SOFTWARE TOOLS FOR MATHEMATICS

Information on teachers, main content, dates and times of online meetings.

Documentation: THINKBS-205-2020.1 Software Tools for Mathematics

Join Zoom Meeting for Online activities:

https://us02web.zoom.us/j/6320098921

Meeting ID: 632 009 8921

Unit 1: R

Beatriz Ranera (branera@usj.es)

	Topics	Activities	Dates and times of online activities
Lecture 1.1	Introduction to R. Type of objects and manipulation.	Installation of R, installation of IDE R Studio, Resolution proposed exercises. Book reading "A first Course in Statistical Programming with R" Chapters from 1 to 2 Reading book "The R Book" Chapters from 1 to 4	7th April 2021 16.00 – 17.40 (CET, UTC+1) (English)
Lecture 1.2	Exploring data, descriptive statistics and graphs.	Installation of graphic and statistical packages. Using functions and attributes manipulation. Resolution of exercises. Book reading "A first Course in Statistical Programming with R" Chapter 3. Reading book "The R Book" Chapters 5 and 6	13th April 2021 16.00 -17.40 (CET, UTC+1) (English)
Lecture 1.3	Control structures: for and while loops and if conditional.	Learning how to use for, while and if statements. Application of control structures. Resolution of exercises. Book reading "A first Course in Statistical Programming with R" Chapter 4.	20th April 2021 16.00-17.40 (CET, UTC+1) (English)

Bibliography:

Braun, W. J., & Murdoch, D. J. (2016). A first course in statistical programming with R. Cambridge University Press.

Crawley, M. J. (2012). The R book. John Wiley & Sons.

Unit 2: Matlab (Octave)

Marta Gómez (magomez@usj.es)

	Topics	Activities	Dates and times of online activities
Lecture 2.1	Introduction to Matlab: arrays and matrices.	Matlab installation and work environment. Basic operations with vectors and matrices. Message encryption with matrices. Resolution of proposed exercises.	9 April 2021 16.00-17.00 (CET, UTC+1) (English)
Lecture 2.2	Function representation. Differential and integral calculus.	2D and 3D representation. Calculation of limits, derivatives, and integrals. Interpolation. Resolution of proposed exercises.	7 May 2021 16.00-17.00 (CET, UTC+1) (English)
Lecture 2.3	Solving systems of equations and other concepts of basic algebra.	Systems of equations. Linear applications. Matrix diagonalization. Resolution of proposed exercises.	17 May 2021 16.00-17.00 (CET, UTC+1) (English)

Bibliography: Palm, William. MATLAB for Engineering Applications. McGraw-Hill Education; N.º: 4 edition (3 April 2018).

Unit 3: Python

Violeta Monasterio (vmonasterio@usj.es)

	Topics	Activities	Dates and times of online activities
Lecture 3.1	Jupyter notebooks, markdown. Basic Python: datatypes, logic, loops and functions	Hands-on tutorials, programming assignments. Suggested reading: Chapter 1 from "Applying Math with Python"	12 March 2021 12:50 – 14:30 (CET, UTC+1) (English)
Lecture 3.2	Scientific computing with NumPy, SciPy and Matplotlib.	Hands-on tutorials, programming assignments. Suggested reading: Chapter 2 from "Applying Math with Python"	19 March 2021 12:50 – 14:30 (CET, UTC+1) (English)
Lecture 3.3	Application: signal processing	Hands-on tutorials, programming assignments. Suggested reading: Chapter 3.9 from "Applying Math with Python"	16 April 2021 12:50 – 14:30 (CEST, UTC+2) (English)

Bibliography: Morley, Sam. Applying Math with Python. Packt 2020.

Unit 4: Latex

Jesús Carro (jcarro@usj.es)

	Topics	Activities	Dates and times of online activities
Lecture 4.1	Starting with LaTeX: The environment, main elements of a document, etc.	Presentation of the environment. Hands-on tutorial, First steps with Latex.	26 February 2021 16.00 (CET, UTC+1) (English)
Lecture 4.2	Writing Mathematics in LaTeX	Hands-on tutorial, Equations in LaTeX, operators and delimiters, matrices, equations of more than one line, groups of formulas	4 March 2021 16.00 (CET, UTC+1) (English)
Lecture 4.3	Images, Tables, lists and other elements in Latex	Hands-on tutorial, Tables, numbered and unnumbered lists, graphics	~~26 March 2021~~ 16 April 2021 16.00 (CET, UTC+1) (English)

Bibliography:

G. Grätzer: Math into LᴀTEX. Birkhäuser-Springer (2000).
H. Kopka y P. W. Daly: A Guide to LᴀTEX
LaTeX documentation in Overleaf:
https://www.overleaf.com/learn/latex/Main_Page
Learn LaTeX in 30 minutes, Overleaf:
https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes