The Construct

BROCHURE

Robotics Developer

MASTERCLASS
BATCH 8 – SEPTEMBER 2025

From Zero to

Robotics Developer

Master Skills, Kickstart Your Career

STARTS ON

September 1, 2025

ESTIMATED TIME

1000 hours

for complete robotics developer readiness

FORMAT

Online

roboticsdeveloper.ai

Index

Overview	**3**
Program Schedule	**6**
Phase 1 – Robotics Developer Novice	6
Phase 2 – Robotics Developer Beginner	8
Phase 3 – Robotics Developer Experienced	10
Phase 4 - Robotics Developer Competent	12
Phase 5 – Robotics Developer Advanced	15
Phase 6 – Robotics Developer	17
Internship Placements	**17**
Job Hunting Program (NEW!)	**18**
Simulated Robots Used	**19**
Real Robots Used	**21**
Bonus Robotics Workouts	**26**
Frequently Asked Questions	**27**

Robotics Needs Developers

Overview

Robots are becoming an essential part of our world. As a result, there is a massive demand for robotics developers to create solutions to everyday problems.

The challenge is that robotics engineering is multidisciplinary and difficult to learn. So we have built the **Robotics Developer Masterclass** **to help you master robotics development from scratch and GET YOU 100% JOB-READY to work at any robotics company.**

Completion Time

1000 hours to acquire all skills.

Join **Masterclass Batch 8 on September 1, 2025** and pace yourself through the 1,000-hour program. See the table below for duration based on weekly commitment.

WEEKLY TIME COMMITMENT	COMPLETION TIME IN MONTHS
40 hours	6 months
30 hours	8 months
20 hours	12 months
10 hours	24 months

Assessment

During the program, students must complete the exercises and projects in each phase. In the final project, they must apply all knowledge learned and present it to all tutors. Students who pass the final project will receive a certificate.

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Course starts on:
September 1, 2025

Spots:
Only 300 students

Format:
Online

Evaluation language:
English

This Masterclass program is available in four languages:
English, Spanish, Japanese, Korean

Tutor meetings, extra C++ live classes, and Discord channel only in English

Prerequisite:

- **Linux knowledge:** Take this free course to learn Linux essentials for robotics.
- **Python 3:** Take this free course to learn Python essentials for robotics.
- **Basic maths:** Check out this course to learn essential math concepts for robotics.

CLASS HIGHLIGHTS

Key Takeaways

Learn to **build robot apps** in an actual integrated development environment

Gain **in-demand robotics skills** in a Fast-growing industry

Practice with both **simulated & real robots**

All courses are based on **hands-on exercises & projects**

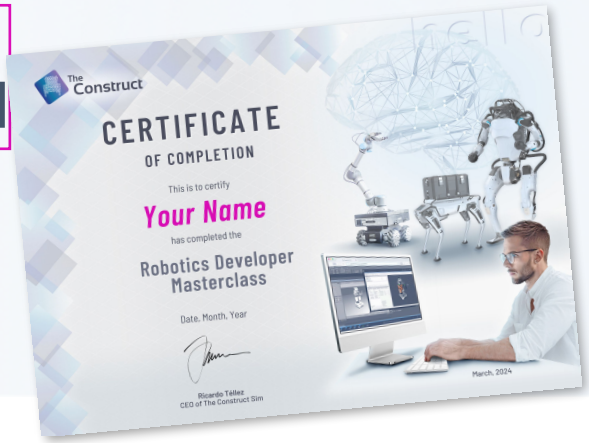
Walk away with a **robotics portfolio** project to share with potential employers

Internship opportunities in robotics companies to apply what you have learned in the real world

ACCOMPLISHMENTS

Learn, Practice, Get Certified

Get recognized! This program is graded as pass or fail; students will receive a certificate of completion issued by The Construct after completing the final project and passing the final exam.



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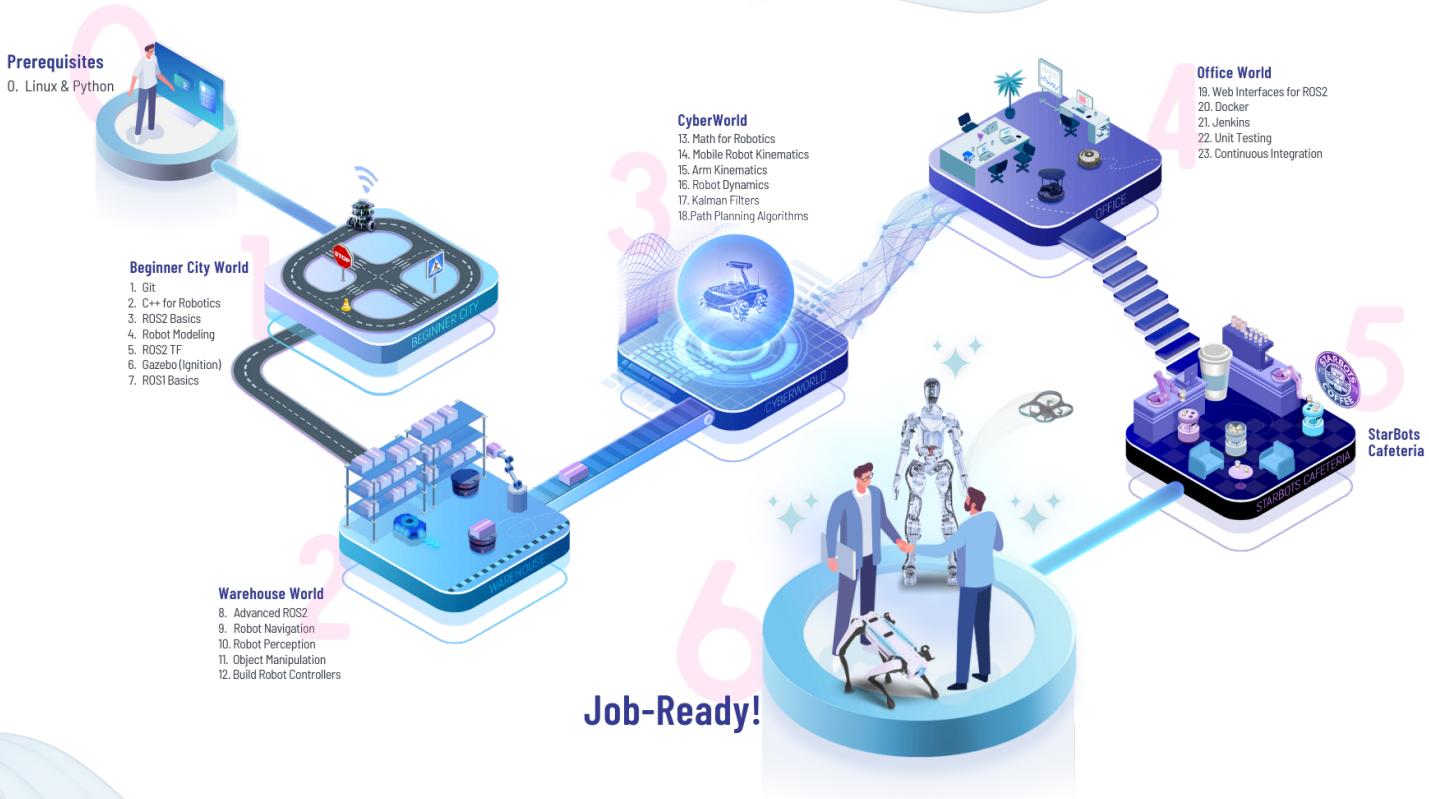
BEGINNER-FRIENDLY
This program is designed for complete beginners, even with no prior experience in robot programming.

