IIBM BootCamp 2025 GitHub
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IIBM Bootcamp 2025

This course, both theoretical and practical, aims to equip students with essential programming skills and mathematical methods for addressing challenges in medicine and biology. The primary goal of this Bootcamp is to prepare students for the postgraduate program of Institute for Biological and Medical Engineering (IIBM) by providing them with the necessary tools for success in various program courses.

Participants will learn the fundamentals of Python and MATLAB, programming languages widely used in scientific computing, along with basic concepts in calculus, linear algebra, and an introduction to image processing. Faculty and graduate students from the IIBM will guide students through interdisciplinary problem-solving, emphasizing the importance of programming and computational tools.

Learning objectives:

- Acquire basic programming skills
- Apply programming tools
- Design basic scripts
- Explain chosen methods and obtained results to an interdisciplinary and diverse audience
- Contrast the results critically and respectfully with different people

Day scheme:

The Bootcamp will be held from **January 13 to 17 from 09:00am to 17:00pm**. The scheme for most days is:

- **09:00 - 10:10** Introduction and Hands-on Coding
- **10:10 - 10:30** Break
- **10:30 - 12:30** Hands-on Coding
- **12:30 - 13:30** Guest professor
- **13:30 - 14:30** Lunch
- **14:30 - 16:30** Group project (pairs)
- **16:30 - 17:00** Presentations and discussion

On the first day, we will meet at **08:45 AM** at the Institute for Biological and Medical Engineering, located on the 7th floor of the Ciencia y Tecnología Building at Campus San Joaquín UC. **A laptop with internet connection, Python and Matlab will be required for the Bootcamp.**

Bootcamp Topics:

Introduction

1. Overview of the course
   - Course description and objectives
   - State of the art in coding and IIBM project examples
2. Setting up Tools
   - Google Colab
   - Github

Programming skills

3. Basic data types: Strings, lists, numbers (int and float) and booleans
4. Control process:
   - Loops: for and while
   - Conditions and if statements
   - Control statements: break, continue and pass
5. Arithmetic operators and naming conventions
   - Arithmetics operators (/, //, %, **, + and -)
   - Naming conventions for variables and functions
6. Functions and scripts
7. Data reading
   - Reading from files (.txt and .csv)
   - Reading images
   - Common libraries for data reading
8. Introduction to Numpy and Matplotlib libraries
   - Numpy: Operating with Matrix and vectors
   - Matplotlib: Plots and parameters
9. Debugging: Python and Matlab

Calculus and Algebra

10. Calculus
    - Derivatives
    - Integrals
11. Algebra
    - Matrix operations
    - Vector operations

Image processing

12. Basic operations
    - Filter
    - Fourier transform

Week schedule:

Location: **TBA**

Time	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Room	**TBA**				
09:00 10:10	Working with Google Colab	Python Arithmetics	Python Matrix and Plots	Derivatives Part 1	Linear Systems
10:10 10:30	**Break**				
10:30 12:30	Intro to Variable Types	Python Functions	Matlab Introduction	Derivatives Part 2	Matlab Images
12:30 13:30	Speaker: **TBA**	Speaker: **TBA**	Speaker: **TBA**	Speaker: **TBA**	Speaker: **TBA**
13:30 14:30	Lunch				
14:30 16:30	Control Flow	Group Project			
16:30 17:00	Discussion and Content Check	Group Project Presentation			Group Project Presentation and Final Thoughts