

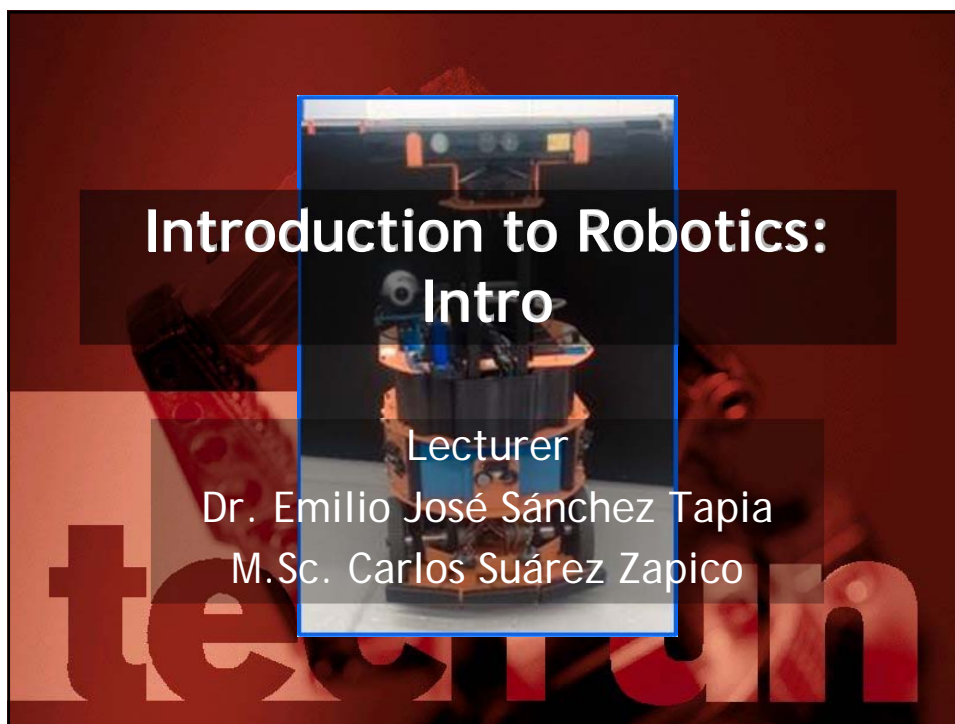
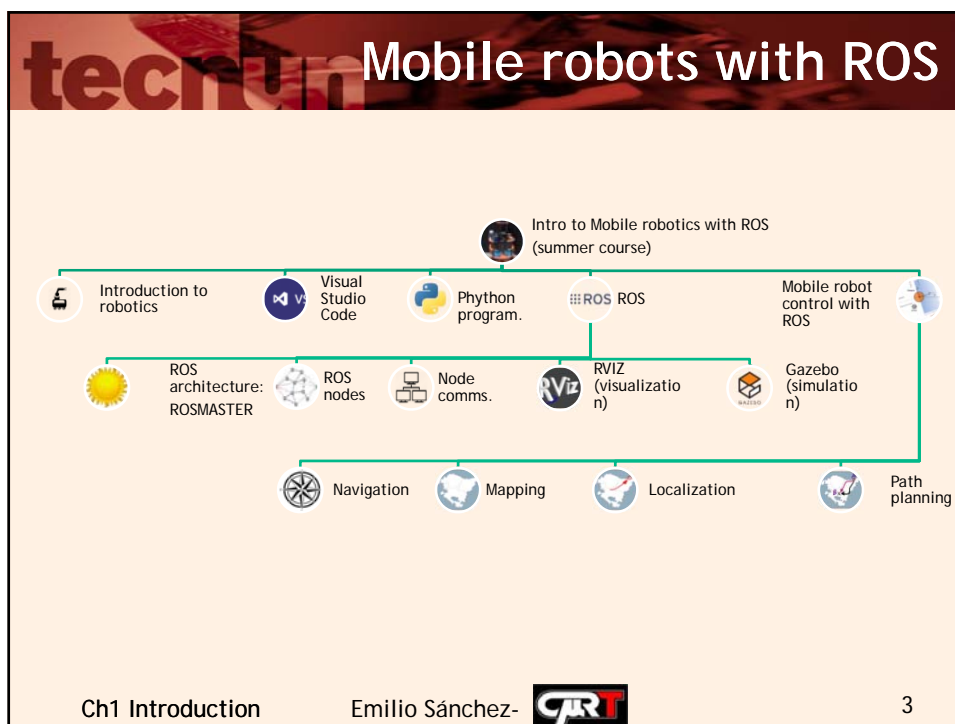


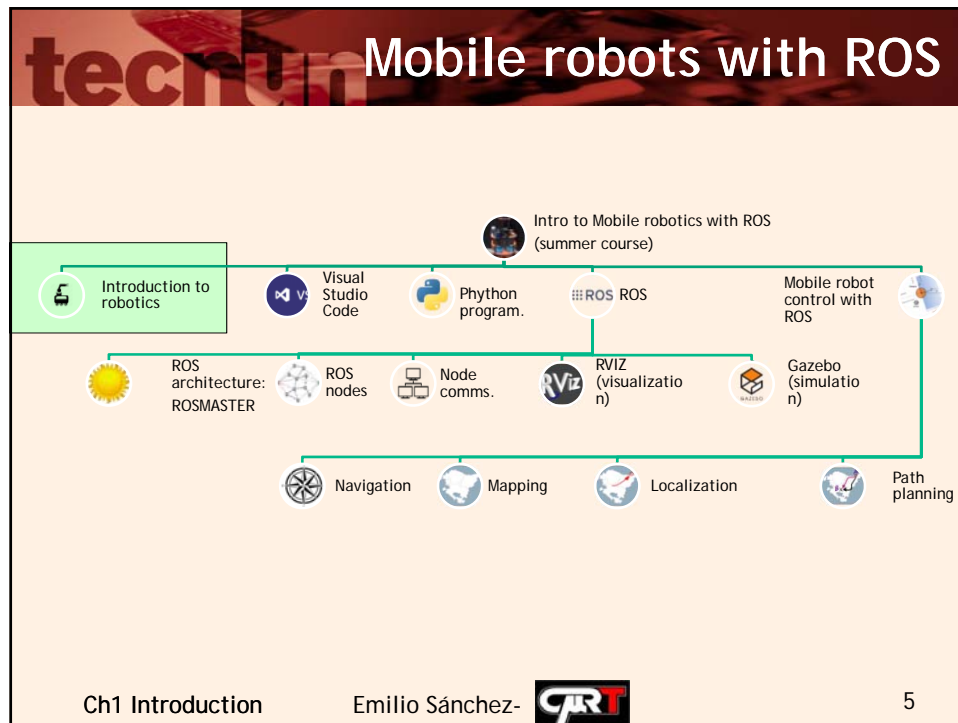
Summer course:
Introduction to Mobile Robotics
(slides)

Lecturers
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M.Sc. Carlos Suárez Zapico
Nerea Urrestilla Angiozar
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What a robot is...

- Robot
 - *robot* comes from the Czech word *robota*, meaning drudgery or slave-like labor
 - 1. m. Máquina o ingenio electrónico programable, capaz de manipular objetos y realizar operaciones antes reservadas solo a las personas.
 - Collins→ any automated machine programmed to perform specific mechanical functions in the manner of a person
 - The American Heritage→A mechanical device that sometimes resembles a human and is capable of performing a variety of often complex human tasks on command or by being programmed in advance.
 - Mechatronic device


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- Robot

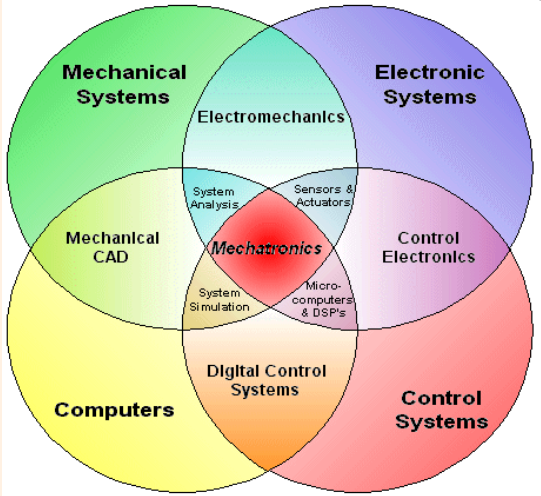
"I can't define a robot, but I know one when I see one."


~ Joseph Engelberger (called the godfather of industrial robotics)

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tecnun **Robot: mechatronic device**

- MECHANics + elecTRONICS=MECHA-TRONICS



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What makes a robot so useful nowadays?

