

# PROGRAMMING FOR DATA SCIENCE SYLLABUS

## Module 1: Functions in R

- Programming with R
- Running R Code
- Including Comments
- Defining Variables and Functions
- Built-in R Functions
- Loading Functions
- Writing Functions
- Using Conditional Statements

## Module 2: Vectors and Lists

- Vectors
- Vectorized Operations
- Vector Indices
- Vector Filtering
- Modifying Vectors
- Lists
- Creating Lists
- Accessing List Elements
- Modifying Lists
- Applying Functions to Lists with `lapply()`

## Module 3: Data Wrangling

- Understanding Data
- The Data Generation Process
- Finding Data

- Types of Data
- Interpreting Data
- Using Data to Answer Questions
- Data Frames
- Working with Data Frames
- Working with CSV Data

## Module 4: Manipulating Data with **dplyr** and **tidyr**

- Data Manipulation
- Core **dplyr** Functions
- Performing Sequential Operations
- Analyzing Data Frames by Group
- Joining Data Frames Together
- **dplyr** in Action: Analyzing Flight Data
- Reshaping Data with **tidyr**
- From Columns to Rows: **gather()**
- From Rows to Columns: **spread()**
- **tidyr** in Action: Exploring Educational Statistics

## Module 5: Accessing Databases and Web APIs

- An Overview of Relational Databases
- A Taste of SQL
- Accessing a Database from R
- Accessing Web APIs
- RESTful Requests
- Accessing Web APIs from R
- Processing JSON Data
- APIs in Action: Finding Cuban Food in Seattle

## Module 6: Data Visualization

- Designing Data Visualizations
- The Purpose of Visualization
- Selecting Visual Layouts
- Choosing Effective Graphical Encodings
- Expressive Data Displays
- Enhancing Aesthetics
- Creating Visualizations with `ggplot2`
- A Grammar of Graphics
- Basic Plotting with `ggplot2`
- Complex Layouts and Customization
- Building Maps
- `ggplot2` in Action: A Case Study

## Module 7: Interactive Visualization in R

- The `Plotly` Package
- The `Rbokeh` Package
- The `Leaflet` Package
- Interactive Visualization in Action: Exploring Changes to the City of Seattle

PAJAMA PADHAI