Information Technology

Course # COMP 2012

Credits 5

Pre-requisites and Co-requisites: Calculus

Course Description

Information Technology is an introductory informatics course, which covers basic programming methods and tools used by researchers in the arts to manipulate, manage and analyze relevant data in statistics. The focus of the course will be on the R programming language, which students will use to solve problem-sets in statistical analysis using real statistical data. Basic statistical functions like *summary() and describe(),* data visualization, and data manipulation techniques are introduced. This course analyses generic programming language concepts and techniques, and demonstrates their implementation in statistical analysis using R. The most relevant functions in data science, such as indexing, conditional statements, loops, customized functions, algorithm design, descriptive statistics, linear regression, decision tree, random forest, t-tests etc. are explained. The main goal of this course is to give students an understanding of the breadth of different programming applications. Students learn how to design and write effective code using R to perform routine and specialized data manipulation, management, analysis, and statistics tasks. The tasks will be accomplished by identifying and using existing R, R-Markdown packages as well as appropriate open-source software extensions.

Course Learning Outcomes

Upon completion of the course, students are expected to be able to:

- Explain the theoretical concepts of different datatypes
- Conceptualize and create loops and if/else statements in R
- Create customized functions in R to handle results
- Manipulate data for descriptive statistical analysis in R
- Use R to perform mathematic calculations
- Use special packages, such as ggplot2, R -Markdown, plotly, to convert graphs and convert plain text to formatted text
- Use MS Excel for summarizing data, creating graphs & charts
- Using the packages dplyr, tidyr, shiny, randomForest, caret, e1071 and xgboost for various statistical analysis, data manipulation, graphing and creating machine learning algorithms.

Course Assignments and Grading

Item	**Weight**

6 Home Assignments	60%
Class participation	10%
Final Project	30%