PERSONAL MENTOR
Receive 1-on-1 feedback and guidance from robotics experts to ensure your success.

100% PRACTICAL
No videos, no slides—learn by doing with both simulated and real robots.

WE HAVE THE PLAN

Kickstart Your Career in RobDev



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FOLLOW A LEARNING PATH

Program Schedule

Phase 1 - Robotics Developer Novice

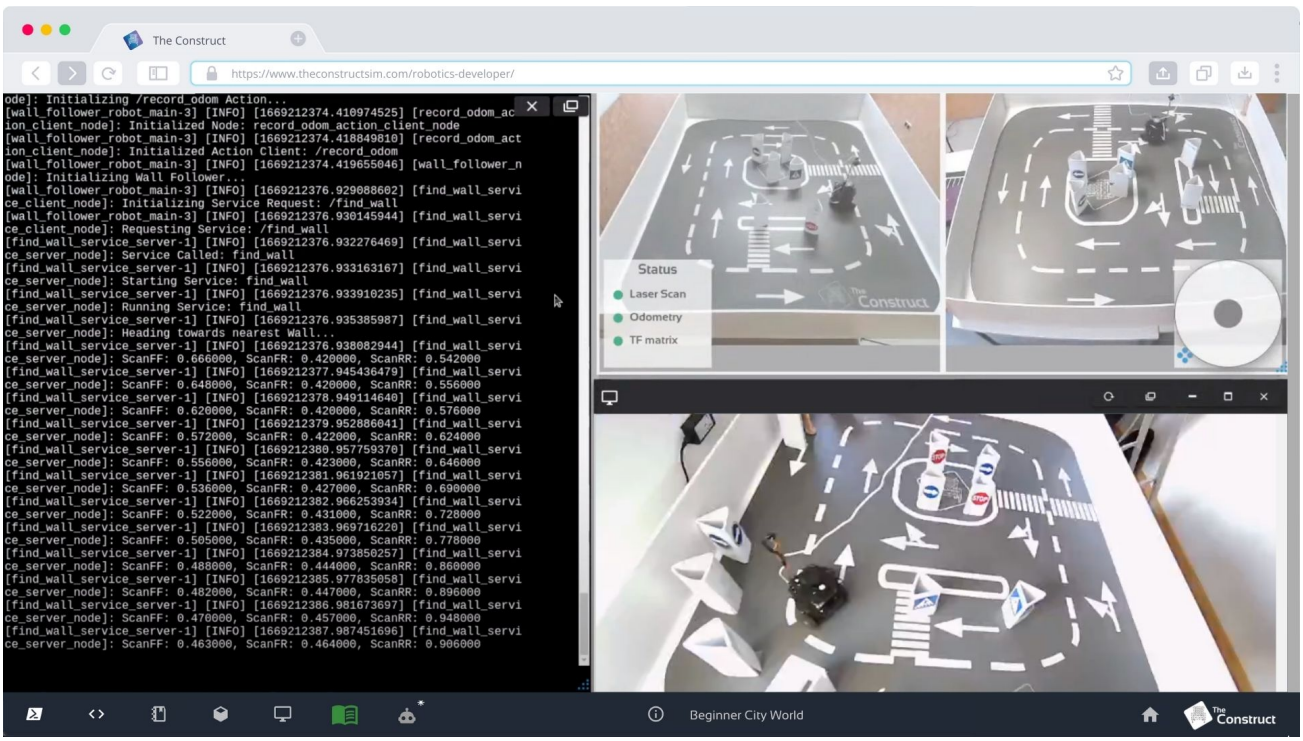
200 hours

Build the robot programming foundation and get started with ROS.

Acquired Skills:

- Collaborative software development with Git
- C++ programming skills for robotics
- ROS 2 basics
- Robot modeling with URDF – ROS 2
- Robot frame transformations with TF ROS 2
- Create robot simulations with Gazebo (Ignition)
- ROS 1 basics

Project of this phase: Apply ROS to the Beginners City Lab and get a mobile robot – TurtleBot3 to perform specific tasks.



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	WHAT YOU WILL LEARN IN THIS PHASE		TIME
1	**Git and GitHub Basics**	• Git Basics • Git Branches • Git and GitHub for Team Collaboration	10 hours
2	**C++ for Robotics**	• How to compile C++ programs • How to store data into Variables • How to operate with the data in the Variables • How to change behavior based on Conditions • How to create Functions that can be called from other places of the code • How to properly use arrays and pointers • How to encapsulate the code into Classes so you can have clean and robust code	18 hours
3	**Advanced Modern C++ for Robotics**	• How to build C++ programs • How to create a library • Understand the Standard Template Library (STL) and how it can help you create better code • How to use C++ classes to optimize your code • Inheritance • Function overriding and function overloading • How to use pointers and references for optimal memory management • Templates and Lambda expressions • How to use threads to parallelize tasks in C++ • How to deal with unexpected or exceptional errors in your code	40 hours
4	**ROS 2 Basics**	• Creation of ROS 2 packages • Management of the new Colcon universal building system. • Topic Publishers and subscribers in ROS 2 C++. • New Launch system based on python • Service servers and client generation for ROS 2. • Basic use of ROS 1-Bridge to communicate ROS 2 systems with ROS 1 systems. • Use of Debbuging tools in ROS 2.	30 hours
5	**URDF for Robot Modeling in ROS 2**	• How to build a visual robot model with URDF • How to add physical properties to a URDF Model (Collision, Frictions…) • How to use XACRO to clean up URDF files. • How to use URDF in Gazebo-ROS ecosystem. • How to use URDF-XACRO in ROS 2 systems	15 hours

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	WHAT YOU WILL LEARN IN THIS PHASE		TIME
6	**TF ROS 2**	• How to Visualize TFs in ROS 2 • How to Publish & Subscribe to TF data • Understanding Transformations & Frames • Common TF Command-line Tools (tf_echo, view_frames…) • Understanding Static Transform Publisher	15 hours
7	**Mastering Gazebo Simulator**	• Gazebo GUI • How to build a robot for Gazebo • How to connect gazebo robots to ROS • How to build custom Gazebo worlds • How to write plugins for gazebo worlds and models	20 hours
8	**ROS 1 Basics**	• Understand key ROS concepts • Understand and create your own ROS programs • How to debug your ROS programs • How to apply theory into real Robotics Challenge and Projects	23 hours

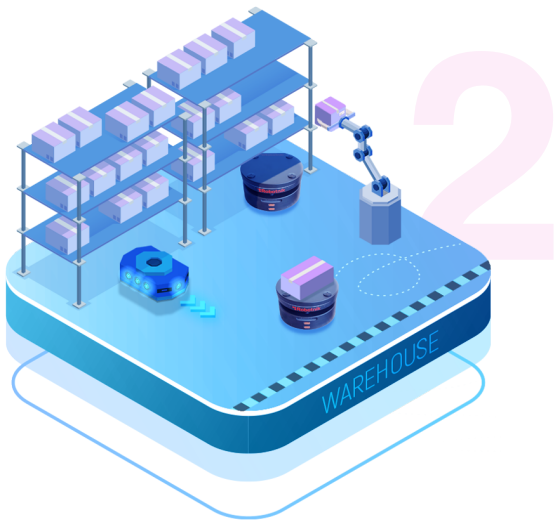
Phase 2 - Robotics Developer Beginner

200 hours

Understand how to program mobile manipulator skills, including navigation, perception of the environment, and manipulation of objects.