- Speed
- Able to work in hazardous / dangerous environments
- Always available to work (continually working day and night without getting tired)
- Can do repetitive tasks
- Can do work with accuracy
- Able to transport big payloads

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9

Classification of robots



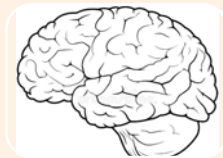
Locomotion



Environment



Application

Level of
intelligence

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10

Classification on Locomotion

- Stationary robots (attached to the floor)
- Wheeled
- Legged
- With turbine
- With vibrators

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Classification on Locomotion

STATIONARY ROBOTS	Cartesian Robots	Cylindrical	Spherical	SCARA	Articulated	Parallel
						
WHEELED ROBOTS	Single Wheel	2 Wheeled	3 Wheeled	4 Wheeled	6 Wheeled	Tracked Robots
						
LEGGED ROBOTS	One Leg	Bipedal	Tripedal	Quadrupedal	Hexapod	Many Legs
						
SWIMMING ROBOTS		FLYING ROBOTS		Robotic Balls	SWARM ROBOTS	MODULAR ROBOTS
						
MICRO Robots	NANO Robots	SOFT ROBOTS	SNAKE Robots	CRAWLER Robots	HYBRID Robots	
						

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Classification on the environment where they work

- **Land robots or UGVs**(Unmanned Ground Vehicles)
- **Aerial robots or UAVs** (Unmanned Aerial Vehicles)
- **Water-based robots**
- **Underwater robots AUVs** (autonomous underwater vehicles)
- **Space robots (space ROVER)**

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13

UGVs: Wheeled Robots



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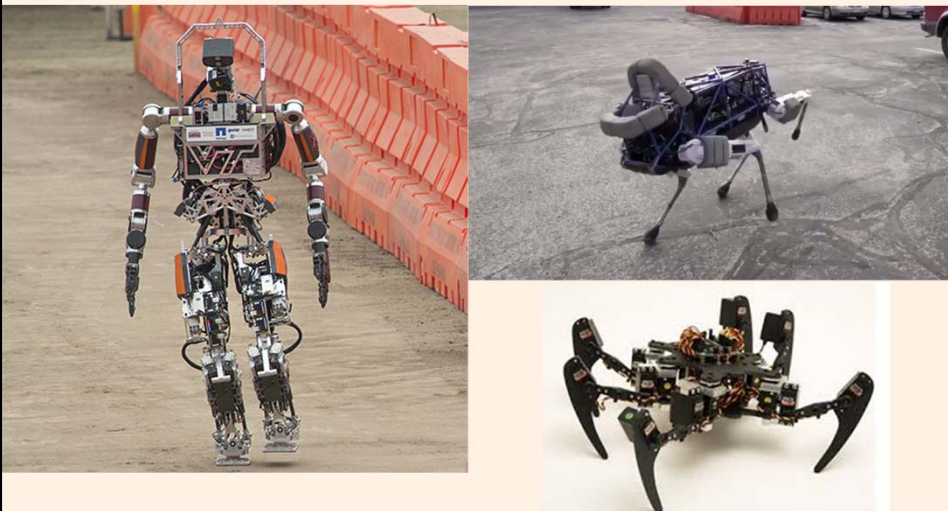
14


tecun UGVs: Tracked Robots



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tecun UGVs: Legged Robots



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UAVs



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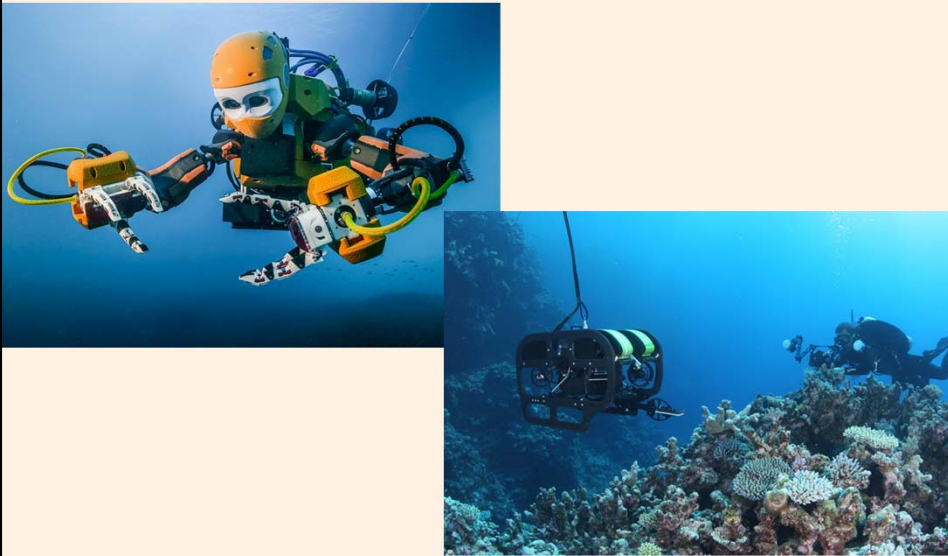
Water-based Robots




