

Open Lab Instructions

1. Using internet is not allowed, therefore you are required to “**Turn off**” your WIFI and your internet connection status should be visible in your task bar throughout the open lab.



2. **Do not turn on flight mode**, rather, turn off your WIFI.
3. Internet use is strictly prohibited during the Lab Final. Any student found accessing the internet will receive a failing grade.
4. Using generative AI tools (e.g., ChatGPT, Gemini, Copilot) is strictly prohibited. Any student found using these services **during or after the examination** will receive a failing grade and face strict disciplinary action.
5. Your task bar should be visible all the time during lab exam, and there shouldn't be any applications pinned on task bar, rather it should only reflect your running applications all the time.



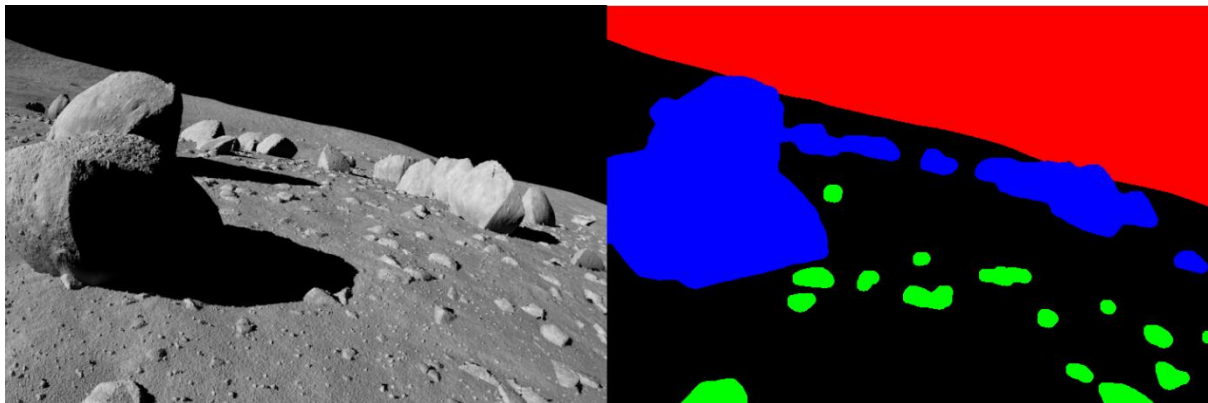
6. You are allowed to run the following applications only.
 - a. PyCharm/Any Python IDE
 - b. File Explorer
 - c. PDF Viewer
7. Running web-based WhatsApp is not allowed.
8. This is an examination, so no technical questions will be addressed. If any information appears to be missing, make reasonable assumptions and proceed with the solution.

Open Lab
(CLO4 -> PLO5)
Digital Image Processing
24 March 2025
Time: 90 minutes

Note: Students should score 50% in OBE specific questions to ensure their accumulated scores towards respective PLOs are above 50%.

Lunar Landscape Images can be used for the development and evaluation of algorithms related to lunar surface analysis. Potential applications include tasks such as identifying different types of rocks, estimating their size and distribution, or even simulating robotic navigation on the Moon. A potential challenge within this dataset could be the presence of variations in lighting, shadows, or even the texture of the lunar surface itself, which might complicate the reliable extraction of individual rocks. An effective algorithm would ideally be robust to these variations and accurately segment the rocks from the background. There are three main objects in the images:

1. Sky (Red in masks)
2. Large Rocks (Blue in masks)
3. Small Rocks (Green in masks)



A sample dataset containing original images along with ground truth masks is provided with this file.

You must test your solution on all images and then find performance parameter DICE Coefficient as given in equation below by comparing your result with given ground truths.

$$Dice\ Coefficient = \frac{2 * TP}{FN + (2 * TP) + FP}$$

Here, True positive (TP) is the number of true foreground pixels (pixels that belong to lesion according to ground truth and you have also extracted it as lesion) and false positive (FP) is false foreground pixels (pixels that don't belong to lesion according to ground truth but detected wrongly as lesions by algorithm you have implemented). False negative (FN) are the false background pixels (pixels which belong to lesion as per given ground truth, but your algorithm couldn't extract them as lesion pixels).

Submission: You need to submit following against this open lab containing:

1. A flow diagram in hard form.
2. Create a zip containing all code files and corresponding images. It should also contain a word file or python command line picture showing Dice Coefficient values against given images.
3. Add all output figures for each intermediate step for all given images in that zip file.