Acquired Skills:

- Advanced ROS 2 concepts
- Robot navigation with ROS 2
- Robot perception with ROS 2
- Object manipulation with ROS 2
- Build robot controllers with ROS 2



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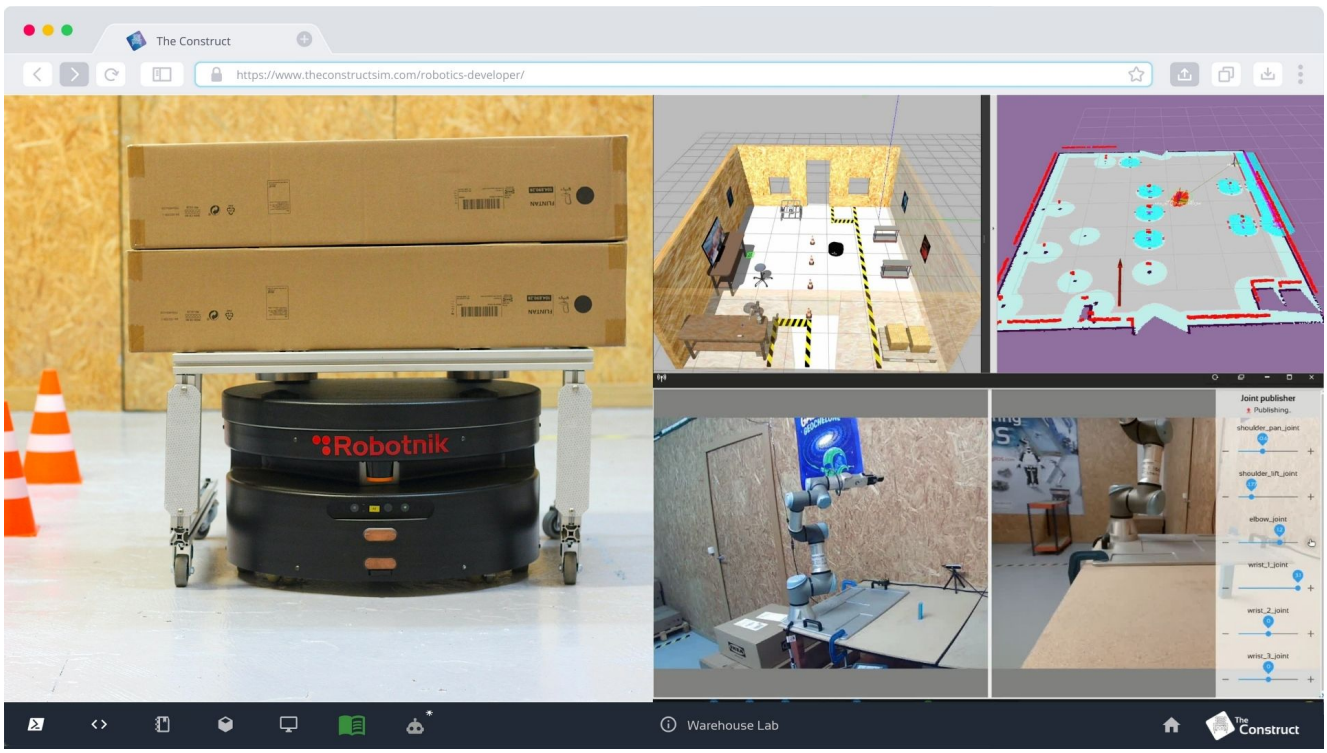
Project of this phase: Apply what you have learned to the Warehouse Lab and create an entire pick-and-place task with real warehouse collaborative robots: RB1-Base and UR3e Arm.



	WHAT YOU WILL LEARN IN THIS PHASE		TIME
9	**Intermediate ROS 2**	• How to create different types of launch files in ROS 2 • How to work with parameters in ROS 2 • Threading in ROS 2 • How to manage callbacks in ROS 2 • Understand Quality of Service (QoS) in ROS 2 • Understand DDS in ROS 2 • Work with Managed Nodes in ROS 2	12 hours
10	**ROS 2 Navigation**	• How to build a map of the environment • How to localize a robot in a map of the environment • Path Planning from an initial position to the desired goal • Obstacle avoidance using Costmaps • Navigation Lifecycle Manager • How Behavior Trees influence Nav2	18 hours

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	WHAT YOU WILL LEARN IN THIS PHASE		TIME
11	**Advanced ROS 2 Navigation**	• How to use the Simple Commander API • How to use Costmap Filters • An explanation of the BT Navigator • How to create a custom behavior • How to use Groot for visualizing behaviors • How plugins are used in Nav2 • How to create custom plugins for Nav2 • The three main plugins of the controller server	12 hours
12	**ROS 2 Perception and Manipulation**	• ROS 2 Moveit • ROS 2 Object Detection • ROS 2 Programatical Motion Planning	22 hours
13	**ROS 2 Control Framework**	• How to configure a ros2_control pipeline • How to write a minimal custom interface for a hardware device • Real-life implementation of a custom hardware interface • Different controller types included with ros2_control • Application of the course content to solve a robotics project based on a quadruped robot	12 hours

Phase 3 - Robotics Developer Experienced

200 hours

Understand any robotic system's physics and mathematical principles, from simple kinematics to advanced planning and control algorithms.

Acquired Skills:

- Essential math for robotics
- Mobile robot kinematics
- Robot arm kinematics
- Robot dynamics
- Kalman filters
- Path planning algorithms

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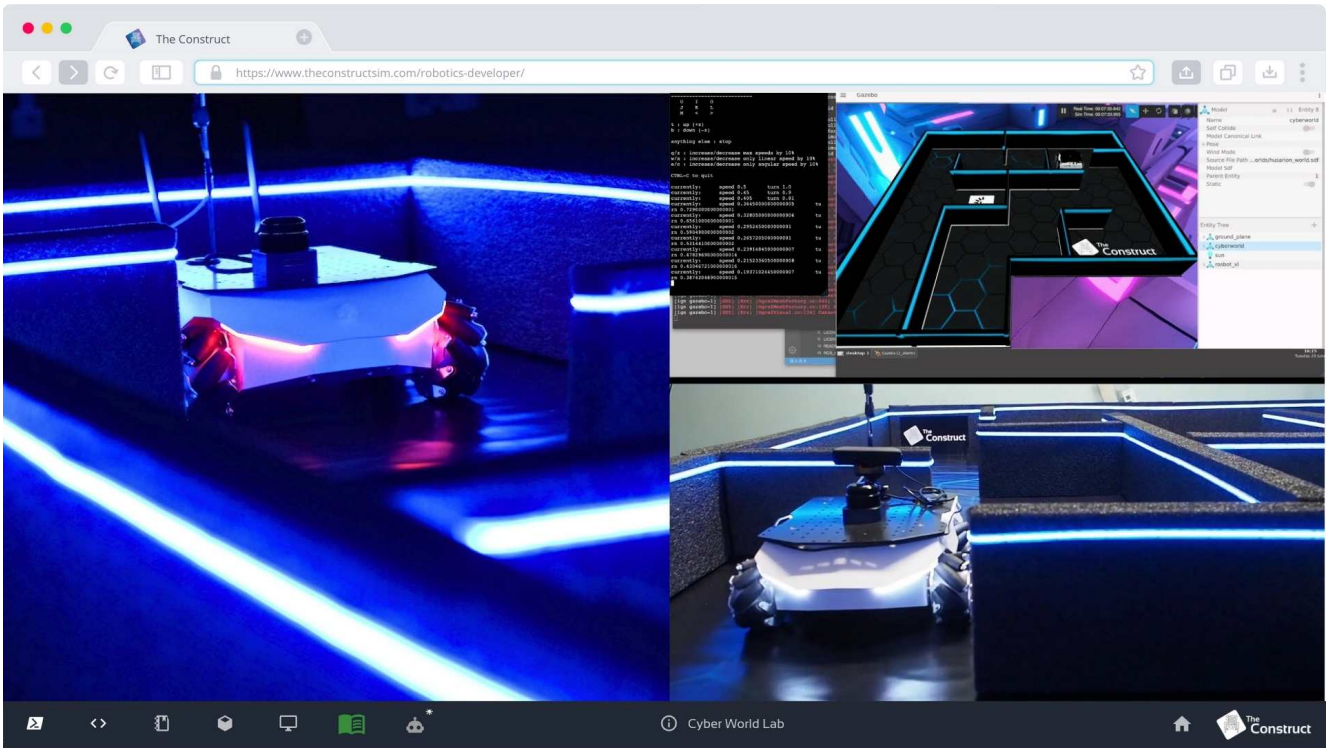
Project of this phase: Apply what you have learned to the Cyber World Lab. Design and develop, from zero, the navigation algorithms for a wheeled mobile robot – ROSbot XL.



