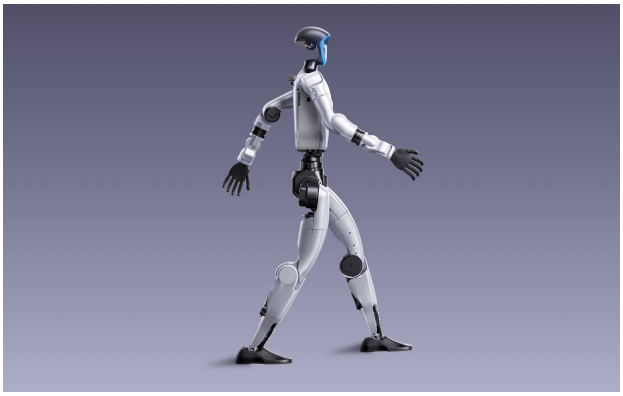
COMPUTING / ENGINEERING / INTERDISCIPLINARY STUDY

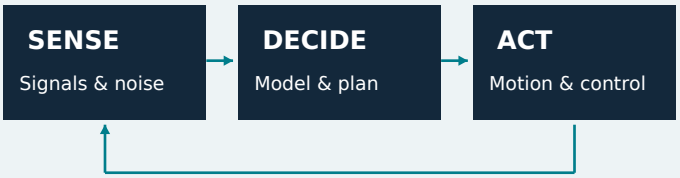
Robotics for higher education

Use robotics to connect theory, software and experimental evidence. Co-design a focused seminar, applied lab or project brief around your module, student level and available facilities.



Unitree G1 product image. Illustrative platform; access agreed separately.

A SYSTEM TO INVESTIGATE



MEASURE / TEST / EXPLAIN

Academic pathways and student evidence

ACADEMIC FOCUS	TOPICS & PRACTICE	POSSIBLE STUDENT OUTPUT
Kinematics & control	Coordinate frames, forward kinematics, joint limits and feedback. Model motion and compare controller behaviour.	Model, response plots and an explanation of tracking error.
Perception & autonomy	Sensor uncertainty, state estimation and planning. Examine how noisy observations change task performance.	Test protocol, error analysis and robustness comparison.
Software & simulation	Python, ROS 2 nodes and topics, state machines and data logging. Build and test a small simulated behaviour.	Reproducible code or notebook, logs and documented tests.
Human interaction & deployment	Usability, accessibility, risk, ethics and cost. Compare robot use with alternative ways to meet a defined need.	User-study proposal, risk register and justified recommendation.

Depth matched to the cohort

Undergraduate: apply taught theory, implement a bounded task and evaluate results. Coding labs assume basic Python; control work may require algebra and calculus.

Postgraduate extension: critique literature, compare methods, test sensitivity to assumptions and discuss reproducibility and the limits of transfer to hardware.

Reference points: QAA Computing (2022), Engineering (2023) and ROS 2 documentation.

A WORKED ACADEMIC EXAMPLE

From hypothesis to evidence.

Illustrative lab sequence: 4 x 3 hours, plus independent study. Investigate how sensor noise affects the tracking performance of a simulated robot joint or mobile base.

An experimental sequence

01 Model & frame

Specify a testable question, variables and a tracking task. Establish a baseline and choose appropriate error metrics.

02 Implement & document

Build a simple feedback controller in the agreed simulator. Record code, parameters, sampling and operating limits.

03 Test & compare

Introduce controlled noise levels. Repeat trials with fixed conditions and logged random seeds; compare tracking error and variability.

04 Interpret & defend

Explain results, limitations and competing explanations. State what further evidence would be needed before a physical trial.

LEARNING OUTCOMES

01 Formulate a bounded robotics problem and justify a model.

02 Implement and document a reproducible computational experiment.

03 Evaluate results against a baseline, including uncertainty and failure cases.

04 Defend a conclusion using evidence, ethical reasoning and technical limitations.

ASSESSABLE EVIDENCE

Code or notebook, parameters and data, comparative plots, a short technical report and a viva or presentation. Suggested criteria: theoretical rationale, fair testing, reproducibility, interpretation and recognition of limitations. Academic staff set the assessment brief, marking and any credit.

Delivery shaped with your academic team

Formats
A 90-minute seminar, one-day applied workshop or a short lab sequence. Scope one pathway to the cohort.

Planning & resources
Agree facilitator expertise, software, accessibility and facilities before booking. Advanced labs and live robots require separately confirmed specialists and equipment.

DISCUSS YOUR MODULE OR COHORT

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Academic brief and separate quotation, agreed before booking.