 **INDIAN INSTITUTE OF MANAGEMENT AMRITSAR**

**Master of Science in Data Science and Management**

**Course Outline**

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| **Course Code and Course Title** | OQM404 Predictive Analytics (PAR) |
| **Course type** | Regular |
| **Pre-requisites (if any)** | NA |
| **Course unit** | 1 unit |
| **Total no. of sessions** | 20 |
| **Session Duration** | 75 minutes |
| **Semester** | 3 |
| **Year and Batch** | 2024, MSDSM 01 |
| **Sections (if any)** | A |
| **Instructor(s)** | Dr. Mahima Gupta |
| **Contact Details** | [mahima.gupta@iimamritsar.ac.in](mailto:mahima.gupta@iimamritsar.ac.in) |
| **Office** | Tel(O): 0183- 2820027 |
| **Consultation Hours** | With Appointment |

**Introduction**

Businesses have witnessed an unprecedented growth of data from within their units as well as the ecosystem. Despite such high availability of data, much of it remains underutilized as organizations face challenges in extracting value from data. Many of the data analytics initiatives don't provide actionable insights, and decision-makers have to rely solely on intuition and gut-driven decision-making. The course would enable the students to strengthen their intuition-based decision making with sound analytical methods and thereby take appropriate interventions in creating value with their data analytics initiatives. This course will introduce statistical techniques for understanding and modelling analytical problems involving complex datasets. The course will cover the techniques employed for estimation, prediction and classification. The focus will be on the skill development of transforming data into knowledge. These techniques will be illustrated with the examples in functional areas of business such as Marketing, Finance and Operations. Also, the course will use R as a software for implementing the various analytics methods.

**Learning Outcomes/Course Objectives**

* To foster critical thinking and analytical abilities to address business dilemmas
* To synthesize and analyze data for data driven decision making
* To implement predictive analytics for solving business problems
* To understand implementation of predictive analytics in R

**Textbooks and Learning Materials**

**Textbook**

Daniel T. Larose, Chantal D. Larose. Data Mining and Predictive Analytics, 2nd Edition, Wiley Publication

***Reference Books***

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). *An Introduction to Statistical Learning: with Applications in R.* New York*:* Springer-Verlag*.*

Chapman, C. N., & McDonnell Feit, E. (2015). *R for Marketing Research and Analytics.* Switzerland: Springer International.

Jank, Wolfgang (2011). *Business Analytics for Managers*. New York : Springer-Verlag.

Ohri, A (2013). *R for Business Analytics*. New York : Springer-Verlag.

Lander, J. (2013). *R for Everyone: Advanced Analytics and Graphics.* New Jersey: Addison-Wesley.

***Technology and Software***

R

***Internet Websites***

https://www.informs.org/Community/Analytics

http://analytics-magazine.org/

https://www.kaggle.com/

http://www.r-bloggers.com/

http://blog.revolutionanalytics.com/r/

http://chance.amstat.org/

http://www.statslife.org.uk/significance

**Pedagogy Used/Learning Process**

The pedagogy will be driven by a mix of lectures, case discussion and hands on working of case lets. The concepts taught in the class will be demonstrated with a domain specific problem using R. In addition to the text book, additional readings and cases will be distributed in the class from time to time. The performance of students shall be assessed through a continuous system of quizzes, assignments, group project and term-end examination.

**Evaluation Components/Assessment of Student Learning**

Students will be evaluated based on individual and group basis. The methods to be employed along with their weightage is listed below.

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| --- | --- | --- |
| Assessment Components | Percentage | Description |
| Quiz/Individual Assignment | 40% | These components are required to check and evaluate the students’ understanding of concepts and application of appropriate tools and techniques as taught in the class. |
| Group Project/Assignment | 20% | Students are expected to work in teams for case analysis/data sets as it would provide them opportunities to explore diverse perspectives for a business problem. |
| End-term Exam | 40% | This would test the comprehensive understanding of the student from the course. |

**Session Plan**

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| Session no. | Module/Topic | Readings | Case Study |
| 1,2 | An introduction to R and Crisp DM framework |  |  |
| 3,4 | Univariate and Multi-Variate Statistics | TB Chapter 5,6 | Testing Marketing Hypotheses at WSES   * Product #: IMB693-PDF-ENG |
| 5,6 | Linear Regression | TB Chapter 8, 9 | Package Pricing at Mission Hospital  TK, Sriram; Grover, Shailaja; Hariharan, Satyabala; Unnikrishnan, Dinesh Kumar  Product #:  IMB527 |
| 7,8 | Logistic Regression | TB Chapter 13 |  |
| 9,10 | Integration of Predictive and Prescriptive Analytics |  | Marketing Head's Conundrum by [Maneesh Bhandari](https://store.hbr.org/search.php?search_query=Maneesh%20Bhandari&section=product),  [Pramod Kumar Bagri](https://store.hbr.org/search.php?search_query=Pramod%20Kumar%20Bagri&section=product),  [Dinesh Kumar Unnikrishnan](https://store.hbr.org/search.php?search_query=Dinesh%20Kumar%20Unnikrishnan&section=product) Product #: IMB541-PDF-ENG |
| 11,12 | Model Evaluation Techniques | TB Chapter 15 |  |
| 13,14 | Regression Tree and Classification Trees | TB Chapter 11,18 |  |
| 15,18 | Ensemble Methods: Bagging and Boosting | TB Chapter 25 | Predicting Customer Churn At Qwe Inc. by  Ovchinnikov, Anton S.  Product Code: UV6694-PDF-ENG |
| 19-20 | Group Exercise/Presentations |  |  |