the class, teachers are offered the opportunity to network with, share and receive feedback from other educators.

Teacher certification

Upon completion of the Teacher Training Course, educators will receive an industry recognized UR Academy Certificate which:

- Recognizes the instructor as a UR certified educator and their institution as a Certified Educational Training Partner

- Provides access to the LMS & all modular content

- Enables the UR Curriculum to be taught to their students

- Enables teachers to issue UR certifications to their students who successfully complete the UR curriculum and testing

Your student's certification

The certification earned by students demonstrates to potential employers that a student has an industry recognized level of competency in the specialty of robotics. The following learning outcomes are tested:

- Build and optimize programs for several typical applications such as pick & place and palletizing

- Connect and handle peripheral equipment, such as sensors, grippers or conveyor belts

- Use online tools to help with application programming

- Understand and can apply robot safety

> **"I attended a train-the-trainer remote learning course where the trainer showed me all the capabilities of UR Academy. I am thoroughly impressed with the quality of the training materials that I received."**

Adam Paisie
Robotics & Automation Instructor, Delaware, USA

Advanced Education & Research

Universal Robots understands the needs of researchers and developers—because our journey began at Southern Denmark University, where our technology was first conceived to solve real world challenges. Built on an open-source platform, Universal Robots encourages sharing, collaboration, and innovation across the global academic and research communities. Our Developer Suite and advanced robot features are designed to empower you to, learn faster, accelerate discovery, and contribute to the future of robotics.

> "We have created the UR Developer Suite so that you have the tools and knowledge needed to innovate and integrate with ease. It is an online database comprising of everything you would need to develop with our cobots."

Søren Poll Bendtsen
Global Product Manager, Developer Tools at Universal Robots

Universal Robots Developer Suite

For researchers, developers, and academics who need a comprehensive, free toolbox for robot application development, the Universal Robots Developer suite provides software, hardware, and interface resource to accelerate innovation and integration with UR cobots.

URCap tools

Tutorials | API Ref | URSim | SDK

PolyScope 5

5

PolyScope X

API Ref | URSim | SDK | UI Kit

X

URScript tools

Script manual

Tutorials

Communication protocols

Control & intergration interfaces

Dashboard Server | Primary/Secondary interface | Real-time interface | Interpreter mode

RTDE | Socket TCP/IP | ROS/ROS2 driver | XML-RPC

Fieldbus protocols

Modbus | EtherNet/IP

SRCI | PROFINET/ PROFISafe

Hardware & Robot motion

Mounting & installation

Robot arm | Teach pendant | Control Box

Electrical interface

Tool Connector | Control Box

CAD files

CAD files

Robot motion

DH Parameters | Path offset | Payload & working area

Scan to see the full Developer Suite offering:
Or visit: universal-robots.com/developer

Software Tools

UR Script - Universal Robot's scripting language which provides low-level control of Universal Robots, enabling custom motion commands, advanced algorithms, and integration with external devices.

SDKs (Software Development Kits) - Universal Robots SDKs empower advanced users to develop, extend, and customize robot applications, user interfaces, and integrations. SDKs streamline development, support advanced functionality and enable seamless deployment of new features on UR robots.

APIs (Application Programming Interface) - offer researchers and advanced users robust, documented access to robot functions and data, facilitating real-time communication, monitoring, and control. APIs enable flexible integration with external systems and support scalable, interoperable robotics research and development.

Robot Tools

Mechanical Interfaces - available CAD files for digital twin environments - design your own base and end effectors.

Electrical Interfaces - connect electrical devices through the M8 tool connector or the control box.

Fieldbuses - The robot supports multiple fieldbuses for connecting external PLCs or IPCs.

Direct Torque Control – for researchers and academics who need advanced control capabilities - implement your own control algorithms seamlessly using low–level servo, speed, or direct torque control via UR Script. Use URScript functions to retrieve mass matrix, coriolis and centrifugal forces, jacobians, and more.

$$M(q)\ddot{q} + C(q,\dot{q})\dot{q} + F(\dot{q}) = \tau - G(q)$$

AI Accelerator – a comprehensive toolkit for education and AI research. The AI Accelerator provides plug and play hardware. NVIDIA-powered AI libraries, and seamless integration with UR cobots via the PolyScope X platform. PolyScope X offers a modern web based front end for interacting with image-based systems and a cybersecure containerized back end, ready for cloud training.

