University of Lincoln Assessment Framework
Assessment Briefing Template 2024-2025

1. Module code & title	CMP9764 Advanced Robotics
2. Assessed learning outcomes	[LO 1] Analyse the "state of the art" in advanced robotics, including an understanding of the mathematical principles and current applications; [LO 2] Critically appraise a range of advanced concepts for navigation, state estimation, planning, learning, and control, identifying their strengths and weaknesses, and selecting appropriate methods to serve particular roles; [LO 3] Design a software component for solving complex robot control problems for mobile robotics or robotic manipulators.
3. Assessment title	Assessment Item 2
4. Contribution to final module mark (%)	50%
5. Description of assessment task	This module assessment is comprised of 2 items, one for each block of delivery of the Advanced Robotics module: 1. Human Robot Interaction (HRI), and 2. Robot Learning. You must complete both of the assessment items above, and submit your reports as two separate PDFs. You should use the following naming convention for each PDF: cmp9764-2425_[asstX]_[studentID] Where [asstX] represents the item number of the assessment that the report addresses, and [studentID] is your student ID number. There is a single submission deadline for the submission of both of the assessment item reports. Please refer to the school hand-in spreadsheet for this deadline.

Assessment Item 2: Robot Learning report

Description of Assessment Task and Purpose:

In this individual assignment, you will further explore and characterise some of the principles of robot learning by demonstrations that have been explored in the lectures and workshops of the learning from demonstration block of the Advanced Robotics module. In addition to this briefing, you should refer to the Assessment Item 2 CRG for the marking criteria.

There are two main parts to this assignment. Both of these should be included in the report.

Part 1: Conduct a brief literature review (2-3 papers) on the topic of robot learning from demonstration (up to 2 pages).
The review should contain the following:

- What is learned from the machine learning methods (e.g. low level control inputs, high level policies)
- How are the demonstrations introduced (through kinesthetic teaching, teleoperation or passive observation?)
- What is the learning outcome, input and output?
- What machine learning methods are used?
- Is stability and convergence guaranteed and how?
- A critical evaluation and comparison of the presented papers. What are the advantages and disadvantages of those?

Part 2: Robot learning of dynamical systems from demonstrations using Dynamic Movement Primitives (DMPs) and Stable Estimator of Dynamical Systems (SEDS). (up to 2 pages)
This part should contain:

- Brief presentation of the mathematical formulation of DMPs and SEDS
- Application of DMPs and SEDS on provided datasets ("Assessment Item 2 - datasets.zip")
- Plots and comparison of learned trajectories
- The methodology that was followed to fine-tune the hyper-parameters of DMPs SEDS (number of Gaussians)

You should write a report covering the literature review and application, providing appropriate motivation, justifications, analyses, and discussions.

This is an individual assessment. While you are encouraged to discuss your approaches and results with your course colleagues, all code (for the simulations) and reporting thereon (i.e. the report to be submitted) must be your own work.

6. Assessment submission instructions	You should submit your report as a single ".PDF" file to the "*Assessment Item 2 Upload*" section. You may structure your report as you deem appropriate in order to describe the work that you conducted. However, it would be worth considering at least the following sections in the report (following an appropriate title and abstract): 1. Introduction: describes the problem statement, the categories of existing solutions, and the open research questions in each category. 2. Literature Review (or Related Work): Select three related works/papers and summarise them. 3. Applications: Use the code developed in the workshops and present the key outcomes of applying DMPS and SEDS on the provided datasets of demonstrated trajectories of various complexity. Present the methodology you followed for deciding on tuning the parameters of DMPs and SEDS 4. Discussion: This section should provide a critical discussion which provide a good understanding of pros and cons of different related works in the domain of interest. For the report, you must use the IEEE A4 Conference Proceedings template, which is available online (https://www.ieee.org/conferences/publishing/templates.html). You may use either the Word or LaTeX templates: your submission should be a PDF document, no more than 4 pages long (including figures and references). *DO NOT include this briefing document with your submission.*
7. Date for return of mark and feedback	Please see the **Hand In Dates.xls** spreadsheet. Note: *all marks awarded are provisional until confirmed by the Board of Examiners.*
8. Feedback format	Individual feedback will be given in written format with the grade. These grades are provisional until final moderation. Further clarifications on the feedback received may be obtained from the module delivery team upon request.
9. Use of Artificial Intelligence (AI) in this assessment	You may **not** use Artificial Intelligence (AI) in this assignment. This means that you may not use any AI technologies including Grammarly, CoPilot, QuillBot and others. If you are not sure whether you should be using a

	particular tool then ask your module leader first.
10. Marking criteria for assessment	A Criterion Reference Grid (CRG) is used to evaluate your learning against a set of pre-defined criteria.
11. Additional information (support, advice, tips etc)	Each of the assessment items will be introduced in the associated block of delivery of the module. In addition to this, a part of the workshop time will be made available for assignment support within each block of delivery.
12. Important Information on Dishonesty, Plagiarism and AI Tools	University of Lincoln Regulations define plagiarism as *'the passing off of another person's thoughts, ideas, writings or images as one's own...'*. Examples of plagiarism include the unacknowledged use of another person's material whether in original or summary form. Plagiarism also includes the copying of another student's work'. Plagiarism is a serious offence and is treated by the University as a form of academic dishonesty. For more information on examples of Academic Offences, please see the **Academic Offence Guidance**. Please note, if you use AI tools in the production of assessment work **where it is not permitted**, then it will be classed as an academic offence and treated by the University as a form of academic dishonesty. Students are directed to the University Regulations for details of the procedures and penalties involved. For further information, see www.plagiarism.org