Warsaw University
of Technology

COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course	4606-ES-000000L-0259	Name of the course	Polish	**Zaawansowane programowanie w języku R**	
			English	**Advanced R programming**	
Type of the course	Special courses				
Course coordinator	prof. dr hab. inż. Janusz Hołyst	Course teacher	dr inż. Robert Paluch		
Implementing unit	Faculty of Physics	Scientific discipline / disciplines*			
Level of education	Doctoral studies	Semester	~~Winter/~~ summer		
Language of the course	English				
Type of assessment	Graded credit	Number of hours in a semester	30	ECTS credits	2
Minimum number of participants	10	Maximum number of participants	20 (10 per group)	Available for students (BSc, MSc)	No

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week	0	0	3	3	0
	in a semester	0	0	15	15	0

* does not apply to the Researcher's Workshop

1. Prerequisites

The participant has a good knowledge of the basics of the R language, e.g. he has completed the *Data analysis and visualization in R* course.

2. Course objectives

The aim of the course is to familiarize participants with the advanced functions of the R language and with the latest trends in data analysis and visualization.

3. Course content (separate for each type of classes)

Lecture

Does not apply

Laboratory

1. Advanced function writing and attributes. Units tests. Debugging. Exception handling.
2. Rcpp package – using C++ language in R. Creating and publishing own R packages.
3. Text processing and mining. Regular expressions. Web scraping. Date and time.
4. Writing web applications in shiny R.
5. Selected ggplot2 extensions.

4. Learning outcomes

Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*

Knowledge			
K01	Absolwent zna główne trendy rozwojowe związane z metodami statystycznej analizy danych.	SD_W3	project
Skills			
S01	Absolwent potrafi wykorzystać możliwości języka R do działalności dydaktycznej i naukowej, poprzez tworzenie stron internetowych i aplikacji webowych.	SD_U9	project
Social competences			
SC01	Absolwent jest gotów do dzielenia się swoim dorobkiem intelektualnym ze społeczeństwem na zasadach otwartego oprogramowania.	SD_K3	project

*Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria

Mini-projects (started at class and completed at home): 5 x 10 points = 50 points

Marks: (25; 30) - 3.0; [30; 35) – 3.5; [35; 40) – 4.0; [40; 45) – 4.5; [45; 50] – 5.0

6. Literature

Primary references:

[1] P. Biecek, Przewodnik po pakiecie R, Oficyna Wydawnicza Gis, Wrocław 2017.

[2] M. Gogolewski, Programowanie w języku R, Wydawnictwo Naukowe PWN, Warszawa 2014

Secondary references:

[1] Shiny R from R Studio, https://shiny.rstudio.com/

[2] A. Coghlan, A Little Book of R For Biomedical Statistics, http://a-little-book-of-r-for-biomedical-statistics.readthedocs.io/en/latest/

[2] A. Coghlan, A Little Book of R For Multivariate Analysis, http://a-little-book-of-r-for-biomedical-statistics.readthedocs.io/en/latest/

7. PhD student's workload necessary to achieve the learning outcomes**

No.	Description	Number of hours
1	Hours of scheduled instruction given by the academic teacher in the classroom	30
2	Hours of consultations with the academic teacher, exams, tests, etc.	5
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	15
4	Amount of time devoted to the preparation for exams, test, assessments	0
	Total number of hours	**50**
	ECTS credits	**2**

** 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)

8. Additional information

Number of ECTS credits for classes requiring direct participation of academic teachers	1.4
Number of ECTS credits earned by a student in a practical course	1.2