



ASFAN
ENG

Robotics & Automation Technologies





Innovating the Future of Technical Training, Industrial Automation, and Digital Fabrication

ASFAN is dedicated to equipping industries, research institutions, and educational organizations with **robotics, fabrication, and automation solutions**. Our portfolio combines physical and virtual systems to ensure learners and professionals can gain hands-on experience without compromising safety, efficiency, or cost-effectiveness.

From **humanoid robots** that can work safely alongside humans, to **industrial-grade 3D printers** that bring digital designs into reality, to **high-precision CNC machining systems** that shape raw materials into finished parts, and **autonomous robots** capable of agile, real-world navigation — ASFAN's offerings are designed to meet the needs of a rapidly evolving technological landscape such like robotic dogs, tanks & cars.

Educational Pathline: From Learning to Industry-Ready

ASFAN not only delivers advanced equipment but also provides a **comprehensive learning journey** that takes individuals from foundational skills to full professional readiness in robotics and advanced manufacturing.

This **educational pathline** is built to guide learners through every stage of skill development:

1. **Foundations & Prerequisites** – Linux, Python, and basic mathematics for robotics.
2. **Novice to Beginner** – Core robotics programming (C++, ROS2, simulation with Gazebo), robot modeling, and control basics.
3. **Intermediate Development** – Navigation, perception, object manipulation, and building robot controllers.
4. **Advanced Theory & Applied Skills** – Robotics mathematics, kinematics, dynamics, sensor fusion, and path planning.
5. **Software Engineering for Robotics** – Web interfaces, Docker, CI/CD, unit testing, and deployment pipelines.
6. **Final Integration** – A capstone project that combines all acquired skills into a standout portfolio ready for employers

1. COLLABORATIVE ROBOTICS SYSTEMS

Safe, Intelligent, and Flexible Automation for Learning and Industry

Collaborative robots, or “cobots,” are transforming the manufacturing floor, research lab, and classroom. ASFAN’s cobots are engineered for **safe and precise human-robot collaboration**, capable of automating repetitive, dangerous, or high-precision tasks while operating alongside human workers without cages or barriers.

Our cobots are **ROS (Robot Operating System) compatible**, making them perfect for universities and research centers developing advanced AI, computer vision, and control systems. For industrial customers, they are **plug-and-play**, with intuitive programming interfaces that minimize setup time and training requirements.

Key Benefits:

- **Human-Safe Operation** – Integrated torque and force sensors allow the cobot to stop instantly when contact is detected, preventing accidents.
- **Rapid Deployment** – No specialized cell setup is needed; can be moved and redeployed within minutes.
- **Customizable for Any Task** – Compatible with grippers, vision systems, welding tools, and dispensing systems.

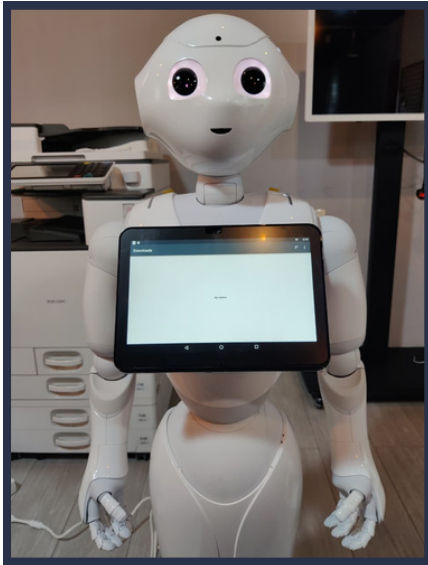
Learning Outcomes / Capabilities

- Understand and apply collaborative robotics safety protocols.
- Program robots using both graphical interfaces and industry-standard programming languages like Python or C++.
- Integrate computer vision and sensor data for adaptive task execution.
- Perform coordinated tasks such as assembly, packaging, inspection, and pick-and-place.

Key Experiences:

1. **Pick-and-Place Automation** – Moving parts from one location to another with speed and precision.
2. **Vision-Guided Quality Inspection** – Using cameras and AI to identify defects in manufactured products.
3. **Collaborative Assembly** – Building products together with human operators in shared workspaces.
4. **Research and Development Applications** – Testing new algorithms in motion planning, AI perception, and robot control.

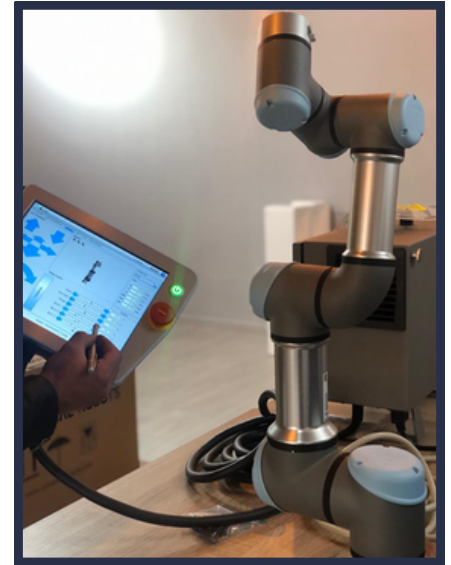
Supported Platforms: Physical Cobots, Simulation Software, ROS Environment
Languages: EN, AR



Pepper Robot Wheel
Humanoid – A social humanoid robot from Softbank Robotics designed for human-robot interaction and AI applications.



DOBOT – A compact robot arm for teaching programming, robotics, and coordinate control.



UR3 Robot Arm – Ideal for teaching industrial automation and safe human-robot collaboration.



NAO Robot – A programmable humanoid robot used in STEM education, research, and development.



Humanoid Robot has the flexibility beyond normal human, can imitate & reinforce the learning a high-performance bipedal robots



Humanoid robot/civilian robot that combines advanced mechanics with powerful onboard computing

2. 3D PRINTING SOLUTIONS

Rapid Prototyping and Additive Manufacturing for Every Scale

ASFAN's 3D printing solutions range from desktop units ideal for STEM classrooms to large-format industrial systems capable of producing functional prototypes and end-use parts. They enable additive manufacturing of highly detailed and structurally sound components using a wide range of materials – from PLA and ABS to engineering-grade composites and high-temperature polymers.

These systems are ideal for accelerating product development cycles, reducing prototyping costs, and training students in modern manufacturing methods. ASFAN ensures that each 3D printing package includes training in CAD modeling, slicing software, and printer maintenance.

Key Benefits

- Open-Material Compatibility – Use common filaments or advanced engineering plastics without vendor lock-in.
- Scalable Solutions – From compact 200×200 mm printers to 1-meter cube industrial models.
- Multi-Material Capability – Dual extruders for soluble supports, flexible parts, or multi-color printing.
- High Accuracy – Print resolution up to 50 microns for detailed components.

Learning Outcomes / Capabilities

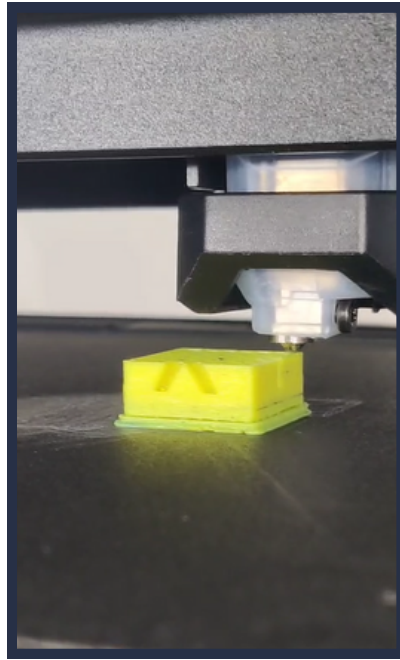
- Prepare and slice 3D models for optimal print quality.
- Select appropriate materials for mechanical strength, flexibility, or heat resistance.
- Post-process parts with sanding, painting, or coating for functional and aesthetic purposes.
- Integrate 3D printing into production workflows to produce jigs, fixtures, and small-batch products.

Key Experiences

1. Prototyping Mechanical Parts – Testing design iterations within hours instead of days.
2. Educational Model Creation – Printing visual aids and functional teaching tools.
3. Custom Manufacturing – Producing low-volume, highly customized components.
4. Research Applications – Fabricating test rigs, sensors, or robotic components for experiments.

