

**DBA4711: Applied Analytics**  
**Sem II – 2023/24**

**Instructors: Chaithanya Bandi (bizchaba@nus.edu.sg)**

**Description**

Big data and analytics have climbed to the top of the corporate agenda—with ample reason. Together, they promise to transform the way many companies do business, delivering performance improvements not seen since the redesign of core processes in the 1990s. In this class we examine how data analytics is used to transform businesses and industries, using examples and case studies in e-commerce, healthcare, social media, fintech, pharma and beyond. Through these examples and many more, we teach and demonstrate the use of predictive and prescriptive analytics methods such as linear regression, logistic regression, classification trees, random forests, social network analysis, time series modeling, clustering, optimization, and machine learning.

**Prerequisites:**

Introduction to Optimisation, or a basic statistics and a basic optimization course. Please contact the course instructors with questions about appropriate prerequisites.

**Readings/Resources**

There is no required textbook for the course. However, we have some suggested readings from *The Analytics Edge* by Dimitris Bertsimas, Allison O’Hair and William Pulleyblank, Dynamic Ideas LLC, 2016. We refer to the book below as the AE book.

**Final Project:**

For the final project, each team needs to submit a one-page proposal that outlines a plan to apply analytical methods to a problem the team has identified using some of the concepts and tools discussed in the course. The proposal should include a description of: (1) the problem, (2) the data that you have or plan to collect to solve the problem, (3) which analytic techniques you plan to use, and (4) the impact or overall goal of the project (say, if you could build a perfect model, what would it be able to do?).

The final project submission will consist of a written report of at most 4 pages (not including appendices) that describes your analysis, as well as a 15-minute presentation (in PowerPoint or pdf format) of your project.

**Midterm**

Midterm will be conducted in class in the middle of the semester after the reading week.

**Individual Assignment**

Individual assignment is expected to be completed alone. Assignment will generally be due in-class. Everyone should turn in individual soft copy, including code files.

### **Group Assignment**

Group assignment is expected to be completed in a group. Every group should turn in individual soft copy, including code files.

## Course Outline

---

### **Week One**

Intro to Analytics, Examples from Industry: Ford, Uber, Google  
Introduction to R and R Studio

---

### **Week Two**

- Network Analytics
- More R
- Plotting and Visualization in R

### **Individual Assignment 1 Due on Week Three**

---

### **Week Three**

- Predictive Analytics 1
- Generalized Regression

---

### **Week Four**

- Predictive Analytics 2
- Clustering

---

### **Week Five**

Predictive Analytics 3

- CART
- Trees

---

### **Week Six**

Predictive Analytics 4

- Boosting
- Random Forests

---

**Recess Week**

---

**Week Seven**

- Midterm

**Syllabus:**

- Lectures until Boosting and RandomForests

---

**Week Eight**

## Predictive Analytics 5

- Time Series Analysis

---

**Week Nine**

- Deep Learning I

---

**Week Ten**

- Deep Learning II

---

**Week Eleven**

- Deep Learning III – Transformers and applications

---

**Week Twelve**

- Conclusion and Summary – Netflix and Mynta Case studies

---

**Week Thirteen**

- Project Proposal Presentation