



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

College of Computer Science and Information Technology
نامولعملا ءينقو بساحلا مولع
ةبلاك



DEPARTMENT OF COMPUTER ENGINEERING

ARTI404 – Image Processing

STUDENT PROCEDURAL MANUAL
Lab 1

2024 - 2025

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College	Department	Course
College of Computer Science and Information Technology	Department of Computer Science	ARTI407 – Image Processing

Practical Session Plan

Session Topic/Title	Session No.	Session Duration (Minutes)
Basics of programming with Python	1	100

1- Session Outcomes

Outcome#1: Explain how digital images are represented and manipulated in a computer.

2- Tool(s)/Software

- Python 3
- Anaconda
- IDE for Python: Jupyter, Spyder.

3- procedural steps (Tasks)

Step#1: Install Anaconda:

Download and install latest version of Anaconda from <https://www.anaconda.com/>

The current version of Anaconda is 3. After installation and running Anaconda, you will get similar environment, where Jupyter and Spyder are already installed, which are the target tools for this course.

Step#2: Start Jupyter or Spyder for Python.

You can start Jupyter or Spyder either from the Anaconda GUI (which is most time-consuming task. You can also start Jupyter or Spyder directly from the start menu (without starting Anaconda).

Step#3: Install Libraries / Packages in Python:

Most of the time you will need libraries/Packages in Python during your work. You will need the following libraries: SkyPi, OpenCV, scikit-image, Pillow, Matplotlib.

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Step#4: Install NumPy:

Google for NumPy, you will find some link, one of them will be NumPy.py (<https://pypi.org/project/numpy/>) copy and paste it in the command prompt of Jupyter and Spyder and it will be installed locally

Task#1: Exercise with Spyder:

Exercise the two cheat sheets for python practices in the resources section.

Task #2: Loading and Visualizing Images:

a. Loading/reading image using OpenCv

```
import cv2
img = cv2.imread('images/cameraman.tif') #Load the
image data into a NumPy array

import matplotlib.pyplot as plt
plt.imshow(img)
plt.show()
```

b. Loading/reading image using PIL

```
from PIL import Image
img2 = Image.open('images/lena_gray_256.tif') #load
image into a PIL Image object

import matplotlib.pyplot as plt
import matplotlib.cm as cm
plt.imshow(img2, cmap = cm.Greys_r)
plt.show()
```

Task #3: Image Storing

a. Saving image to disc using OpenCV

```
cv2.imwrite('new_image.jpg', img)
```

b. Saving image to disc using PIL

```
img2.save('new_image2.jpg')
```

Task #4: Display image as an Array

```
print(img.shape) #Note: img1 loaded using open cv is a numpy
array
print(img)
```

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```
import numpy as np
# Convert the image to a NumPy array
img_array = np.array(img2)

# Print the array
print(img_array.shape)
print(img_array)
```

4- Assessment

The student will be asked to perform different operations on the array using NumPy library.

5- Resources

[NumPy cheat sheet](#)

[Python Basics cheat sheet](#)

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Appendix: