**Subject**

**Computer Vision**

**Activities in class**

**Unit II**

**Digital Image Fundamentals**

**Session 04**

**Teacher: Rubén Ferreiroa**

# Exercise 1 - Basic Patterns:

* Students create and visualize simple patterns (vertical and horizontal lines)
* They observe how these patterns are represented in the frequency domain
* Helps understand the fundamental relationship between spatial and frequency domains

# Exercise 2 - Frequency Analysis

* Generation of sinusoidal signals with different frequencies
* Combination of signals and visualization of their transforms
* Shows how different frequencies are represented in the spectrum

# Exercise 3 - Fourier Domain Filtering:

* Implementation of low-pass and high-pass filters
* Visualization of the effects of each filter type
* Practical understanding of how filtering affects images

# Exercise 4 - Basic Compression:

* Implementation of compression using FFT
* Analysis of different compression levels
* Understanding the relative importance of frequency components

# Exercise 5 - Phase and Magnitude Reconstruction:

* Separation of magnitude and phase from the transform
* Swapping phases and magnitudes between images
* Understanding the importance of phase information in images