



Jordan University of Science and Technology
Faculty of Computer & Information Technology
Robotics Science Department

RB201 Introduction To Robotics

First Semester 2025-2026

Course Catalog

3 Credit Hours. This course offers a comprehensive introduction to the fundamental principles of modern robotics, with an emphasis on modeling, design, planning, and control. It builds a strong theoretical foundation through core concepts in geometry, kinematics, statics, dynamics, and control theory. Students examine practical aspects of robotics, including robotic system types, forward and inverse kinematics, motion dynamics, and path planning. By the end of the course, students will have a balanced understanding of both the theoretical and applied aspects of robotics.

Teaching Method: On Campus

Text Book

Title	Introduction to Robotics: Mechanics and Control
Author(s)	John J. Craig
Edition	3rd Edition
Short Name	Ref #1
Other Information	Pearson Prentice Hall, ISBN: 0-201-54361-3

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Robotics: Modelling, Planning and Control	Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, and Giuseppe Oriolo	1st Edition	Springer

Instructor

Name	Ahmad Al Ali
Office Location	-
Office Hours	
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Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 14:00 - 15:00 Room: M2010

Prerequisites		
Line Number	Course Name	Prerequisite Type
1792400	AI240 Introduction To Artificial Intelligence	Prerequisite / Study
901400	MATH140 Elements Of Linear Algebra	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction to Robotics	
Weeks 2, 3	Spatial descriptions and transformations	From Ref #1
Week 4	Manipulator Kinematics	From Ref #1
Week 5	Denavit Hartenberg parameters	From Ref #1
Weeks 6, 7	Inverse manipulator kinematics	From Ref #1
Week 8	Jacobians and velocities	From Ref #1
Week 9	Manipulator dynamics	From Ref #1
Week 10	Robotics path planning and control	From Ref #1
Week 11	Trajectory generation and polynomials	From Ref #1
Week 12	MATLAB and Simulink : building a robotic manipulator and controlling it (in simulation)	

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Analyze Jacobians to relate joint velocities and forces to end-effector motion.	10%	
Design and evaluate robot motion trajectories using polynomial methods and trajectory generation techniques.	10%	
Integrate theory and simulation to build and validate a complete robotic manipulator model in a virtual environment.	10%	
Analyze robotic manipulators using forward and inverse kinematics, including Denavit-Hartenberg (DH) parameterization.	20%	
Model and analyze the dynamics of robotic manipulators using fundamental principles of statics and dynamics.	10%	

Use modern engineering tools such as MATLAB and Simulink to model, simulate, and control robotic systems.	10%	
Develop and implement basic path planning and control algorithms for robotic manipulators.	10%	
Apply spatial descriptions, coordinate transformations, and homogeneous transformation matrices to model robotic systems.	20%	

Evaluation	
Assessment Tool	Weight
First Exam	20%
Second Exam	20%

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