## Data Science and Machine Intelligence

10659.56 Added for 2016 to replace IN705001 Databases 3

|  |  |  |  |
| --- | --- | --- | --- |
| *SMS Code* | IN726001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | IN511001,IN521001 | *Total Learning Hours* | 150 |
| *This course partially replaces: IN705001 Database 3* | | | |

***Aims***

To provide a broad introduction to Machine Intelligence/Data Science with an emphasis on the intuition and the applications behind the concepts. Students will be able to analyse a data problem and based on a reasoned argument choose and deploy the appropriate machine learning tool to solve the problem and obtain useful/actionable information from the raw data.

***Learning Outcomes***

At the successful completion of this course, students will be able to:

1. Identify the principles, advantages, limitations and possible applications of a range machine learning tools.
2. Select the appropriate machine learning technique to solve specific machine learning problems, and show how the solutions can be applied to a range of industry problems
3. Design test procedures in order to evaluate a model
4. Obtain, scrub, explore, visualize, model, evaluate, and interpret data

***Indicative Content***

* Linear algebra, signal processing, probability and statistical intuitions
* Supervised learning (linear regression, logistic regression, neural networks, SVMs)
* Unsupervised learning (clustering, dimensionality reduction, kernel methods)
* Learning theory (bias/variance tradeoffs, sensitivity/specificity trade-offs, validation, regularization, learning curves);
* Adaptable topics based on industry demand (recommender systems, deep learning, anomaly detection, reinforcement learning and adaptive control)

***Assessment***

|  |  |  |
| --- | --- | --- |
| **Assessment Activity** | **Weighting** | **Learning Outcomes** |
| Assignment 1 | 25% | 1,2,3,4 |
| Exam 1 | 25% | 1,2,3,4 |
| Assignment 2 | 25% | 1,2,3,4 |
| Exam 2 | 25% | 1,2,3,4 |