	WHAT YOU WILL LEARN IN THIS PHASE		TIME
14	**Basic Maths for Robotics**	• Linear Algebra, where you'll learn about vectors and matrices • Calculus, where you'll learn about functions, derivatives, and integrals • Probability, where you'll learn about random variables and belief distributions	12 hours
15	**Basic Kinematics of Mobile Robots**	• Rigid-Body Motions • Kinematics for Non-Holonomic Robots • Kinematics for Holonomic Robots • Kinematic Control	18 hours
16	**Basic Arm Kinematics**	• The baiscs of Rigid Body tranformations • The Denavit Hartenberg method for frames generation. • Forwards kinematics • Inverse Kinematics	10 hours

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	WHAT YOU WILL LEARN IN THIS PHASE		TIME
17	**Robot Dynamics and Control**	• How to solve the dynamics for the motion of rigid bodies in 3D space with the use of Newton's laws of motion • How to model the dynamics of a simple robotic system and how to derive its equations of motion • How to create a full state feedback controller to allow a robotic system to balance	12 hours
18	**Kalman Filters**	• What is a Kalman Filter and why are required • Different types of Kalman Filters and when to apply each one. • Bayesian Filters • One-dimensional Kalman Filters • Multivariate Kalman Filters • Unscendent Kalman Filters • Extended Kalman Filters • Particle Filters	10 hours
19	**Path Planning Basics**	• Dijkstra algorithm • A* search algorithm • Rapidly-Exploring Random Tree (RRT) • Artificial Potential Fields	12 hours

Phase 4 - Robotics Developer Competent

200 hours

Understand the development tools for robot programming in a corporate environment. Then, get prepared to bear the day-to-day work of a robotics developer.

Acquired Skills:

- Program web interfaces for ROS 2
- Containerize your software with Docker
- Automate development tasks with Jenkins
- Check the integrity of the code with continuous integration (CI)

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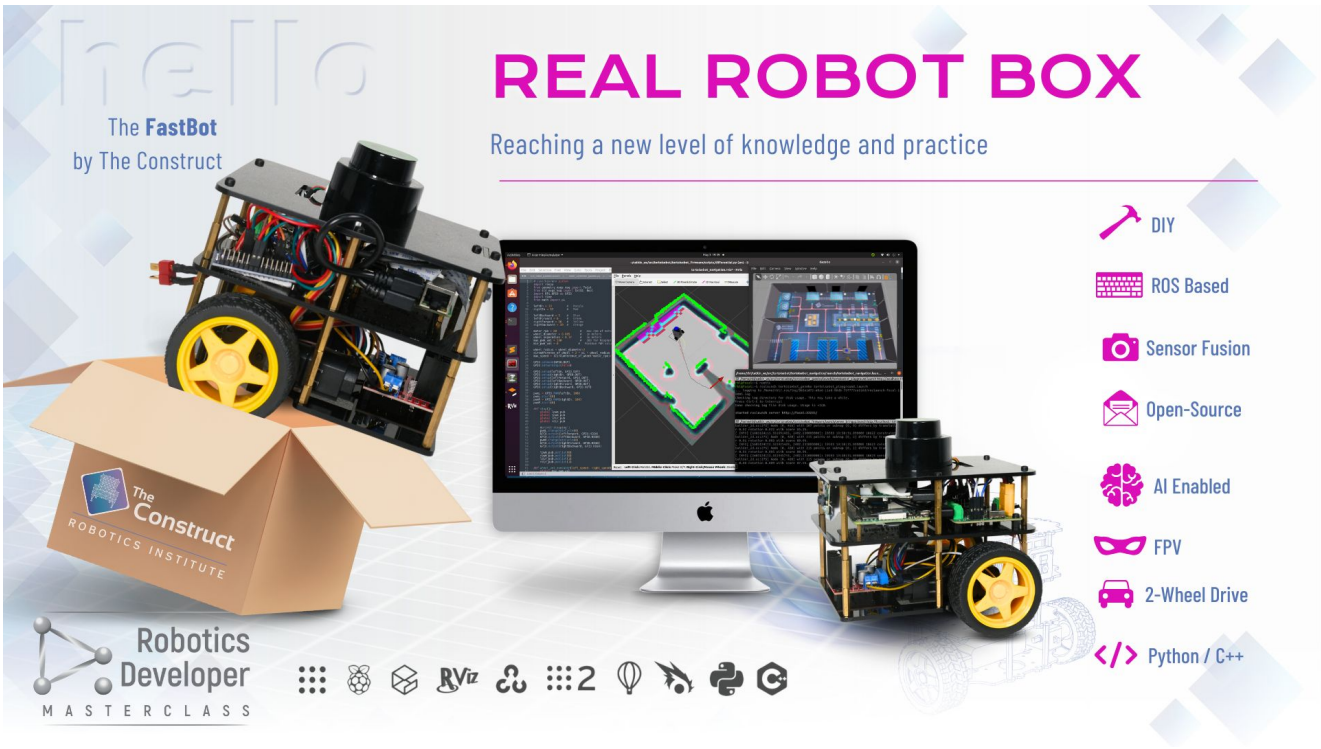
Project of this phase: You'll receive a real robot box – the FastBot kit, assemble and program it. Your goal in this phase is to develop a ROS-based web app from scratch to control the robot within a containerized environment using continuous integration.



	WHAT YOU WILL LEARN IN THIS PHASE		TIME
20	**Web Development for Robotics**	• Rosbridge: Use the Rosbridge to connect your web pages to ROS • HTML5: Learn to build web pages containing the necessary elements to display your desired information. From simple titles and paragraphs to complex table data and forms to collect user's input and process that information • CSS3: Learn to style your web pages to make them look great • JavaScript: Learn basic instructions, types, arrays, and objects starting from programming logic. • ReactJS: Learn to create scalable web applications by providing an organized folder structure and compiler for your web components	20 hours

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	WHAT YOU WILL LEARN IN THIS PHASE		TIME
21	**Developing Web Interfaces for ROS**	• Understand how to make ROS data available to other environments • Understand how to create simple but efficient web pages • How to publish to topics and control robots from the web • How to subscribe to topics and monitor ROS data from the web • How to work with ROS params from the web • How to consume ROS services and action servers from the web • Create powerful interfaces that show: 3D models, maps and camera images	15 hours
22	**Docker Basics for Robotics**	• Introduction to Docker: How to pulling public images, run and inspect containers, basic commands, etc. • Creating Docker Images: Create your own docker image, check its history, and work with Docker containers. • Docker Network and Docker Compose: Launch multi containers using a single command and understand docker-compose files. • Docker with ROS: Examples of using ROS with Docker.	12 hours
23	**Jenkins Basics for Robotics**	• Jenkins installation and initial setup • Jenkins jobs • Managing Users and Security • Jenkins Pipelines • Source Code Management Integration • Test Integration • Jenkins CLI	12 hours
24	**Unit Testing with ROS**	• How to create Python Unit Tests • How to create ROS Unit Tests • How to create ROS Integration Tests	12 hours
25	**Continuous Integration**	Integrate all the learned DevOps tools into a single practical project	8 hours

