2020 / 21

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Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Module Descriptor

Data Mining
(Computing and Mathematics)

Award:
Specialisation:
Level:
Num of stages:
Programme Leader:

Data Mining (A14502)

Short Title: Data Mining
Department: Computing and Mathematics
Credits: 10 **Level:** Postgraduate

Please Note

Due to covid-19, there may be some changes to the traditional delivery of this module including on-line delivery of content and how the assessments methods are implemented. The school office, your programme leaders and lecturers will keep you informed of any changes.

Description of Module / Aims

The student will be introduced to the fundamental concepts and techniques of Data Mining. The student will learn the data mining process and experience the steps involved; including data pre-processing, modelling, optimisation, result interpretation and validation. The student will learn and apply an appropriate methodology, tool or technology to datasets that support business intelligence applications.

Programmes

	stage/semester/status
MSc in Computing (Enterprise Software Systems) (WD_KCOEN_R)	5 / 0 / E
MSc in Computing (Communications Software) (WD_KTESO_R)	5 / 0 / E

Indicative Content

- Introduction to Data Mining; Classification, Prediction, Clustering
- Introduction to Data Mining Process
- Pre-processing: data gathering, wrangling, and transformation
- Model building, optimization and evaluation
- Result analysis, validation, deployment
- Use of data mining tools

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Categorise between typical fundamental Data Mining problems.
2. Appraise the concepts and fundamentals of Classification, Prediction and Clustering and their solution techniques.
3. Assess the Data Mining Process and all of its steps.
4. Justify the use of appropriate tools and techniques for each stage of the Data Mining Process.
5. Evaluate, interpret and utilize results obtained at each step of the Data Mining Process.
6. Prepare an appropriate visual representation of the date mining findings.

Learning and Teaching Methods

- The lectures will introduce the theory content to the student. The student will be encouraged to participate in class discussions and ask questions to support their learning process.
- The practical classes facilitate the student in implementing the theory learned in the lectures.
- The student will apply typical methods of Data Mining to data sets provided.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	24
Practical	24	24
Independent Learning	222	222

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	50%	
Assignment	50%	4,5,6
Final Written Examination	50%	1,2,3

Assessment Criteria

<40%: Unable to describe and apply key concepts of the data mining process.

40%–59%: Ability to discuss key concepts of the data mining process and ability to discover and integrate related knowledge in other knowledge domains.

60%–69%: Be able to solve data mining problems by applying each step in the data mining process.

70%–100%: All the above to an excellent level. Be able to analyse and design solutions to a high standard for a range of both complex and unforeseen problems through the use and modification of appropriate skills and tools.

Supplementary Material(s)

- Han, Jiawei., Michelle. Kamber and Jian. Pei. *Data Mining, Concepts and Techniques.* NY: Morgan Kaufmann, 2011.
- James, G., D. Witten, T. Hastie and R. Tibshirani. *An Introduction to Statistical Learning, with Applications in R..* NY: Springer, 2013.
- Leskovec, J., A. Rajaraman and J. Ulman. *Mining of Massive Datasets.* NY: Cambridge University, 2014.
- Tan, Pang-Ning, Michael Steinbach and Vipin Kumar. *Introduction to Data Mining.* NY: Addison-Wesley, 2006.
- Witten, I., E. Frank and M. Hall. *Data Mining, Practical Machine Learning Tools and Techniques.* NY: Elsevier, 2011.

Requested Resources

- Room Type: Computer Lab