



مولانا آزاد نیشنل اردو یونیورسٹی
मौलाना आज़ाद नेशनल उर्दू यूनिवर्सिटी
MAULANA AZAD NATIONAL
URDU UNIVERSITY
(Accredited Grade "A+" by NAAC)



BRICS/IDIA: Data Analytics Training

Pre-course Orientation

May 7, 2025

Daniel Egbo

Welcome Aboard

- Excited to have you join us!
- This course: Your first step into programming for astronomy.
- We'll learn Python basics and apply them to astronomical concepts.
- Focus on practical skills and building confidence.
- Goal: Use Python as a tool in your scientific work.

About BRICS Astronomy

BRICS

Members



BRAZIL



RUSSIA



INDIA



CHINA



SOUTH AFRICA



SAUDI ARABIA



EGYPT



ETHIOPIA



IRAN



U.A.E



- BRICS originally stands for Brazil, Russia, India, China and South Africa.
- Astronomy officially became a BRICS thematic science area in 2014, leading to the formation of the BRICS Astronomy Working Group (BAWG) in 2015.
- the BRICS Intelligent Telescope and Data Network, focusing on transients, survey science, time domain astronomy, and Big Data.

Name, Summit Details and Chairmanship

About IDIA



- Primary goal: to build the capacity and expertise needed for data intensive research on large survey science projects (and in particular MeerKAT and other large projects on SKA pathfinder telescopes)
- IDIA has set up the data-intensive research cloud facility *ilifu* to service its scientific community, as well as visualisation software CARTA and iDaVIE
- This course follows IDIA's vision to **inspire, train, and then empower** the next generation of data scientists

Why Python for Astronomy?

- ❑ The common programming tool for modern astronomy.
- ❑ Automate repetitive tasks (calculations, data processing).
- ❑ Analyze large datasets efficiently.
- ❑ Create plots and visualizations.
- ❑ Widely used in research – access powerful libraries!
- ❑ It is a valuable skill for your future studies and career.

Audience

- Undergraduate students,
- Researchers,
- Astronomy enthusiasts (or related fields)
- New to programming or have very limited or no prior experience with Python
- Key Requirement: Willingness to learn and practice!

Objectives

- ❑ Understand fundamental programming concepts (variables, data types, operators).
- ❑ Write and execute basic Python scripts.
- ❑ Define and use functions to create reusable and modular code.
- ❑ Read data and perform data statistical analysis.
- ❑ Perform data visualisations relevant in astronomy.
- ❑ Understand the concept of packages and install external packages (like **pandas**, **astropy** etc.) using **pip** or **conda**.
- ❑ Apply these Python concepts to solve simple problems relevant to astronomy.

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Abell 2744

ZwCl 1358+62

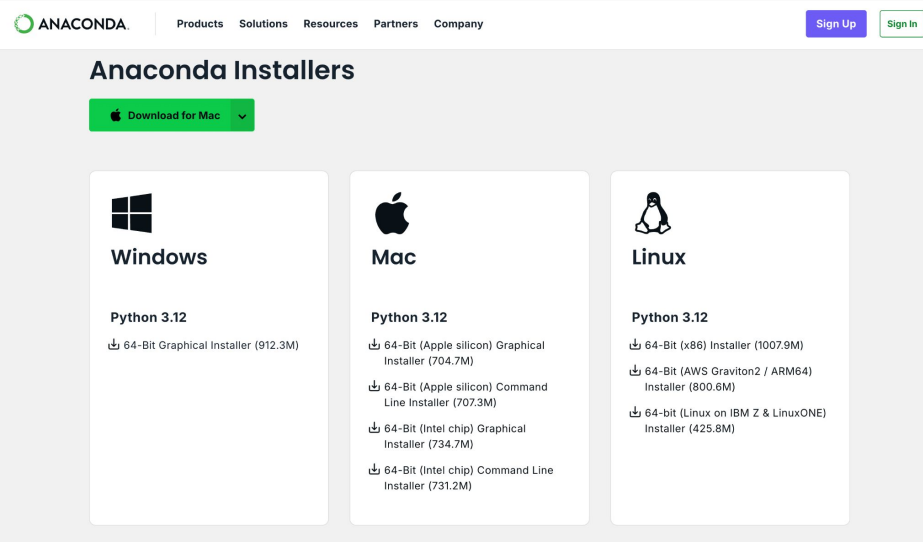
Course Roadmap/Schedule

- ❑ Orientation week (7 May 2025)
- ❑ Introduction to Python (14 May 2025)
- ❑ Introduction to Data Analysis (21 May 2025)
- ❑ Data Visualization/representation and Colour theory (28 May 2025)
- ❑ Astronomical Data Sources & Data Handling (4 June 2025)
- ❑ Astronomy Time Series Analysis (11 June 2025)
- ❑ Machine Learning Basics for Astronomy (18 June 2025)
- ❑ Machine Learning Basics for Astronomy (25 June 2025)
- ❑ Week 8: Capstone Project & Presentation (2 July 2025)

Pre-requisites

- Access to computer
- Platform can be any of the following (Windows, macOS, or Linux)
- Access to internet
- **Anaconda** software installation
- For more details visit: [pre-course link](#).
- Join the [Slack](#) workspace.

