RIT جامعة روتشستر الأمريكية للتكنولوجيا في دبي
A Global American University in Dubai

# PROF 740 - Fundamentals of Data Analytics

## Course Schedule Plan:

| Weeks | Topics | Assessments |
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| Week 1 | • Introduction to Course PROF740 (Week1, Session 1)<br>• Introduction to Analytics (Week1, Session 1)<br>• Introduction Linear Algebra/Matrix<br>• Intro to R programming (Week1, Session 1)<br>• Nature of Data (Week1, Session 2)<br>  • Data objects/ Attributes types<br>  • Taxonomy of data<br>  • R programming practice<br>  • Installation R -R Studio | |
| Week 2 | Statistics for Descriptive Analytics (Week 2, Session 1)<br>• Measuring the Central tendency<br>• Measuring the Data Dispersion<br>• Graphical presentation of descriptive analytics<br><br>Data Visualization (Week 2, Session 2)<br>• Composition/Comparison/Relationship<br>• Measuring Data Similarity/Dissimilarity<br>• R for data visualization<br><br>LAB: Descriptive Analysis using R | HW 1 set |
| Week 3 | Data Preprocessing (Week 3, Session 1)<br>  • Data Cleaning<br>  • Data Integration<br>  • Data Reduction<br>  • Principle Composite Analysis (PCA)<br>  • Factor Analysis (FA)<br>  • Singular Value Decomposition (SVD)<br>  • Data Transformation<br>  • Data Discretization<br>  • R for Data Preprocessing<br>Data Warehouse (Week 3, Session 2)<br>  • Basic concepts of Data Warehouse<br>  • Database SQL<br>  • Data Warehouse Modeling<br>  • Data Cube<br>  • OLAP<br>  • Data Warehouse Design<br>  • Data Warehouse Implementation<br><br>LAB: Managing Data | HW 1 due<br>HW 2 set |
| Week 4 | Regression Models (Week 4, Session 1)<br>• Regression Model Process<br>• Simple Linear Regression | Project Assignment<br>HW 2 due |

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| | ● Ordinary Least Squares Estimation<br>● Multiple Linear Regression<br>● Logistic Regression<br>● R for Regression models<br>Regularized Linear Modeling<br>● Ridge Regression<br>● Least Absolute Shrinkage and selection operator (LASSO)<br>● R for regularized models<br><br>LAB: Linear Regression in R | Midterm Exam |
| Week 5 | Data Mining: Basic Concepts (Week 5, Session 1)<br>● Introduction to Data Mining<br>● Data Mining Process (CRISP-DM)<br>● Knowledge Discovery in Database (KDD) process<br>● Machine Learning: Basic Concepts<br>● Supervised Learning<br>● Unsupervised Learning<br>● Reinforcement Learning<br>Association Rules (Week 5, Session 2)<br>● Association Rules (Week 5, Session 2)<br>● Market Basket Analysis<br>● A-priori Algorithm<br>● FP-Growth Algorithm<br>● Association Rules in R | Project Report Submission |
| Week 6 | Model Performance Assessment (Week 6, Session 1)<br>● Confusion Matrix<br>● Accuracy estimation<br>● Sensitivity and Specificity<br>● Precision and Recall<br>● The F-measure<br>● Visualizing performance tradeoff (ROC curve)<br>● Hypothesis testing<br>● Improving Model Performance (Bagging/Boosting/Adaptive Boosting)<br>Week 6, Session 2)<br>● Final Exam-Project Presentation held | Project Presentation |