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.

Location and Assessment Methods

<table>
<thead>
<tr>
<th>Edi</th>
<th>SBC</th>
<th>Ork</th>
<th>Dub</th>
<th>Malay</th>
<th>IDL</th>
<th>COLL</th>
<th>ALP</th>
<th>OTH</th>
<th>Method</th>
<th>Weight</th>
<th>Exam Mins</th>
<th>Type</th>
<th>Diet</th>
<th>Synoptic Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coursework</td>
<td>50</td>
<td></td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Examination</td>
<td>50</td>
<td>120</td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
</tr>
</tbody>
</table>