University of Lincoln Assessment Framework
Assessment Briefing Template 2024-2025

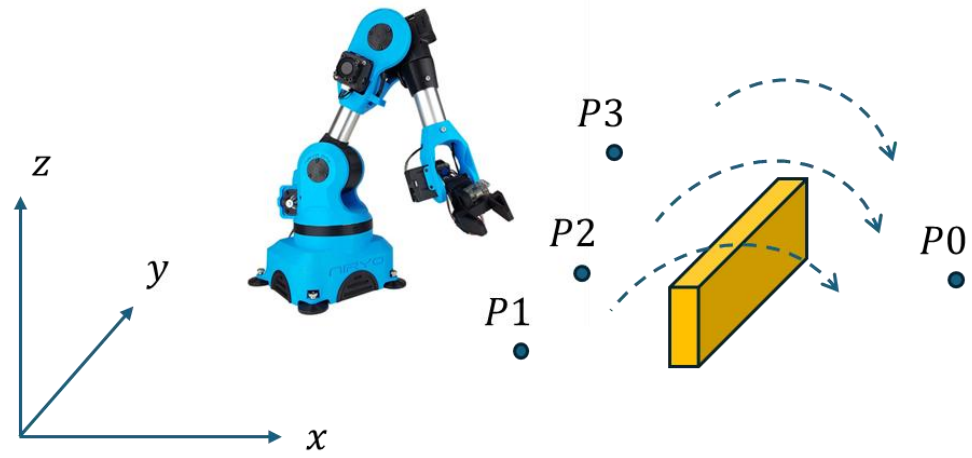
Module Code & Title: ELE3005M – Robotics and Automation

Contribution to Final Module Mark: 70%

Coursework Title: Final Robotics Project

Description of Assessment Task and Purpose:

The aim of this project is to automate a basic manipulation task in which the Niryo robot is programmed using MATLAB/Python/ROS to pick up three small boxes (P1, P2, P3, 10 mm × 10 mm × 10 mm) and stack them on top of each other at the other side of a barrier (P0, barrier height 100 mm, width 10 mm). Implement this task utilising everything that you learn in this module to be able to model the Niryo robot, detect targets, describe them using 3D poses, compute transformations, calculate trajectories that avoid collisions, and finally, control the robot to implement this in simulation. Your task outcomes will be evaluated for reliability, which you will attempt to enhance through the logic you implement in your MATLAB/Python script. Innovative solutions that go beyond the project requirements to improve performance and/or user interface are encouraged.



Learning Outcomes Assessed:

1. Select and evaluate technical literature and other sources of information to address problems in the robotics and automation field and its underlying principles.
2. Select, evaluate and apply key control principles, quantitative science and robot programming tools in the design of robotics systems and problems
3. Select and apply appropriate computational and analytical techniques to model typical robotics applications in automation problems and recognise the limitations of the techniques employed
4. Understand and evaluate the operation and application of a range of sensory systems in robotics and demonstrate principles of secure data storage and analysis
5. Communicate effectively on complex engineering matters with technical and non-technical audiences

Knowledge & Skills Assessed:

1. Subject Specific Knowledge, Skills and Understanding: automation using robots, manipulation and teleoperation, forward and inverse kinematics, robot types, configurations and applications

2. Professional Graduate Skills: independence and personal responsibility, written communication, literature search, and solving engineering problems

3. Career-focused Skills: Skills and attributes required by employers (MATLAB, ROS and Python)

Assessment Submission Instructions:

This submission is group work.

You will find submission links via the ELE3005 Blackboard Module Site under Assessments.

All work should be submitted by the deadline stated above. Any late submissions will be subject to a lateness penalty in line with the University policy.

The method of submission described above should be used in the first instance however, in cases of technical issues please email your assessment to: soesubmissions@lincoln.ac.uk by the above deadline. Please include the module code and coursework title in the email subject.

All work will be subject to plagiarism and academic integrity checks. In submitting your assessment you are claiming that it is your own original work; if standard checks suggest otherwise, Academic Misconduct Regulations will be applied.

