College Dublin
Computing • IT • Business

# Teaching Scheme

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| **Programme Name & Stage:** | MSc in Data Analytics - Feb 2023 - SB+ cohort |
| **Module Title:** | Machine Learning for Data Analytics |
| **Semester:** | 1 (Sept-Dec) - 2023 |
| **Lecturer:** | Dr. Muhammad Iqbal |

**Assessment Weighting:**

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| Integrated CA1 (Week --) | 50% |
| Integrated CA2 (Week --) | 50% |

**NOTE:** This Teaching Scheme is intended as a GUIDE ONLY. It is possible that the topics/areas covered may be changed from time-to-time.

| Week No. | Date Commencing | Major Topic(s) / Subject Area(s) | Notes |
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| 1 | 18th Sept 2023 | Supervised, semi-supervised and unsupervised learning<br>Machine Learning, Deep Learning and Reinforcement Learning<br>CRISP-DM, KDD and SEMMA<br>Tutorial 1 Practical | Aurélien Géron, 2019, 2nd Edition, Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, O'Reilly Media [ISBN: 978-1492032649] |
| 2 | 25th Sept 2023 | Classification and Regression<br>Tutorial 2 Practical | |
| 3 | 2nd Oct 2023 | Supervised Learning:<br>Linear Regression (practical)<br>Nearest Neighbour (practical)<br>Tutorial 3 Practical | Andriy Burkov, 2019, The Hundred-Page Machine Learning Book, Andriy Burkov, [ISBN: 978-1999579500] |
| 4 | 9th Oct 2023 | Supervised Learning:<br>Decision Trees (practical)<br>Random Forest (practical)<br>Tutorial 4 Practical | |
| 5 | 16th Oct 2023 | Supervised Learning:<br>Support Vector Machine (SVM) (practical)<br>Gaussian Naive Bayes (practical)<br>Tutorial 5 Practical | |
| 6 | 23rd Oct 2023 | **READING WEEK*** | |

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| | | **(Tues 24th – Mon 30th inclusive)** | |
| 7 | 30th Oct 2023 | Unsupervised Learning:<br>Clustering (practical)<br>Dimensionality Reduction (practical)<br>CASE STUDY<br>Tutorial 6 Practical | College Closed – Mon 30th Oct – Public Holiday |
| 8 | 6th Nov 2023 | Semi-Supervised Learning:<br>Natural Language Processing (practical)<br>Tutorial 7 Practical | Introduction to Machine Learning with Python A Guide for Data Scientists, Andreas C. Müller and Sarah Guido, Copyright © 2017, O'Reilly. |
| 9 | 13th Nov 2023 | Unsupervised Learning:<br>Clustering (practical)<br>Dimensionality Reduction (practical)<br>CASE STUDY<br>Tutorial 6 Practical | |
| 10 | 20th Nov 2023 | Semi-Supervised Learning:<br>Natural Language Processing (practical)<br>Tutorial 7 Practical | |
| 11 | 27th Nov 2023 | Validation and Optimisation:<br>Validation (Re-substitution, Hold-out, K-fold cross-validation, LOOCV, Random subsampling, Bootstrapping…) (practical)<br>Tutorial 8 Practical | |
| 12 | 4th Dec 2023 | Validation and Optimisation:<br>Optimisation (loss functions/cost functions, Gradient Descent, Momentum, AdaGrad, RMSProp, Adam…) (practical) | |
| 13 | 11th Dec 2023 | Deep Learning:<br>Artificial Neural Networks<br>Types of Artificial Neural Networks<br>Activation Functions in ANN<br>Concept of Perceptron<br>The perceptron Learning Rule<br>Perceptron's training algorithm<br>Design Issues in ANN and Gradient Descent<br>CASE STUDY, Tutorial 9 Practical | Introduction to Data Mining (2nd Edition) January 2018, January 2018, Pearson, ISBN:978-0-13-312890-1. |
| 14 | 18th Dec 2023 | **HOLIDAY BREAK**<br>**(College closes from 21st December until 2nd January)** | |
| 15 | 25th Dec 2023 | | |

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| 16 | 1st Jan 2024 | **(College reopens Tuesday 2nd January)** |

**Examination Period:** Wednesday 3rd January 2024 to Friday 10th January 2024 (inclusive). An exact Examination Timetable will be issued closer to the time.

**Although there are no classes scheduled during Reading Week, please note that this is not a Holiday period and it is possible that additional classes may be scheduled during a Reading Week, if necessary.*

*** During Revision Periods your lecturer may schedule an additional class, if this is necessary.*