

3 credits	15.0 h + 20.0 h	Q2
-----------	-----------------	----

Teacher(s)	Gatto Laurent ;
Language :	French
Place of the course	Bruxelles Woluwe
Main themes	This introduction to bioinformatics and data science applied to biomedical sciences will introduce students methodologies and technologies used in bioinformatics . They will learn how to manage bioinformatics projects and how to manipulate and visualise data of average size.
Aims	<p>After this course, the students will understand what bioinformatics is and when to use it . They will be able to</p> <ul style="list-style-type: none"> • Analyse a simple bioinformatics problem , and implement a bioinformatics solution to solve it . • Decompose a problem in simpler sub-problems and solve these as analysis scripts. <p>1</p> <ul style="list-style-type: none"> • Read and understand existing scripts. • Use informatics tools to help and support their programming tasks . • Understand technical documentation for the R programming language and Bioconductor vignettes. • Write their own R scripts and small analysis reports in Rmd . <p>This course contributes to the leaning goals 2a, 2c, 3c, 5a, 5b, 5c, 5d of the bachelor's programme in biomedical sciences.</p> <p>-----</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Evaluation methods	The course evaluation will be practical and computer-based; the students will prepare a reproducible report in Rmd using RStudio answering to the exam questions addressing small scale data analysis task similar to those presented during the course.
Teaching methods	<p>The course will be composed of practical sessions, during which the students will implement solutions to data analysis problems relevant to biomedical sciences using the R programming language and the RStudio development environment.</p> <p>Course attendance to all sessions (volume 1 and 2) is mandatory. In case of repeated unjustified absence, further attendance to the final exam might be excluded.</p>
Content	<ul style="list-style-type: none"> • This introductory course to bioinformatics will focus on the following themes: <ul style="list-style-type: none"> • What is bioinformatics and it application domains. • Technologies and methodologies used in bioinformatics. • Introduction to omics data and technologies. • Biological databases and public data. • Files and formats in bioinformatics. <p>The data science applications to biomedical sciences will focus on:</p> <ul style="list-style-type: none"> • Data analysis project management and reproducible research. • Spreadsheets for data organisation. • The RStudio programming environment. • Data analysis and programming in R. • Introduction to data structures in R. • Data handling and visualisation. • High throughput data with R and Bioconductor. <ul style="list-style-type: none"> • Introduction to relational data bases and SQL (structured query language).

Bibliography	• Documents sur Moodle
Faculty or entity in charge	SBIM

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Additionnal module in Biomedical Sciences	WSBIM100P	3		