University of Lincoln Assessment Framework
Assessment Briefing 2025-2026

1. Module code & title	**CMP3108M/9055M Image Processing**
2. Assessed learning outcomes	[LO2] apply a range of imaging techniques to solve practical problems.
3. Assessment title	Assessment 2 - Assignment
4. Contribution to final module mark (%)	70% (BSc) 60% (MComp, Year 4)
5. Description of assessment task	This is an **individual** assignment. **Requirements** This assessment comprises two assessed components, as detailed in the following page. 1. A report (in PDF format) that describes your approach to the tasks (maximum 4 pages, including figures but not the cover page). Weighting: 30% of this assessment. 2. A file containing all functions written in MATLAB/Octave code with clear comments and requested figures. Weighting: 70% of this assessment. **Tasks** Download and unzip the file 'Assignment_Input.zip' from Blackboard. You should obtain: • A dataset of 16 images containing a white swan logo; • Two MATLAB script m-files named 'Task1.m' to 'Task2-3.m'. • A folder containing the ground truth images (i.e. annotated masks). Complete the MATLAB m-files to perform the corresponding tasks described below. As a guide, a few command lines for performing the Tasks have already been added to the script. You need to add the command lines to implement the other steps. Ensure you add appropriate comments to your code to briefly explain what each section is doing. You CAN use any built-in function but not any custom functions written by others (e.g. from Matlab File Exchange). **Task 1 Simple Swan Segmentation** Complete the MATLAB script Task1.m to automatically segment the swan from the provided image IMG_01.jpg. Your goal is to produce a binary image that contains only the complete white swan (as accurate as possible) on a black background (with as little noise as possible). *Hint: thresholding, edge detection, connected component analysis and morphological operations may be useful.*

In your report, describe the steps you took and include the resulting binary image.

Task 2 Swan Recognition

Extend your work into Task2.m to design a more general and robust method that works across the entire dataset. The output should be a binary image where background pixels are 0 and pixels belonging to the swan are non-zero (as shown in the figure below).

Fig. (a) Original Image

Fig. (b) Swan Segmentation

Your solution should aim to minimise the use of hard thresholds and must NOT use machine learning approaches.

Hints (optional):

- Preprocessing such as resizing, greyscale conversion, histogram analysis, or edge detection.
- Colour thresholding, connected component analysis, or region/shape feature analysis.
- Post-processing to reduce noise or fill gaps.

In your report:

- Explain the steps in your processing pipeline and justify your design choices.
- Select one image other than IMG_01.jpg and illustrate intermediate outputs at each main processing stage by adding example figure(s) to your report..
- Save all the resulted images when running the algorithm on the entire dataset in a file called ‘output’. This output file can be zipped up together with your source code and submitted through ‘supporting material upload’.

Task 3 Performance Evaluation

Continue to write your code for this task in script Task2.m. Evaluate your method using the provided ground truth images (Assignment_GT.zip). The ground truth labels swan pixels with 255 and background with 0. Ensure your outputs are resized appropriately with matching intensity range before comparison.

- Compute the Dice Score (DS) for each image.
- Present the DS values in a table (per image, plus mean and standard deviation).
- Include the formula for Dice Score in your report and explain what it measures.

6. Assessment submission instructions	This submission is: Individual work All work should be submitted by the deadline stated. The deadline for submission of this work is included in the School Submission dates on Blackboard. You must make an electronic submission of your report in PDF format together with a zip file containing all source code files (i.e. two m-files which produce the desired results and display the outputs) by using the assessment link on Blackboard for this component. Make sure the MATLAB scripts are correct and functional and do not display any error message. Put all the files (excluding the provided images and compress the folder into a zip file for submission. Name your zip file and PDF report using this format: LastName_ FirstName_StudentNo. The report should be submitted through TurnItIn and the zip file should be uploaded as supporting material. You must attend the lectures for further details, guidance and clarifications regarding these instructions. In cases of technical issues please email your assessment to: sepssubmissions@lincoln.ac.uk by the above deadline. Please include the module code and coursework title in the email subject. Please note that links will **NOT** be accepted under any circumstances.
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	See CRG. Written feedback via blackboard.
9. Use of Artificial Intelligence (AI) in this assessment	Students can use AI tools to enhance their understanding of the topics, questions, and techniques involved in this assessment. However, submitting any solutions or answers directly provided by AI tools as your own work is strictly prohibited and will be considered an academic offence. You are responsible for producing original responses based on your own understanding and analysis.
10. Marking criteria for assessment	A Criterion Reference Grid (CRG) or Marking Scheme specific to this particular assessment will be available when the questions get released. It will be used to evaluate your learning against a set of pre-defined criteria. ***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.***
11. 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**. The use of AI tools: Not Permitted

	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