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Phase 5 - Robotics Developer Advanced Final Project

200 hours

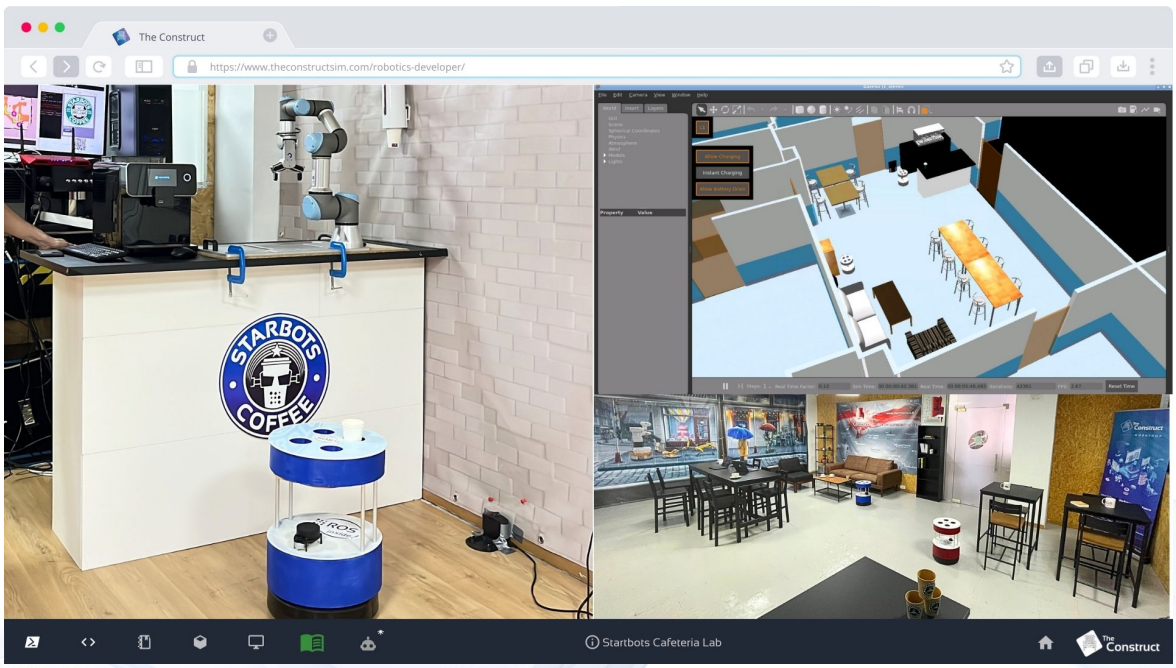
Apply all the skills and knowledge you've gained in a real-world setting. This final project serves as a great opportunity to build your robotics portfolio and showcase your abilities to future employers.

Choose one of the following final project options:

Project Option 1: StarBots Cafeteria Lab

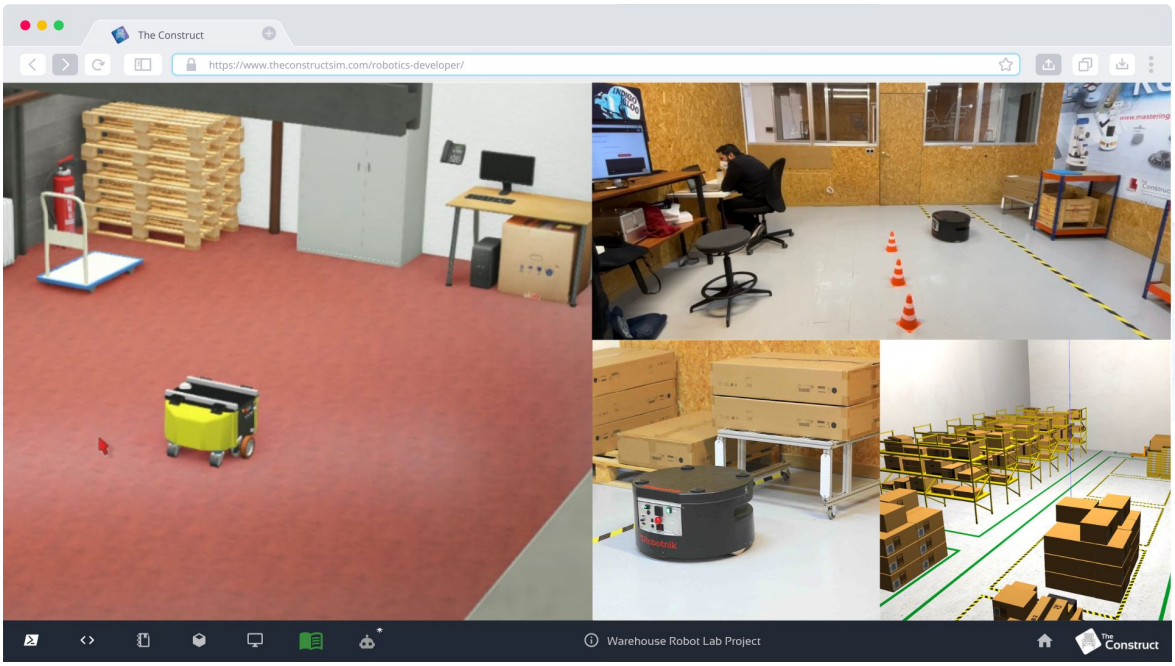
Design, develop, and present a complete robotics project from scratch. Choose between two sub-projects:

- **Robotic Arm Project:** Develop a robotic arm app that grabs a coffee cup and places it on another robot for delivery to the tables.
- **Mobile Robot Project**: Use the TurtleBot 4 robot to clean the tables in the cafeteria.



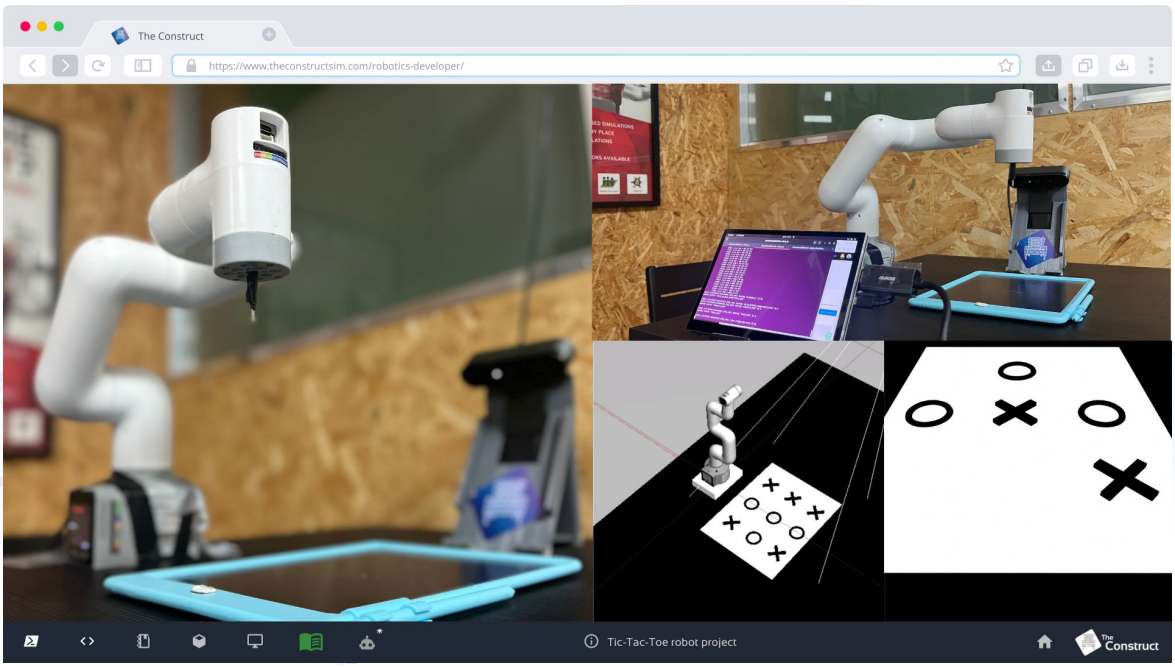
Project Option 2: Warehouse Robot Lab

Design, develop, and present a complete robotics project for a small warehouse setting. Use the RB-1 BASE mobile industrial robot to practice applications for warehouse and logistics use cases.