Date for Return of Feedback: 2 weeks after hand-in

Format for Assessment:

The submission of this project assessment is composed of 3 parts as follows:

1. Project files (40% - group submission via BB assignment link)

Submit all MATLAB/Python files you created to complete the task for this project in the form of a single zipped file named as your group number.

2. Technical report (40% - individual submission via Turn-it-in link)

2.1 The aim of your report is to document all your progress on this project and show your understanding of the technical aspects involved.

2.2 Your submission should take the form of an individual PDF report using the following structure:

a. Background (Introduction to robotic manipulation and the project task),

b. System overview (hardware specifications and software used),

c. Methodology (explain your approach to solving this project),

d. Results and Conclusions (evaluate how well your solution performed and areas for future improvement).

2.3 A good technical report will combine the implementation with the supporting theory in a concise and organised format. Supporting figures are encouraged where applicable.

2.4 Note: there is a 10-page limit for your report.

3. Simulation Video (20% - group submission via BB video submission link)

3.1 The aim of this simulation video is to showcase what you achieved in this project by recording the simulation of the required task being completed.

3.2 Your submission will be a recorded video of the simulation. Adding commentary and/or supporting text is encouraged to highlight areas of innovation and limitations that can be further improved.

3.3 Note: there is a maximum of 6 minutes limit for your video.

Marking Criteria for Assessment:

90-100%: a range of marks consistent with a first where the work is exceptional in all areas.

80-89%: a range of marks consistent with a first where the work is exceptional in most areas.

70-79%: a range of marks consistent with a first. Work which shows excellent content, organisation and presentation, reasoning and originality; evidence of independent reading and thinking and a clear and authoritative grasp of theoretical positions; ability to sustain an argument, to think analytically and/or critically and to synthesise material effectively.

60-69%: a range of marks consistent with an upper second. Well-organised and lucid coverage of the main points in an answer; intelligent interpretation and confident use of evidence, examples and references; clear evidence of critical judgement in selecting, ordering and analysing content; demonstrates some ability to synthesise material and to construct responses, which reveal insight and may offer some originality.

50-59%: a range of marks consistent with lower second; shows a grasp of the main issues and uses relevant materials in a generally business-like approach, restricted evidence of additional reading; possible unevenness in structure of answers and failure to understand the more subtle points: some critical analysis and a modest degree of insight should be present.

40-49%: a range of marks which is consistent with third class; demonstrates limited understanding with no enrichment of the basic course material presented in classes; superficial lines of argument and muddled presentation; little or no attempt to relate issues to a broader framework; lower end of the range equates to a minimum or threshold pass.

35-39%: achieves many of the learning outcomes required for a mark of 40% but falls short in one or more areas.

30-34%: a fail; may achieve some learning outcomes but falls short in most areas; shows considerable lack of understanding of basic course material and little evidence of research.

0-29%: a fail; basic factual errors of considerable magnitude showing little understanding of basic course material; falls substantially short of the learning outcomes for compensation.

Marks will be allocated for appropriate structure and format of the report, demonstration of an understanding of the context and theoretical background to the work, use of an appropriate range of references and effective use of results to support any conclusions made.

Please note that all work is assessed according to the University of Lincoln Management of Assessment Policy and that marks awarded are provisional on Examination Board decisions (which take place at the end of the Academic Year.

Feedback Format:

Feedback will be given via TurnItIn

Additional Information for Completion of Assessment:

1. Please make sure any supporting figures/screenshots you include are clear and show detailed steps for describing your project.
2. Avoid copying over question with your submitted report to avoid false high similarity scores on turn-it-in.

Assessment Support Information:

Please email any questions to SaLiu@lincoln.ac.uk

Important Information on Academic Integrity:

The use of AI tools is Not permitted

All work will be subject to plagiarism and academic integrity checks. In submitting your assessment, you are certifying that this is entirely your own work, without input from either commercial or non-commercial writers or editors or advanced technologies such as artificial intelligence services unless explicitly allowed and referenced. If standard checks suggest otherwise, Academic Misconduct Regulations will be applied.