Numerical Optimization Syllabus

Fall 2024 – LB Lab in the Leonardo da Vinci building, ground floor. 11:00-13:00.

Instructor Information

Instructor	Email	Office Location & Hours
Dr. Onofrio Mazzarisi	onofrio.mazzarisi@gmail.com	Ex-SISSA building, 231
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General Information

Description

Programming is an indispensable tool of the modern scientist. Theoretical and empirical minded scientists across disciplines write programs to perform calculations, clean data, and generate figures. In this course, you will learn how to carry out these tasks using the programming language Python. Python is a high-level, general-purpose programming language that emphasizes readability, making it a useful language to have familiarity with as a scientist and a nice starting point for learning programing. Proficiency with Python and key Python packages will help you in your other courses at ICTP and beyond.

Expectations and Goals

By the end of this course, you should have familiarity with basic Python, be able to install Python packages, and be able to use the packages Numpy, Scipy, and Matplotlib. In October you will complete a small group project (details forthcoming). You will primarily be using Jupyter notebooks on Google Colab, where you can drag and drop your Jupyter notebooks and run it through the website without having to download software.

Course Materials

Required Materials

All required materials will be provided by the instructors before the course. Materials will be shared through Slack on the workspace **ICTP_QLS_NumMethods_2024**. You should have received an email invitation via Slack.

Optional Materials

Elements of this course follow the book "*Introduction to Scientific Programming with Python*" by Joakim Sundnes. A PDF of this book will be provided on Slack, though reading it is not required. You may also find the book "*Numerical Methods in Physics with Python*" by Alex Gezerlis useful. This book is available through the ICTP library and we have shared a PDF copy in Slack.

Course Schedule

Date	Topic	Notebook
16/9	Basic Python	0_Intro_to_Python.ipynb
18/9	Intermediate Python	1_Intermediate_Python.ipynb
20/9	Working with Google Colab	2_Working_with_Colab.ipynb
23/9	Numpy	3_Numpy.ipynb
25/9	Scipy	4_Matplotlib.ipynb
27/9	Matplotlib	5_SciPy.ipynb