SYLLABUS

Field : Maths and Computer Science **Branch:** Computer Science

Specialization: Big Data Managment and Analysis

Semester : Master-S1 **Year :** 2020-2021

Identification of the teaching material

Title : Programming in R language

Teaching Unit : MTU2

Number of credits : 4 **Coefficient : 2**

Total weekly hourly volume : 3 H

- **Cours (number of hours per week)** : 1.5 H
- **Practice Work (number of hours per week)** : 1.5 H

Responsible for teaching

Name, Rank : Ahmed Boulemden, Lecturer - B
Offices :
- N°23, Computer Science department.
- NIDAL team office, Computer Science Research Laboratory .

Email : ahmed_boulemden@yahoo.com

Tel : +213.698.114.841

Schedule and location of the course : Sunday, 11:30 to 14:45. BDMA classroom.

Description of the teaching material

Prerequisites : Algorithmics, statistics and probability.

Main objective :

The course aims mainly to offer the students the basic knowledge of the R programming language and its applications and utility in a context of data science and machine learning.

Learning objectives :

1- Learn the basics of programming in R language.
2- Visualize data using graphics resources.
3- Manipulate data and create models using DS and ML resources.

Content of the teaching material

Chapter 1 : The programming language basics

- Introduction.
- Mathematical operations.
- Data types.
- Data Structures
  - Vectors, matrices and arrays.
  - Lists.
  - Data-frames.
- Conditions and loops.
- Functions.
- Object oriented programming.
- Exceptions.

Chapter 2 : Graphics and data visualization

- Introduction.
- Import data.
- First steps.

- Aesthetic mapping.
- Common problems.
- Facets.
- Geometric objects.
- Statistical transformation.
- Position adjustments.
- Coordinate systems.
- The layered grammar of graphics.

Chapter 3: Data science and machine learning libraries.

- Introduction.
- Data transformation with dplyr.
- Tibbles with tibble.
- Data import with readr.
- Tidy data with tidyr.
- Relational data with dplyr.
- Strings with stringr.
- Model basics with modelr.
- Model building.
- Models with purrr and broom.

Assessment methods

Nature of control	Weights %
Exam	50 %
Practical works	20 %
Personal project	20%
Attendance	10 %
Total	**100%**

References

Title	Author	Editor / year
Learning R, a step by step function guide to data analysis	Richard Cotton	O'Reilly. First edition September 2013. ISBN: 978-1-449-35710-8
The book of R, a first course in programming and statistics	Tilman M. Davies	No starch press. ISBN-10 : 1-59327-651-5. 2016.
R for Data Science, import, tidy, transform, visualize and model data	Hadley wickham & Garett Grolemund	O'Reilly. First edition December 2016. ISBN : 978-1-491-91039-9

Planning of the course

Week	Lecture	Date
1	Intorduction + syllabus	10/01/2021
2	Chapter 1	17/01
3	Chapter 1 (In attendance)	24/01
4	Chapter 2 (In attendance)	31/01
5	Chapter 2	07/02
6	Chapter 2	14/02
7	Chapter 3 (In attendance)	21/02
8	Chapter 3 (In attendance)	28/02
9	Chapter 3	04/03
10	Evaluation of the personal project	
11	Exam	

List of students:

N°	First and last names	Signature
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