Camera

Orbbec Gemini 335Lg – 3D Vision

NVIDIA

Mounting

Hardware accessories to mount AI Accelerator components on a PolyScope X powered robot

Compute box

Embedding NVIDIA Jetson Orin AGX 64GB

External Interface Tools

ROS Drivers - enable researchers to control UR robots directly from their ROS environment, supporting real-time communication at 2ms targets, motion commands, and safety-aware operations. This integration streamlines experimental workflows and allows full replacement of the teach pendant with ROS services for advanced robotics research.

RTDE Client Library - allows researchers to monitor and control UR robots from external systems via Ethernet. It provides real-time data exchange and command execution, making it ideal for building custom applications, logging experiments, and integrating UR robots into broader research platforms.

MATLAB for Universal Robots – Robotics System Toolbox provides tools and algorithms for designing, simulating, testing and deploying robotic applications.

ROS
ROS2

MathWorks®
Partner

A flexible program for a broad range of education needs

Hardware

Software

Training & Certification

LMS & Curriculum

The Universal Robots Education Program is designed to equip students, educators, and researchers with the hardware, software, and resources needed to prepare for the future of automation. By integrating collaborative robotics into classrooms and labs, we help learners - from beginners to advanced - develop essential skills in programming, problem-solving, and real-world automation.

Technical Education & Training:

- Hands on learning modules
- Industry-recognized certifications
- Relevant technologies for workforce development

## Advanced Education & Research:

- Cutting edge open source platform
- Developer tools
- Resources for academic exploration

From entry-level learners to advanced robotics experts, our program supports every stage of the educational journey. Together, we can solve the challenges of tomorrow and ignite a passion for innovation in every classroom and lab.

Sign up to the Education Program:

universal-robots.com/industries/education-science

Where education meets innovation:
Preparing students for an automated world.

| UR3e | UR7e | UR16e | UR12e | | UR18 | UR15 | UR30 | UR8 Long | UR20 |

e-Series

UR Series
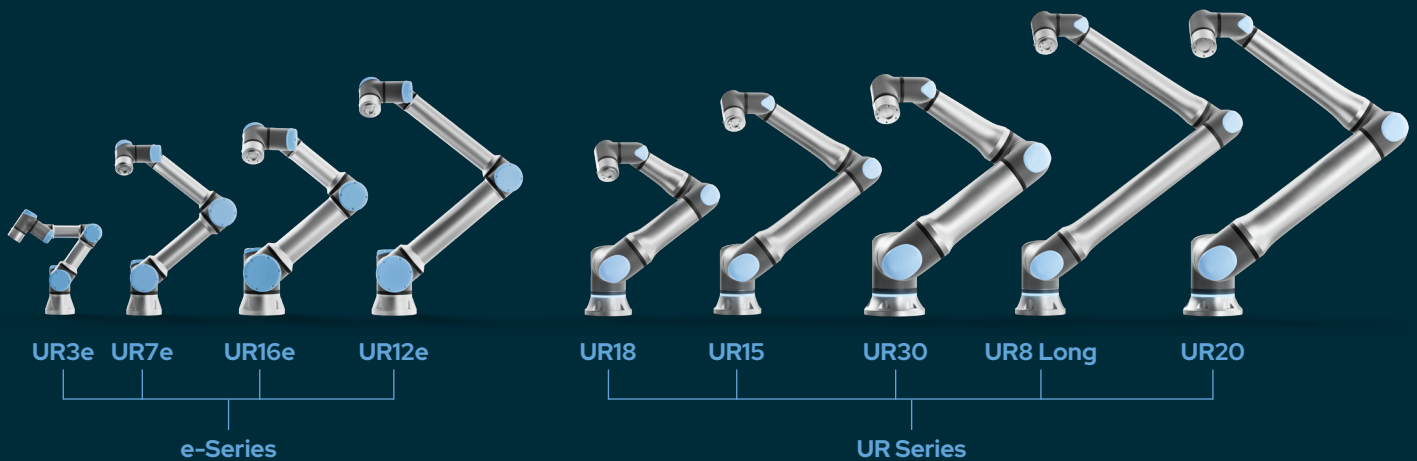
> " Robotics education is an essential skillset for the next generation of engineers, technicians, and operators. I think that exposure to robotics for my students is going to have a massive long-term impact."

Adam Paisie
Robotics & Automation Instructor, Delaware, USA

Contact us to get started today

universal-robots.com/industries/education-science