Data Analysis with Python for Medical Physicists

Online

21st – 23rd April 2022

Malta

Endorsed by:

Contents

Course Overview

Course Aim
The aim of this course is for participants to learn skills in Python that a medical physicist should know. By the end of the course, participants will be competent to implement data analysis using this programming language and use them in different applications.

Target Group
Attendants should be clinical or academic medical physicists who are interested in learning and developing new skills in the programming language, Python. Individuals who have limited to no background of Python, or would like to refresh their skills are encouraged to apply.

Local Organizers
Malta Association of Medical Physics (V/O 1715)

Course Lecturer
Eric Pace, Lead Medical Physicist, Medical Physics Expert, Medical Imaging Department, Mater Dei Hospital, Malta.

Course Content

- Overview of programming basics and control flow
- Classes and methods as the building blocks of object oriented programming. Explain how these may be applied in the context of managing typical medical physics data. This will help develop skills beyond a simple linear execution of code.
- Reading unstructured data that is often produced by CT, MRI and other modalities
- Structure data in a more machine readable format for storage and retrieval – this assists in preparing data for fast insertion into databases (although databases themselves will not be discussed)
- Using an Integrated Development Environment (IDE) such as PyCharm
- Introduce the concept of panels as a wrapper over matrix data. Medical physicists often have columnar data (2D matrix) which needs to be cleaned, filtered, processed and plotted.
- Plotting of data as line, bar, box and scatter plots.
- Use PyDICOM package to work with DICOM files (extract information from DICOM headers and write any modifications back to DICOM files).

This course will not:

- Explore the use of databases and SQL
- Cover numerical methods or statistical techniques

Methods of assessment

At the end of the course participants have an option to participate in a marked assignment.

Teaching methods

3 days of lectures and practical sessions will be carried out online via Zoom. The course is practice and discussion based, where participants will have the opportunity to use Python installed on their computer. Any issues arising during practice can be discussed with a designated Python expert via Zoom in real time.

Accreditation

This course is seeking accreditation by the European Board for Accreditation in Medical Physics (EBAMP). More information will be provided when available.

Course Fee

Registration fee: €300 until 31st January 2022
                   €350 from 1st February 2022

How to Apply

Applications are accepted on a first come first serve basis through MAMP Website only. The application process consists of two steps:

1. Fill in the Google Form on our website: https://mamp.org.mt/python-april-2022-registration-page/
2. Affect payment within 5 days using your credit/debit card by clicking "here" in the website on step 1.

A screenshot of the website can be found below. Should you find any issues with payments, or if you are unable to pay via debit/credit card, kindly contact us on info@mamp.org.mt.

Scientific Programme

The course will start on Thursday morning, 21st April 2022 at 09:00. It is recommended that participants are online at least 15 minutes before. Course will finish on Saturday 23rd April around 14:00. The draft programme can be found below.

Day 1-Thursday, 21st April

Time	Lecture
08:30 – 09:00	Registration
09:00 – 10:00	1 Introduction: Data types, data structures, string manipulation and formatting
10:00 – 10:30	Walkthrough examples and hands-on session
10:30 – 11:00	*Coffee Break*
11:00 – 12:00	2 Structured Programming 1: Control flow, iterables, list comprehensions
12:00 – 12:30	Hands-on session to work out exercises
12:30 – 13:30	*Lunch Break*
13:30 – 14:30	3 Structured Programming 2: Modules, functions and classes: basics of Object-Oriented Programming (OOP)
14:30 – 15:00	Walkthrough examples and hands-on session
15:00 – 15:30	*Coffee Break*
15:30 – 16:00	4 Navigating the PyCharm Integrated Development Environment
16:00 – 17:00	Walkthrough examples and hands-on session
17:00	*Close*

Day 2-Friday, 22nd April

Time	Lecture
09:00 – 10:00	5 Files and Operating System: Read/write csv, json, Excel, directory traversal, path operations
10:00 – 10:30	Walkthrough examples and hands-on session
10:30 – 11:00	*Coffee Break*
11:00 – 12:00	6 Panel data 1: Creation, import, selection, filtration, vector operations
12:00 – 12:30	Walkthrough examples and hands-on session
12:30 – 13:30	*Lunch Break*
13:30 – 14:30	7 Panel data 2: Reshape, concatenate, split-apply-combine sub-panels
14:30 – 15:00	Walkthrough examples and hands-on session
15:00 – 15:30	*Coffee Break*
15:30 – 16:00	8 Visualisation: Plotting fundamentals using Matplotlib, Pandas, Seaborn
16:00 – 17:00	Walkthrough examples and hands-on session
17:00	*Close*

Day 3-Saturday, 23rd April

Time	Lecture
09:00 – 10:00	9 String pattern matching using Regular Expressions
10:00 – 10:30	Walkthrough examples and hands-on session
10:30 – 11:00	*Coffee Break*
11:00 – 11:30	10 Interacting with DICOM files: Create, read, modify, write DICOM tags
11:30 – 12:30	Walkthrough examples and hands-on session
12:30 – 13:30	*Lunch Break*
13:00 – 13:30	Optional Assignment: General Information on what is expected
13:30 – 14:00	Open Question and Answer session
14:00	*Close*

Zoom Platform

The course will be carried out on Zoom. Around 2 weeks before the course, you will receive 3 links. These links will give you access to the course in real time. Kindly visit the links and ensure that both your microphone and camera are working properly. Since participants are expected to have the camera on during the course, recording is NOT allowed as per GDPR regulations.

Insurance and cancellation

MAMP does not accept liability for individual medical, travel or personal insurance. Participants are strongly advised to take out their own personal insurance policies.

In case an unforeseen event would force MAMP to cancel the meeting, the Association will reimburse the participants fully the registration fees. MAMP will not be responsible for the refund of travel and accommodation costs.
Otherwise, in case of cancellation, the course is non-refundable.

MAMP takes no responsibility for, and the provider of the virtual meeting services has represented and warranted that the services shall not contain, and that no end user shall receive from the software used to hold the virtual meeting, any virus, worm, trap door, back door, timer, clock, counter or other limiting routine, instruction or design, or other malicious, illicit or similar unrequested code, including surveillance software or routines which may, or is designed to, permit access by any person, or on its own, to erase, or otherwise harm or modify any data or any system, server, facility or other infrastructure of any end user. MAMP will not be held liable for the internet connection used in order to attend the course online.