Supported Platforms: Desktop & Industrial 3D Printers

Languages: EN, AR



**3D Printer producing
a PLA prototype :**
an essential tool for rapid
prototyping and iteration
in digital fabrication.

3. 3D Scanners

3D scanner is a device that captures the shape and appearance of a physical object, converting it into a digital 3D model. This process uses lasers, light, or other technologies to generate a point cloud or mesh of the object's surface, which can then be used for various applications, including prototyping with 3D printers, reverse engineering, quality control, medical imaging, and entertainment.



4. CNC MACHINING SOLUTIONS

Precision Subtractive Manufacturing for Training and Production

ASFAN's CNC machining systems give learners and professionals the tools to cut, mill, drill, and engrave with industry-level precision. Available in 3-axis, 4-axis, and 5-axis configurations, these machines are for technical training programs, R&D labs, and small to medium-scale production environments.

Our CNC systems are integrated with modern CAM software such as Fusion 360, enabling seamless design-to-production workflows. With rugged construction, high-speed spindles, and safety enclosures, ASFAN CNC machines are both reliable and safe for daily operation.

Key Benefits:

- **Versatile Material Capability** – Work with metals, plastics, composites, and wood.
- **Multi-Axis Capability** – Produce complex parts with undercuts and freeform surfaces.
- **Educational Integration** – Comes with training materials for G-code, toolpath planning, and setup procedures.
- **Scalable** – From benchtop units to large-format production machines.

Learning Outcomes / Capabilities:

- Set up and align stock material for machining.
- Create and simulate toolpaths in CAM software.
- Operate CNC machinery following safety protocols.
- Perform finishing operations to achieve desired tolerances and surface quality.

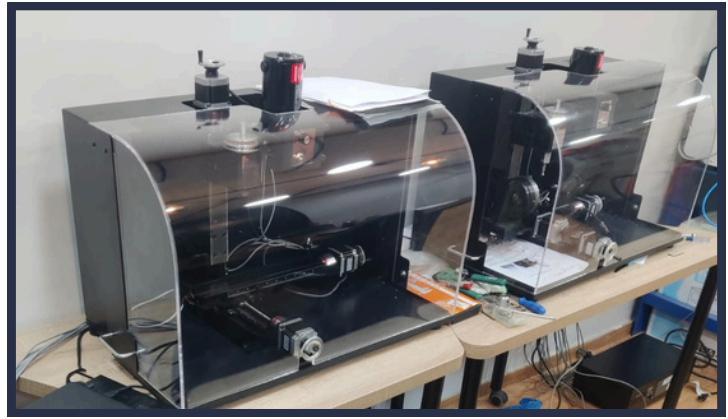
Key Experiences

1. **High-Precision Part Production** – Fabricating aerospace, automotive, and robotics components.
2. **Multi-Axis Machining** – Complex geometries for engineering projects.
3. **CNC Engraving** – Adding text or logos to finished products.

Supported Platforms: Educational & Industrial CNC Machines

Languages: EN, AR

Precision mini CNC milling machines used for small-scale prototyping and engraving.



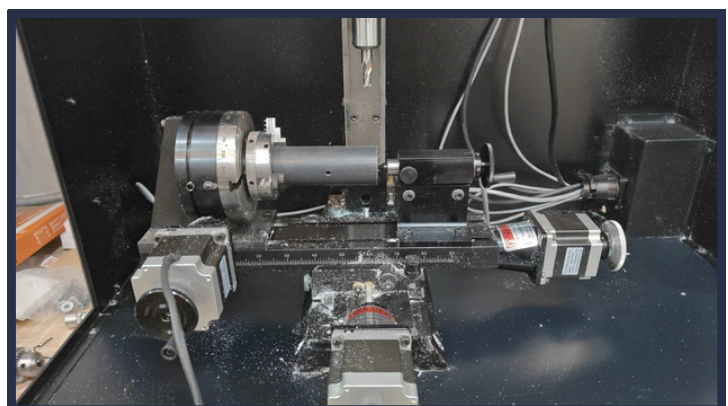
Close-up of high dense foam milling on desktop CNC, highlighting formation during operation.



Large-scale CNC Router – Model: ELECNC 1215, Brand: Blue Elephant – ideal for woodworking and soft material routing.



Rotary axis CNC setup for cylindrical part machining and 4-axis operations.



5. AUTONOMOUS SYSTEMS

Intelligent, and Versatile Mobile Robotics for Research, Training, and Field Applications

ASFAN's autonomous systems bring the latest in mobile robotics to education, research, and industry. Combining advanced locomotion, real-time sensing, and AI-based autonomy, these robots are capable of navigating complex environments, carrying payloads, and performing inspection or monitoring tasks with precision.

Built for outdoor and indoor deployment, the system can traverse uneven terrain — making it an ideal platform for both technical training and real-world missions. With full ROS integration and a rich sensor suite, it's also a powerful research tool for autonomous navigation, AI perception, and human-robot interaction.

Key Benefits:

- **All-Terrain Mobility** – rough terrain with stability.
- **Fully Programmable** – Supports Python, C++, and ROS for custom behaviors.
- **Sensor-Rich** – Equipped with LiDAR, depth cameras, GPS, and IMUs for precise navigation.
- **Payload Capability** – Mount sensors, cameras, or manipulators for specialized tasks.
- **Long Runtime** – High-capacity battery enabling hours of operation in the field.

Learning Outcomes / Capabilities:

- Develop and deploy autonomous navigation algorithms.
- Integrate and use advanced perception sensors for mapping and object detection.
- Apply SLAM (Simultaneous Localization and Mapping) techniques in real environments.
- Conduct human-robot interaction experiments and mobile robot coordination.
- Test and validate robotics research in challenging real-world scenarios.

Key Experiences

1. **Autonomous Patrol & Inspection** – Navigating an environment while detecting objects and hazards.
2. **Search and Rescue Simulation** – Operating in disaster-like conditions to locate and deliver payloads.
3. **Sensor Integration Projects** – Adding LiDAR, cameras, or environmental sensors for data collection.
4. **AI Navigation Challenges** – Testing obstacle avoidance, path planning, and dynamic re-routing.

Supported Platforms: Physical Quadruped Robots, Simulation Environments (Gazebo, isaac sim)

Languages: EN, AR

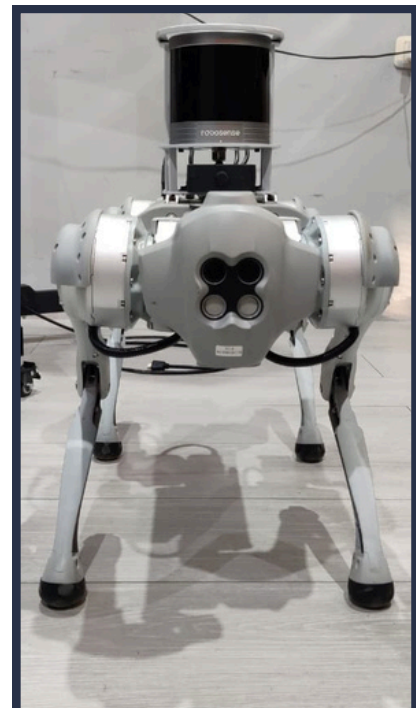
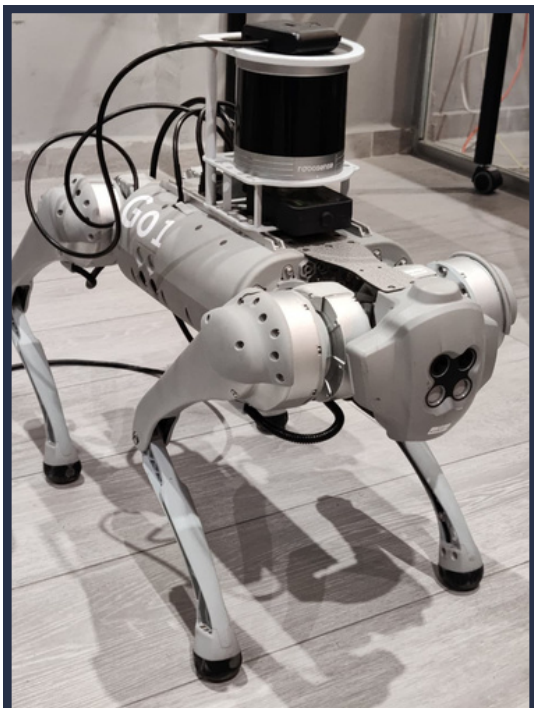