Project Option 3: Tic-Tac-Toe Lab

Design, develop, and present a complete robotics project featuring a Tic-Tac-Toe robot arm.



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Phase 6 - Robotics Developer

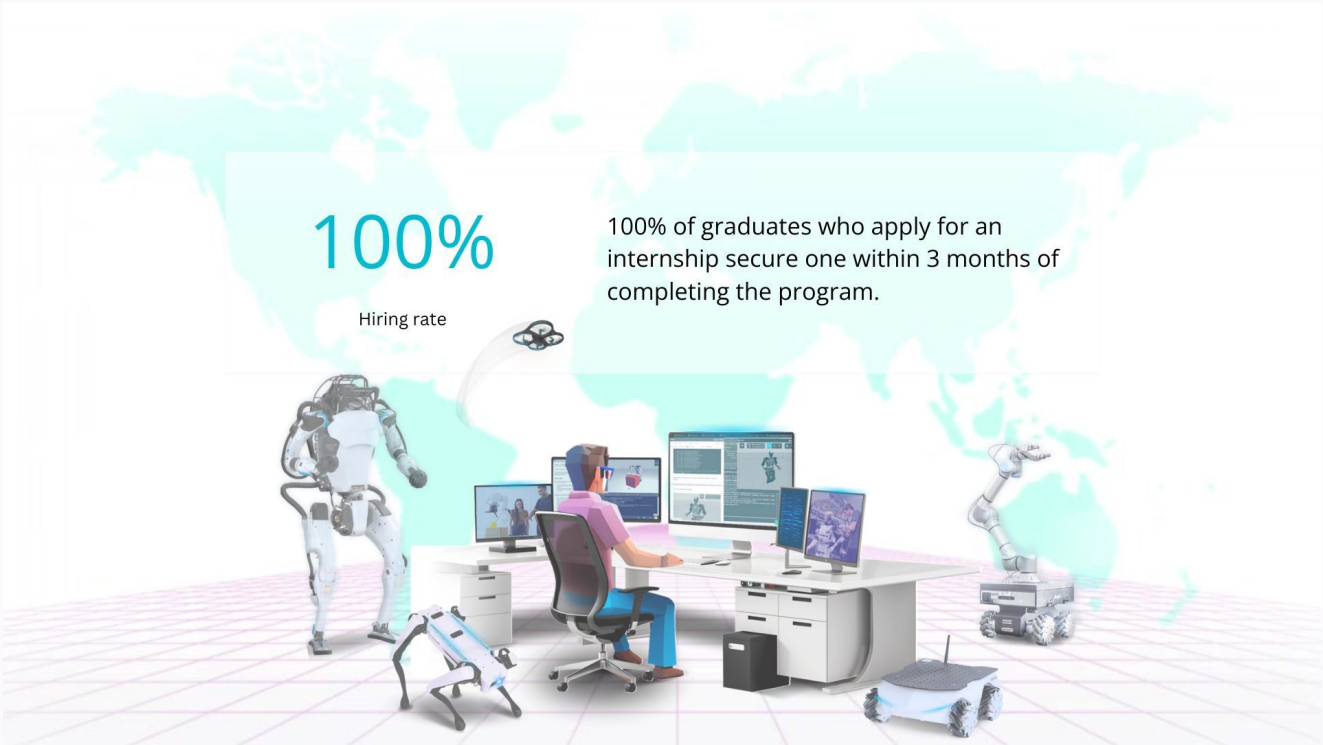
3 months internship

The Robotics Developer Masterclass offers you a practical internship at a leading robotics company.

Learn from industry practitioners and enhance your knowledge with relevant work assignments to help you prepare for your future career as a robotics developer.

INTERNSHIP PLACEMENTS

After your Masterclass, you'll be placed in an online/on-site internship at one of the world's leading robotics companies. Internships are optional and not required for the certificate.



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NEW!

We Include a Job Hunting Program

This program is provided for **free** to our **Masterclass graduates** to help you turn your **dream job** into reality.

Here's what's included:

Full Step-by-Step Guidance

We provide step-by-step guidance throughout your job search, from identifying positions to interview preparation.

Expert Proposal Building

We guide you in crafting an impressive CV, LinkedIn profile, and cover letter to help you stand out

Weekly Job Hunting Action Plan

We provide a weekly plan with specific actions for clear job search and interview guidance.

Weekly Follow-Up with Tutors

We review your job search progress, make adjustments, and plan for the week ahead

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REAL PRACTICES

Get Hands-on with Robots

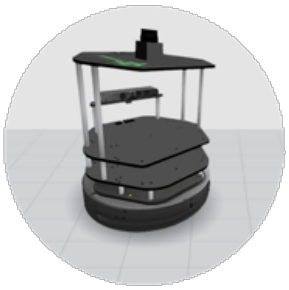
Simulated Robots Used

BB-8

IRI Wam arm

Parrot A.R.

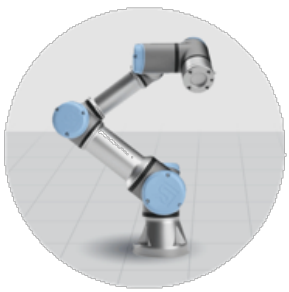
TurtleBot2



SUMMIT-XL

Husky

UR3



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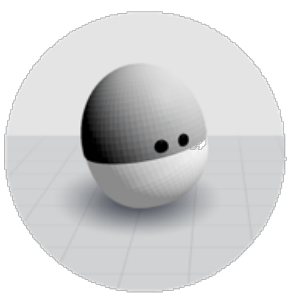
Mira



