COURSE DETAILS
Course Code: F20DL
Full Course Title: Data Mining and Machine Learning
SCQF Level: 10
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL
Undergraduate: Yes  Postgraduate Taught: No  Postgraduate Research: No
Additional Information:

COURSE AIMS
In this course, students will develop:

• An understanding of the fundamental concepts and techniques used in data mining and machine learning.
• An understanding of the mathematics underpinning data mining and machine learning.
• A critical awareness of the appropriateness of different data mining and machine learning techniques and the relationships between them.
• Familiarity with common applications of data mining and machine learning techniques.

LEARNING OUTCOMES – SUBJECT MASTERY

• Extensive understanding of the data mining process and machine learning algorithms.
• Detailed understanding of the mathematics underpinning the data mining and machine learning methodologies.
• Awareness of the appropriateness and performance of the different techniques, as well as the relationships between them.
• Awareness of data quality and the appropriate use of data mining and machine learning for decision making.
• Ability to apply this knowledge for practical data mining and machine learning purposes

LEARNING OUTCOMES – PERSONAL ABILITIES

The students will be expected to:

• Demonstrate the ability to learn independently.
• Show capacity for rational problem identification and definition.
• Show capacity for critical analysis and solution selection.
• Manage time, work to deadlines, and prioritise workloads.
• Use appropriate computer software to process data.
• Present results in a way that demonstrates a good understanding of the technical and broader issues of data mining and machine learning.

SYLLABUS
**Basic Concepts:** datasets, dealing with missing data, classification, supervised vs unsupervised learning.

**Generative Models:** naïve Bayes, probabilistic graphical models, cluster analysis (such as k-means clustering, EM algorithm).

**Discriminative Learning:** linear regression, decision tree learning, perceptron, advanced models such as multi-layer perceptron and deep learning architectures.

### COURSE RELATIONSHIPS

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