Direzione Ricerca,
Innovazione e
Internazionalizzazione

UNIVERSITÀ DI TORINO

ID

VP_020_BIOTEC

Visiting Professor Program
Academic Year 2025/2026

TEACHING COMMITMENT: 12 hours

COURSE TITLE

Programming Approaches for Bioinformatics

TEACHING PERIOD
II semester

SCIENTIFIC AREA
Informatics

LANGUAGE USED TO TEACH
English

COURSE SUMMARY
The topics of the Course are: Differences and similarities between R and Python. Basic Data structures in R and Python: Vectors, lists, matrices, data frames, dictionaries. Basic structures, For/while loops, apply, if/else, Functions, R libraries and Python packages, Embedding R in Python and Python in R. Linux: Basic bash programming. Reproducibility. Building and using docker containers. Bioinformatics specialised data structures and tools: GenomicRanges (Bioconduct library), SummarizedExperiment (Bioconductor library), Seurat object (Seurat R library), sparse matrices (Matrix R library), bed files, wig, bigwig, gtf, big data table (data.table R library)

LEARNING OBJECTIVES
Provide life scientists with fundamental programming skills, focusing on their application to biological data analysis and problem-solving.
Guide students in designing, implementing code to perform bioinformatics tasks such as sequence alignment, data parsing, and complex data analysis.

Introduce methods for managing and analyzing large-scale biological datasets, including genomic and transcriptomic data.

Provide hands-on experience with popular bioinformatics libraries and frameworks (e.g., Biopython, R/Bioconductor) to enhance computational efficiency and productivity.

Promote the use of coding best practices, robust documentation, and contenerization to support reproducibility and collaborative research in bioinformatics.

Enable students to frame biological questions as computational challenges and implement programmatic solutions that yield valuable insights into biological systems.

OTHER ACTIVITIES BESIDE THE COURSE

The Visiting Professor will also give seminars and conferences addressed to PhD students (Digital Humanities) and research fellows.

VISITING PROFESSOR PROFILE

The Visiting Professor candidate should meet the following requirements:

- Strong background in the field of Informatics demonstrated by scientific publications and participation at international meetings and coordination of research projects.
- At least ten years of work experience in an English-speaking Academic Institution
- Teaching experience

CONTACT REFERENT

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