Installation




The screenshot shows the Anaconda website's installer page. At the top, the Anaconda logo is on the left, and navigation links for Products, Solutions, Resources, Partners, and Company are in the center. On the right, there are 'Sign Up' and 'Sign In' buttons. Below the navigation bar, the heading 'Anaconda Installers' is displayed. Underneath, there is a green button labeled 'Download for Mac'. The main content area is divided into three columns for Windows, Mac, and Linux. Each column features the respective operating system's logo, the text 'Python 3.12', and a list of available installers with download icons and file sizes.

ANACONDA | Products Solutions Resources Partners Company | Sign Up Sign In

Anaconda Installers


Download for Mac



Windows

Python 3.12


- 64-Bit Graphical Installer (912.3M)



Mac

Python 3.12

- 64-Bit (Apple silicon) Graphical Installer (704.7M)
- 64-Bit (Apple silicon) Command Line Installer (707.3M)
- 64-Bit (Intel chip) Graphical Installer (734.7M)
- 64-Bit (Intel chip) Command Line Installer (731.2M)



Linux

Python 3.12

- 64-Bit (x86) Installer (1007.9M)
- 64-Bit (AWS Graviton2 / ARM64) Installer (800.6M)
- 64-bit (Linux on IBM Z & LinuxONE) Installer (425.8M)

- Download Anaconda from the [link](#).
- Ensure you select the installer for your platform (Windows, macOS, or Linux).
- See installation guidelines [here](#)
- For more details visit: [pre-course link](#).
- If you encounter any problem, kindly share your issues in precourse-orientation Slack [channel](#).

Learning Resources

The screenshot shows the GitHub interface for the 'brics_astro' repository. At the top, it indicates the repository is 'Public' and has 2 'Unwatch' buttons, 0 'Fork' buttons, 1 'Star', and 0 'Tags'. Below this, the repository name 'brics_astro' is displayed. The main content area shows a list of files and their commit history. The files listed are: .cursor, Week1, assets, data, .DS_Store, .gitignore, LICENSE, Makefile, README.md, precourse.md, and requirements.txt. The commit history for each file shows the commit message, the commit hash, the date, and the number of commits. For example, the 'data' file was edited in the README.md file 2 months ago. The 'README' file is highlighted at the bottom of the page.

File	Commit Message	Commit Hash	Date	Commits
.cursor	Week 1 update.	502f5de	yesterday	11
Week1	Week 1 update.		yesterday	
assets	Week 1 update.		yesterday	
data	edited the README.md		2 months ago	
.DS_Store	Week 1 update.		yesterday	
.gitignore	Initial commit		3 months ago	
LICENSE	Initial commit		3 months ago	
Makefile	week one resources created.		3 months ago	
README.md	edited the README.md		2 months ago	
precourse.md	Week 1 update.		yesterday	
requirements.txt	edited the README.md		2 months ago	

All learning resources are available or accessible at the training project [Github repo](#).

The repo contains the following:

- Pre course information and guidelines.
- Notebooks per course week.
- The resources will also be shared in the Slack group.

For more info about using Git and Github, visit the [freecodecamp tutorial](#).

Code of conduct

- Treat all participants with respect and kindness.
- No harassment, bullying, or discrimination of any kind.
- Respect and properly cite the work of others. Welcome newcomers and diverse perspectives.
- Answer questions and discuss respectfully.
- Address or report Code of Conduct violations.
- Applies to all course activities, online and offline.
- Issues? Contact course organizers confidentially.

How to succeed in this training

- Engage Actively with Content: Ask questions during sessions and in the Slack community to deepen your understanding.
- Practice Consistently: Apply what you learn through hands-on exercises available in jupyter Notebook.
- Leverage All Course Resources: Use videos, readings, shared tools, and Slack effectively.
- Build a Portfolio: Turn your projects and visualizations into a portfolio to demonstrate your Data Analysis skills.

Links

- ❑ Pre-course link: [Precourse](#)
- ❑ Join the Slack group: [Slack](#)
- ❑ Anaconda Software: [Software access](#)
- ❑ Anaconda Installation: [Installation guideline](#)
- ❑ Git and Github tutorial (optional): [Freecodecamp](#)
- ❑ Course Github repo: [Github repo](#)
- ❑ How to run Jupyter Notebooks: [Jupyter](#)

Q&A