Phantom X

RB-KAIROS

RRBot

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Neobotix MPO-500

3d Version of the Classical 2D TurtleSim

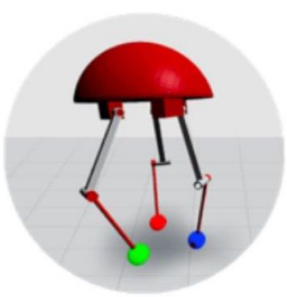
Pi robot

ROSbot 2.0

Mara

TurtleBot 3

Gurdy



JIBO

Motoman Sia10f simulation

Clarkson Open Manipulator

PR2

Shadow hand

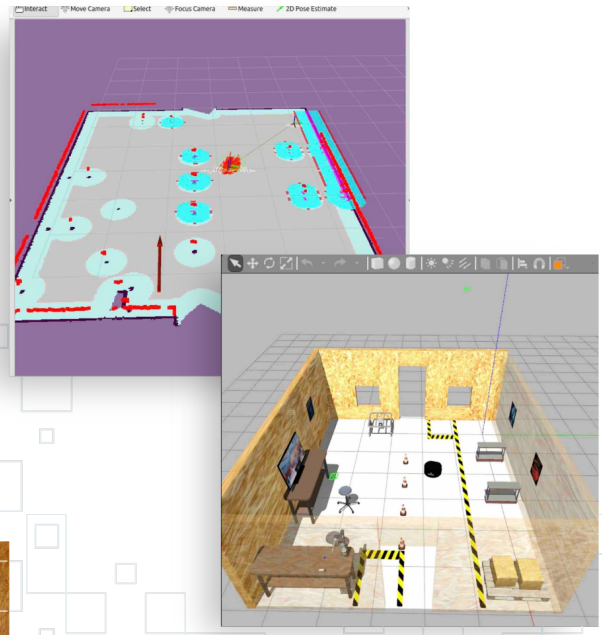
Real Robots Used

During the program, you will learn robotics and develop robotic apps by connecting remotely to the following real robots to practice:

RB-1 BASE mobile robot - Robotnik

RB-1 BASE is a mobile base robot able to move shelves from one location to another. With this robot, practice autonomous navigation; carrying cargo from one place to another; and recognize environments, like tags, people, or objects.

See how it works (video)



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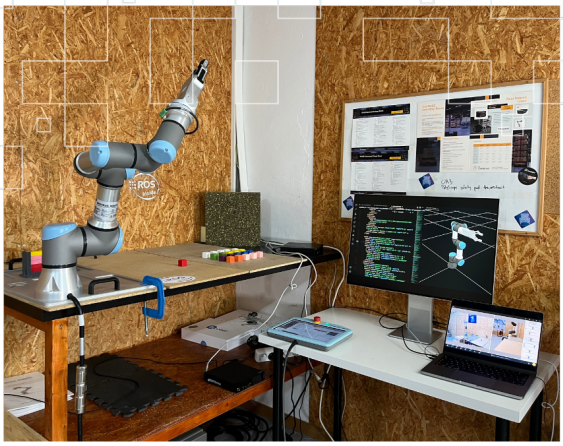
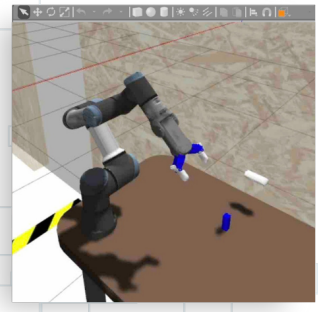
UR3e robotic arm

This is a collaborative robotic arm with a gripper and a 3D sensor for perception.

With this robot, you can practice manipulation, object detection, pick & place objects, and more.

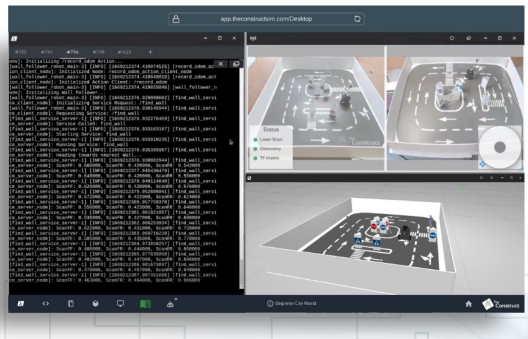


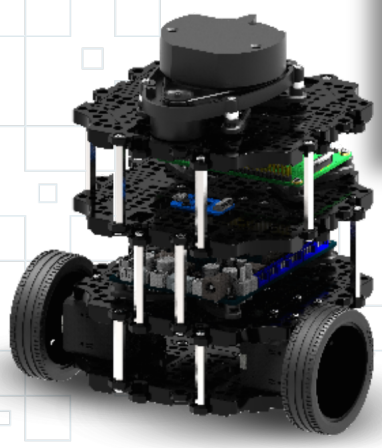


TurtleBot3

TurtleBot3 is a wheeled robot with lidar and a camera.

[See how it works (video)]





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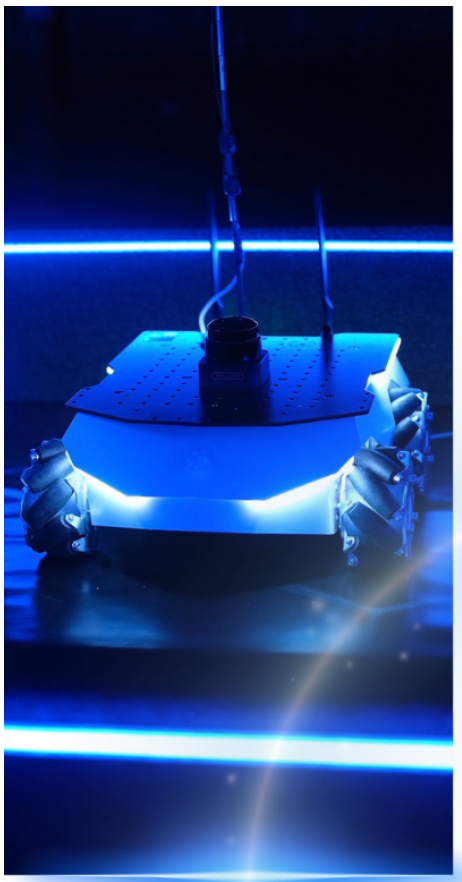
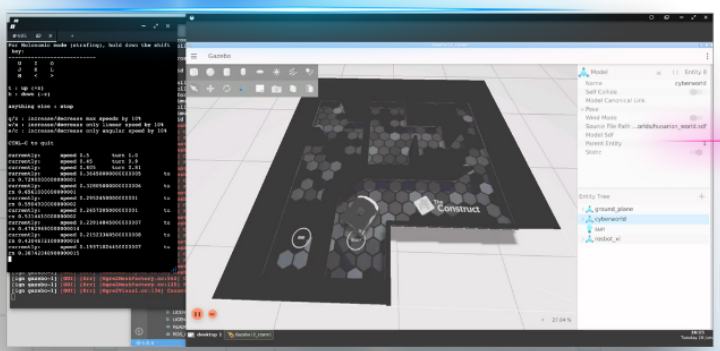


ROSbot XL - Husarion

ROSbot XL is a 4x4 drive autonomous mobile robot platform equipped with LIDAR, RGB-D camera, IMU, encoders, etc.

[See how it works (video)]



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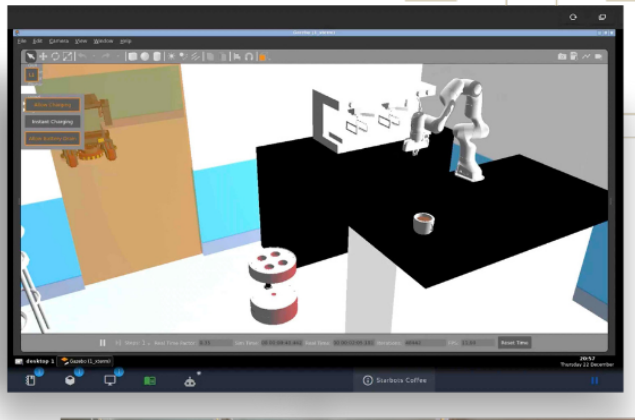
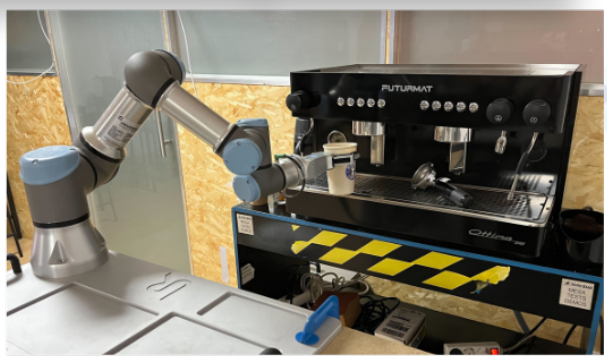
StarBots Cafeteria's Advanced Robot Fleet

Our cutting-edge lineup includes:

1. Two coffee delivery mobile robots
2. Two table carrier robots
3. An UR3e robotic arm, skillfully preparing coffee
4. A programmable coffee machine
5. An automatic door





All our robots are equipped with auto-charging capabilities and work 24/7.