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AUVs




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Space Robots

- No gravity
- Shielded against space radiation that may destroy electronics and control of the robot

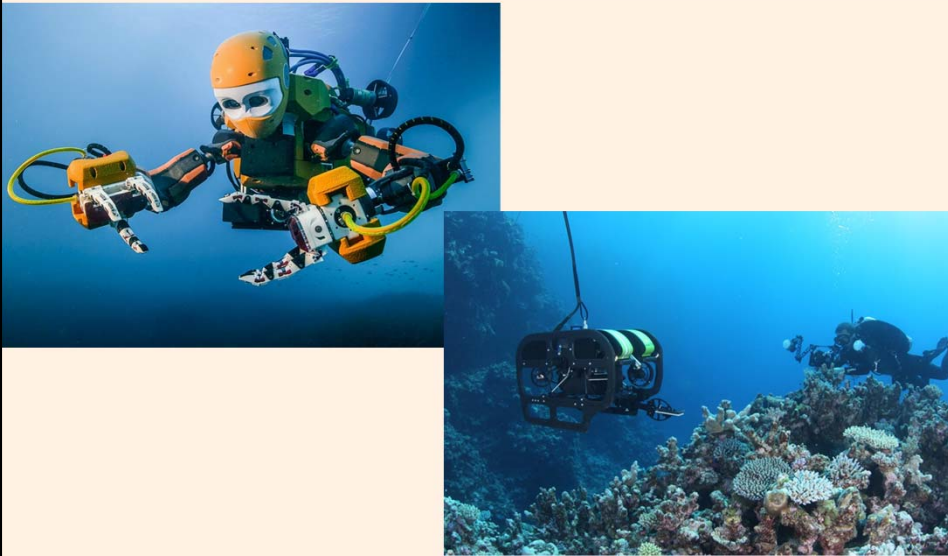



(Dextre Robot)

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AUVs




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Based on the application

- Industrial (assembly, transport, inspection)
- Military
- Domestic (Service robots)
- Medical
- Research and Education (Service robots)
- Entertainment (Service robots)
- Exploration
- Search and Rescue
- Mining
- Construction
- Agriculture

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tecun Industrial Robots

- Anthropomorphic
- Scara Robots
- Delta Robots
- Cartesian coordinate Robots



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tecun Military Robots

- Transport, search and attack



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Medical Robots (Surgical Assistant)



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Healthcare Robots

- Care of people with disabilities or mental health problems.



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Domestic Robots

- Homes are unstructured and disordered environments requiring high adaptability for a changing and challenging environment.
- Most are prototypes

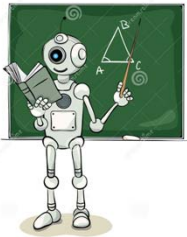








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27

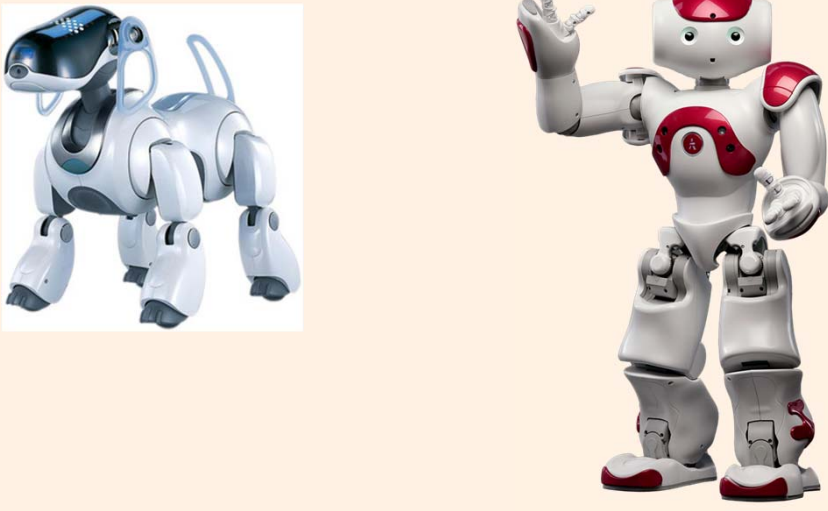
Educational Robots







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tecnum Entertainment Robor



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tecnum Based on degree of Autonomy

- **Variable-Sequence Robot:** A device that performs the successive stages of a task according to a predetermined method easy to modify
- **Playback Robot:** A human operator performs the task manually by leading the Robot
- **Numerical Control Robot:** The operator supplies the movement program rather than teaching it the task manually
- **Intelligent Robot:** A robot with the means to understand its environment and the ability to successfully complete a task despite changes to the environment.

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