

School of Informatics Teaching Course Proposal Form

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Proposal

Course Name: Foundations of Data Science
Proposer's Name: He Sun
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Course Year: 4
Names of any courses that this new course replaces :
none

Course Outline

Course Level: 11
Course Points: 10
Subject area: Algorithms, Machine Learning
Programme Collections:
Computer Science, Artificial Intelligence.

Teaching / Assessment

Number of Lectures: 18
Number of Tutorials or Lab Sessions: 4
Identified Pre-requisite Courses: Discrete Mathematics and Mathematical Reasoning
Identified Co-requisite Courses: Probability with Applications
Identified Prohibited Combinations: none

Assessment Weightings:

Written Examination: 75%
Assessed Coursework: 25%
Oral Presentations: 0%

Description of Nature of Assessment:

The written examination is to test a student's understanding about the materials discussed in class. The coursework worthing 25% is to test a student's ability to apply the studied techniques to solve practical problems.

Course Details

Brief Course Description:

The aim of the proposed course is to introduce the fundamental techniques used for analysing and processing large-scale datasets, and these techniques have become the foundations of data science. Selected topics to be covered include analysis of high-dimentional data, spectral methods, streaming algorithms, among a few others.

Detailed list of Learning Objectives:

1: Understanding of various techniques for processing massive datasets.

2: Ability to design fast algorithms to analyse massive datasets occurring in different settings, including social networks, images, and videos.

Syllabus Information:

1. High-Dimensional Spaces 2. Best-Fit Subspaces and Singular Value Decomposition 3. Spectral Algorithms 4. Streaming Algorithms 5. Clustering 6. Information Spreading

Recommended Reading List:

Foundations of Data Science, by Avrim Blum, John Hopcroft, and Ravindran Kannan

Any additional case for support information:

None