Course Name	Data Processing and Analytics		معالجة وتحليل البيانات	
Course Information	Course Code	Course No.	Credit Hour	Prerequisite(s)
	0911-1670	670	3 (3-0-6)	**Machine Learning**
Course Track	☐ Program Core		☒ Electives	

Course Description

This course introduces the basic concept and architecture of data, data analytics taxonomy and methodologies. It covers several techniques for descriptive analysis and data visualization including descriptive univariate, bivariate and multivariate analysis methods. It also presents the advanced techniques for data preprocessing, data transformation and dimensionality reduction. It introduces various clustering, classification, data summarization and frequent pattern mining methods. Predictive analytics methodologies (including search-based algorithms and optimization-based algorithms) and advanced predictive topics such as ensemble learning, algorithm bias, non-binary classification tasks and advanced data preparation techniques for prediction are introduced. Finally, it presents some of popular data analysis applications for text, web and social media.

Course Outcomes

After the completion of this course, the student will be able to:

1. **Describe** general data architecture and data analytics methodologies. **[A]**
2. **Model** and **visualize** data using descriptive analysis methods. **[C]**
3. **Apply** data preprocessing techniques and dimensionality reduction methods to big data. **[E]**
4. **Explain** and **apply** various clustering and classification techniques on large scale data. **[D]**
5. **Identify** the advanced methodologies of predictive analytics. **[A]**
6. **Discuss** and **apply** different descriptive and predictive analytics techniques on text, web and social media. **[E]**

Assessment Policy (TC)	Assignments	10%	Quiz	10%	Capstone Project	20 %
	Midterm	20%	Final	40%		

Textbook	João Moreira, Andre Carvalho, Tomás Horvath, "A General Introduction to Data Analytics", John Wiley & Sons Inc., 2019. ISBN: 9781119296256.
References	1. Bertrand S. Clarke, Jennifer L. Clarke, "Predictive Statistics Analysis and Inference Beyond Models", Cambridge University Press, 2018. ISBN: 9781107028289 2. Bruce Ratner, "Statistical and Machine-Learning Data Mining: Techniques for Better Predictive Modeling and Analysis of Big Data", 3rd Edition, Taylor & Francis Group/CRC Press, 2017, ISBN: 9781498797603 3. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", 2nd Edition, O'Reilly Media, 2017. ISBN-13: 978-1491957660.