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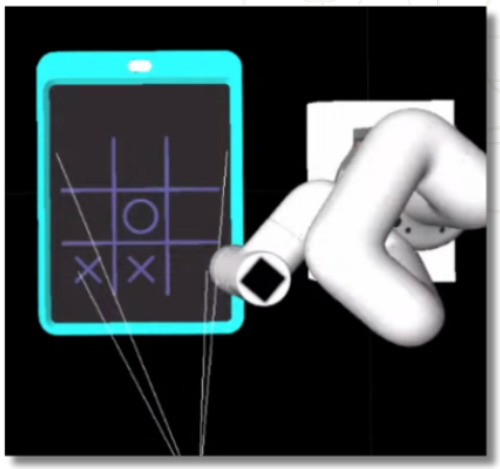
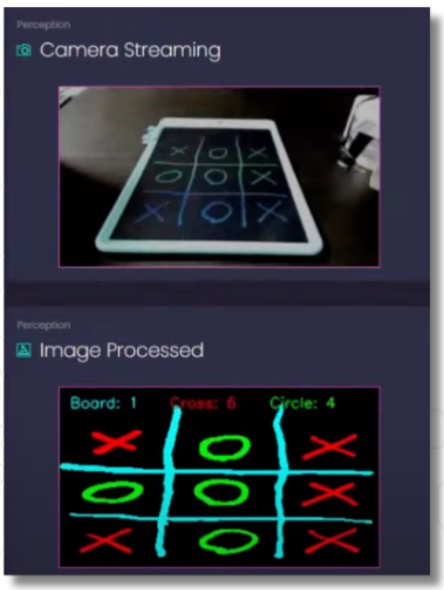
Tic-tac-toe robot Lab

In this lab, you will apply manipulation, perception, and AI reasoning to enable a robot to play tic-tac-toe against a human.

You will need to use perception to identify the current board state, reasoning to select the best move for the robot, and then move the robot to draw the circle in the tic-tac-toe board.





Robotics Developer MASTERCLASS

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EXTRA PERKS

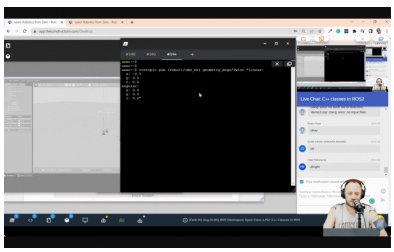
Bonus Robotics Workouts

Weekly Talks by Industry Pros

Learn from top-notch experts in ROS/robotics every week. Gain insights from seasoned robotics developers!

Reinforcement C++ Live Class

Boost your C++ programming skills with two live classes per week.



Daily Study Room Sessions

Gain 2+ hours of focused, instructor-led deep work sessions every weekday to strengthen study habits and achieve your goals.

Robotics Developer MASTERCLASS

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Frequently Asked Questions

What is the difference between this Masterclass and The Construct's existing course library?

The differences are:

- Comprehensive and fully guided step-by-step path to becoming a Robotics Developer in the shortest amount of time.
- A personal mentor guides and supports your learning development. You have a 1-hour meeting with him monthly.
- Access to exclusive courses required to do professional development in a robotics company:
  - Git for Robotics
  - Docker for Robotics
  - Continuous integration
  - Advanced C++ for Robotics
  - Web programming for robotics
  - Jenkins for robotics
- During the course, you will create several projects, which will be integrated into a shareable online robotics portfolio, showcasing your code and results to potential employers.
- You will receive a real robot kit – Fastbot – to assemble and program
- You will practice what you learn in our Remote Real Robot Labs:
  - Beginners city lab, TurtleBot 3 (this one is also available to regular students)
  - Warehouse lab, with an RB-1 Base and a UR3 robot arm
  - Cyberworld, with a ROSbot XL
  - Starbots cafeteria, with two barista robots, one UR3 robot arm, a door, a coffee machine, and a cleaner robot
- You will intern for three months at a leading robotics company.
- Every two weeks, attend a seminar where external professionals share their experience as Robotics Developers.
- Extra live C++ classes
- LinkedIn shareable Robotics Developer certificate

Can I complete the coursework at any time and at my own pace?

Six months is recommended, but you can complete the program at your own pace.

Is there any contract we need to sign before enrolling in the Masterclass?

Before enrolling and paying, we will ask you to sign a Masterclass License Agreement that explains your rights and obligations.

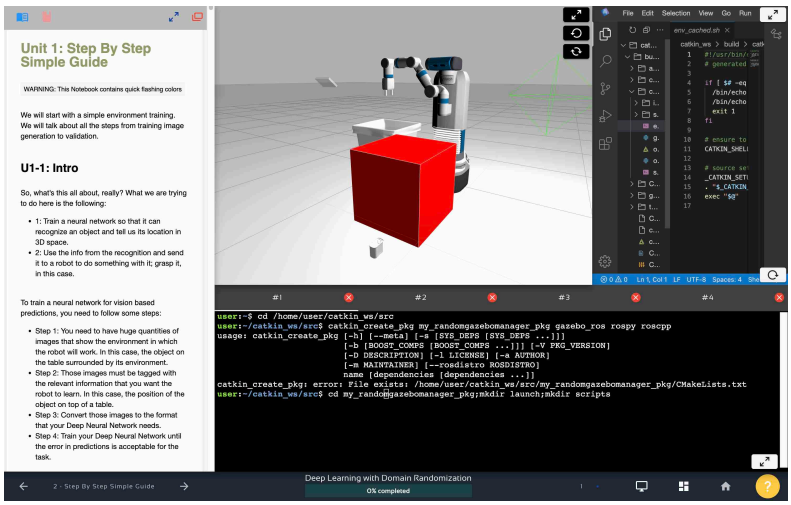
Can I get a scholarship?

Unfortunately, no scholarship is available at this time.

Frequently Asked Questions

Is this Masterclass video-based?

NO. The courses are based on notebooks (as shown in the image below) which contain lectures, exercises, assignments, and exams that will guide you through the program. You can also access the notebooks for review at any time.
The courses are also based on regular meetings with your mentor. You will have a mentor assigned to follow your progress. In a monthly session, your mentor will provide feedback on your development, including areas of strength and improvement.



Is the 3-month internship guaranteed upon completion?

The internship is 100% guaranteed for all the students who do the work, study hard, and pass the program. We take charge of providing you with an internship at a robotics company, but we want to send people who have taken the course seriously.

Is the internship paid?

The payment for internships varies based on the company policies. Some companies offer compensation, while others may not. It is important to note that we do not interfere in the company's decision regarding payment.

Where is the internship? Online or offline?

Internships are remote and in-person, depending on your location and other factors. You will discuss and agree on the internship details with your mentor.

Can I choose the internship location?

We will select the best internship opportunity based on your location, skills, and preferences. Then, you will discuss and agree on the internship details with your mentor.

Kickstart Your Career in Robotics Software

Enroll Today

QUESTIONS?

Email: info@theconstruct.ai

Website: roboticsdeveloper.ai

The Construct

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Where Your
Robotics Career
Happens

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