

**Arab Academy for Science and Technology and Maritime Transport
Computer Science Curriculum
Course Syllabus**

Course Code: CS469	Course Title: Robotics Applications	Classification: E	Coordinator's Name: Dr. Essam Elfakhrany	Credit Hours: 3
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Pre-requisites: <ul style="list-style-type: none"> • CS366 (Introduction to Artificial Intelligence) • CE243 (Intro. to Computer Architecture) 	Co-requisites: None	Schedule: Lecture: 2 hours Tutorial-Lab: 2 hours		
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Office Hours:

Course Description:

This course provides an introduction to the world of robotics and their software programming applications. Topics of interest include the application of microcontrollers and sensors in robotics and from the points of view of hardware and software. The course aims at introducing the students to the mathematical background behind the equations of motion of dynamics and kinematics.

Textbook:

Mark W. Spong, Seth Hutchinson, and M. Vidyasagar, *Robot dynamics and Control*, John Wiley & Sons.

References:

Kilian , *Modern Control Technology: Components and Systems*, 2nd Edition, Delmar.

Course Objective/Course Learning Outcome:	Contribution to Program Student Outcomes:
1. Introduction to robotics	
2. Objecting Location	
3. Rigid motions and general transformation	(SO1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
4. Forward Kinematics ¹	

5. Forward Kinematics ²	
6. Inverse Kinematics ¹	
7. Inverse Kinematics ²	
8. Trajectory planning	SO2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
9. Mobile Robotics	

<p>10. Robotics and AI</p>	
<p>11. Applications</p>	<p>(SO6) Apply computer science theory and software development fundamentals to produce computing-based solutions.</p>
<p>Course Outline:</p> <p>12. Introduction to robotics</p> <p>13. Objecting Location</p> <p>14. Rigid motions and general transformation</p> <p>15. Forward Kinematics¹</p> <p>16. Forward Kinematics²</p> <p>17. Inverse Kinematics¹</p>	<p>18. Inverse Kinematics²</p> <p>19. Trajectory planning</p> <p>20. Mobile Robotics</p> <p>21. Robotics and AI</p> <p>22. Applications</p>

Grade Distribution:

7th Week Assessment (30%)

12th Week Assessment (20%)

Year Work (10%)

Final Exam (40%)

Policies:

Attendance:

AASTMT Education and Study Regulations (available at aast.edu)

Academic Honesty:

AASTMT Education and Study Regulations (available at aast.edu)

Late Submission:

Late submissions are graded out of 75% (1 week late), 50% (2 weeks late), 25% (3 weeks late), 0% (more than 3 weeks late)