



University of Sri Jayawardenepura  
Faculty of Applied Sciences  
Department of Statistics

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Batch: 2016/2017

Year: 2020

Semester: First Semester

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**Course Unit: STA 326 2.0 Programming and Data Analysis with R**

**Type of the course unit: Core for special degree students/ Optional for others**

**Pre-Requisites:**

*STA 114 2.0 Probability and Distribution Theory I, STA 123 2.0 Probability and Distribution Theory II, STA 124 1.5 Data Analysis I, STA 213 2.0 Statistical Inference, STA 226 1.5 Data Analysis II*

**Workload:**

*Minimum total expected workload to achieve the learning outcomes for this unit is 100 hours per semester typically comprising a mixture of scheduled learning activities, independent study and 30 hours of lectures. Independent study may include associated readings, assessment and preparation for scheduled activities.*

**Course Objective(s):**

- To introduce R programming for data science applications.
- To introduce how data is communicated to make impactful decisions.

**Course Contents:**

1. R basics: Objects in R, Data types, Operations, Installing packages, Control structures, Piping
2. Writing functions in R
3. Data analysis with the tidyverse
  - 3.1. Data import and export
  - 3.2. Data wrangling: Tidy data principles, Reshaping data into tidy form, Data transformation
  - 3.3. Data visualization: The grammar of graphics
  - 3.4. Statistical modelling and inference
  - 3.5. Communication: Dynamic reproducible reporting

**Learning Outcomes:** At the end of this course, the student should be able to:

- download and install R and R Studio
- navigate and optimise the R integrated development environment (IDE) R Studio.
- install and load add-in packages.
- use Tidyverse packages in data science workflow
- import external data into R for data processing and statistical analysis.
- fluently reshape complex, messy, data into the most convenient form for analysis or reporting.
- produce effective visualisation and modelling to understand relationships between variables, and make decisions with data
- interpret the results of analysis and communicate these to a broad audience.

**Method of Assessment:**

- Mid-semester examination: 20%
- Final examination: 80%

**Recommended Readings:**

- Course website: Everything you want to know about the course, and everything you will need for the course (links to weekly reading, tutorials and lecture materials) will be posted at [hellor.netlify.com](http://hellor.netlify.com)  
Author: Thiyanga Talagala
- Title: R for Data Science  
Author(s): Hadley Wickham and Garrett Grolemund  
Publisher: O'REILLY  
This book is available online for free. Visit <https://r4ds.had.co.nz/>
- Title: Advanced R  
Author(s): Hadley Wickham  
Publisher: Chapman & Hall/CRC  
This book is available online for free. Visit <https://adv-r.hadley.nz/>

**Lecturer in Charge:**

Name: Dr Thiyanga Talagala

Email: [ttalagala@sjp.ac.lk](mailto:ttalagala@sjp.ac.lk)

**Note:** *The course can be dropped on or before 13 February 2020.*