

240AR060 – Introduction to ROS

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1. BASIC CONCEPTS AND DEVELOPMENT TOOLS
 - 1.1. What is ROS, core concepts and ROS versions
 - 1.2. ROS command-line tools
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 - 1.4. Creating the ROS 2 workspace and a package
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APPENDICES

- 1: Linux basics
- 2: ROS 2 install instructions
- 3: Setup
- 4: Version control using GIT
- 5: Writing, compiling and linking C++ programs
- 6: Good practices: naming, documentation, logging

BIBLIOGRAPHY

Tutorials: <https://sir.upc.edu/projects/ros2tutorials/index.html>

Books:

A Concise Introduction to Robot Programming with ROS 2, Francisco Martín Rico, 2023, CRC Press.

Source code: https://github.com/fmrco/book_ros2

A very informal journey through ROS 2, Marco Mateo Bassa, 2023. Leanpub.

<https://leanpub.com/averyinformaljourneythroughros2>

Web resources:

ROS 2 Documentation: <https://docs.ros.org/en/humble/index.html>

ROS 2 software stack: <https://github.com/ros2>

Paper: [Robot Operating System 2: Design, architecture, and uses in the wild.](#)

Gazebo tutorials: <https://gazebo.org/docs/fortress/tutorials>

ASSESSMENT

Exercises: 20%

Final Work: 80% (deliverable 20%, demonstration and oral presentation 60%)

Regulations

- The Final Work must be done in teams of two/three.
- Final Work deliverable: git repository with commented code and README files.
- The oral presentation of the Final Work is scheduled on June 5th, 2025.

TEMPORAL DISTRIBUTION

	Date	TUTORIAL SESSION	DEADLINES	CLASSROOM
1	21/02	1. Basic concepts and development tools		H-5.4
2	28/02	2. Communications using topics	Exercise 1	H-5.4
3	07/03	Exercise 2	Exercise 2	H-5.4
4	14/03	3. Tools		H-5.4
5	21/03	4. Communications using services		H-5.4
6	28/03	Exercise 3-4		H-5.4
7	04/04	Final work: Hands-on session - Planning	Exercise 3-4	ESAII Robotics Lab
	11/04	<i>Partial exams</i>		
	18/04	Easter week		
8	25/04	5. Simulation		H-5.4
9	02/05	<i>Final work: Hands-on session - Sensing</i>	Exercise 5	ESAII Robotics Lab
10	09/05	6. Communication using actions		H-5.4
11	16/05	7. Robot control		H-5.4
12	23/05	<i>Final work: Hands-on session - Control</i>		ESAII Robotics Lab
13	30/05	<i>Final work: Hands-on session</i>		ESAII Robotics Lab

PERSONAL ADVISE

Professor	Monday	Tuesday	Thursday
Rosell, Jan (jan.rosell@upc.edu)		9:00 ÷ 12:00	9:00 ÷ 12:00
Palomo-Avellaneda, Leopold (leopold.palomo@upc.edu)	15:30 ÷ 17:00		15:30 ÷ 17:00