Unmanned Ground Vehicle (UGV) suitable for indoor and outdoor automation.

quadruped robot designed for research in balance, navigation, and legged locomotion.



the quadruped robot and robotic tanks in Fire Rescue solution



6. Robotics Software Engineer Learning Path

A Complete Roadmap from Beginner to Industry-Ready in 6 Months

ASFAN offers a structured, step-by-step learning journey to help aspiring engineers become professional Robotics Software Engineers. This program combines theoretical knowledge, practical projects, and industry-standard tools, ensuring graduates are fully prepared for the job market.

Prerequisites (Phase 0)

Before starting the program, learners should have a basic understanding of:

- Linux – Navigating and using the Linux environment for development.
- Python Programming – Writing scripts, automating tasks, and basic data handling.
- Basic Mathematics – Algebra, trigonometry, and basic calculus relevant to robotics.

Phase 1 – Robotics Developer Novice

Foundation Skills for Robotics Programming

- Git – Version control for collaborative robotics projects.
- C++ for Robotics – Core programming language for ROS and robotics algorithms.
- ROS2 Basics – Introduction to Robot Operating System 2.
- Robot Modeling – Creating 3D representations of robots for simulation.
- ROS2 TF – Understanding coordinate transforms in robotics.
- Gazebo – Physics-based simulation for testing robot systems.

Phase 2 – Robotics Developer Beginner

Hands-On Robot Building and Navigation

- Advanced ROS2 – Middleware communication and complex nodes.
- Robot Navigation – Path planning and obstacle avoidance.
- Robot Perception – Using sensors and vision systems for environmental awareness.
- Object Manipulation – Robotic arms and grippers for handling objects.
- Build Robot Controllers – Programming motor and actuator control.

Phase 3 – Robotics Developer Experienced

Applied Robotics Mathematics and Kinematics

- Math for Robotics – Geometry, vectors, and transformations.
- Mobile Robot Kinematics – Motion models for wheeled robots.
- Arm Kinematics – Forward and inverse kinematics for manipulators.
- Robot Dynamics – Forces, torques, and motion equations.
- Kalman Filters – Sensor fusion and noise reduction.
- Path Planning Algorithms – A*, RRT, Dijkstra's, and more.

Phase 4 – Robotics Developer Competent

Software Engineering for Robotics

- Web Interfaces – Building browser-based robot control panels.
- Docker – Containerization for robotics software deployment.
- Unit Testing (GTest) – Writing robust, testable code.
- Continuous Integration – Automating builds and tests.

Phase 5 – Robotics Developer Advanced

Industry-Ready Skills & Portfolio Development

- Final Project – Build a standout robotics portfolio project that integrates navigation, perception, and control.
- Career Preparation – Resume building, interview practice, and portfolio presentation.

Outcome

By the end of this learning path, participants will:

- Be proficient in ROS1 & ROS2, simulation tools, and robotics algorithms.
- Have hands-on experience with navigation, manipulation, and perception.
- Understand robotics mathematics, kinematics, and dynamics.
- Be ready to work as a Robotics Software Engineer in industry or research.

Journey to Robotics Expertise

Development Tools

Utilizing Docker, Gtest, and Jenkins for development



Robotics Theory

Understanding advanced concepts like kinematics and dynamics



Robotic Skills

Mastering navigation, perception, and manipulation



Build Your Robot

Creating a physical robot from scratch



Basic Programming

Learning C++, Git, and ROS frameworks



Pre-requisites

Laying the foundation with Python, Linux, and basic maths



Why Choose ASFAN?

- **Pioneers in Technical Training Technology** – Decades of experience delivering advanced training systems.
- **Local Support** – Based in Jordan with Arabic and English support for all products.
- **Proven Deployments** – Trusted by institutions, industries, and research centers.
- **Customizable Solutions** – Configurable for specific training, research, or production requirements.
- **Comprehensive Service** – Installation, onboarding, training, and ongoing technical support.



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