IB9CS-15 Big Data Analytics

24/25

Department
> Warwick Business School

Level
> Taught Postgraduate Level

Module leader
> Tobias Preis

Credit value
> 15

Module duration
> 9 weeks

Assessment
> 100% coursework

Study location
> University of Warwick main campus, Coventry

Description

Introductory description

This module will cover a wide range of cutting edge research in Big Data Analytics. The module has a particular focus on the extensive value of data from the Internet, much of which is freely available if students have the skills to mine it.

This module involves learning to program in R, but no prior programming knowledge is required.

It also involves carrying out statistical analyses. Students joining should be confident with basic statistical concepts, including correlations and regressions, as well as basic concepts relating to time series, such as autocorrelation, trends and seasonality. The module's flexible project-based structure also caters for students who already possess more advanced knowledge of statistics. This is a practical, skills-based module. Students will learn through completing the course assignments, as well as through lectures, seminars, lab sessions and associated exercises. Successful completion of the assignments will involve both programming and implementation of statistical analyses, and will require students to search for information in online resources, with support from the module team.

Module aims

The module aims will include:

Linking stock market movements to online data
Measuring sentiment with online data
Predicting consumer behaviour with online data
Getting quicker measurements of key economic indicators with online data
Measuring where people are and where they are going with mobile phone data and online data
Predicting crime and epidemics
Understanding social networks

The module will also teach students the practical skills they need to work with online data. Students will learn:

How to mine data on Google searches
How to mine data on Wikipedia page views
How to mine data on photographs uploaded to Flickr
How to make data visualisations
How to design and execute a small data science project of their own

As part of this, the module will teach students how to use R, an industry standard programming language for data analytics.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The sessions in this module are made up of lectures, seminars and lab sessions.
Lectures will help students understand use cases for big data, and will provide them with some guidance on acquiring practical data science skills.
Seminars will focus on the acquisition of statistical skills in R, as well as techniques for visualisation.
Lab sessions will enable the students' acquisition of practical programming skills in R.
Students will also learn through completing the course assignments.
The course will follow the structure below.

Week 1
Lecture: Data science - an introduction

Week 2
Lecture: Getting quicker measurements with big data
Lab session: Mining Google data

Week 3
Lecture: Making predictions with big data - 1
Seminar: Basic statistics in R - 1
Lab session: Mining data from photos

Week 4
Lecture: Making predictions with big data - 2
Seminar: Basic statistics in R - 2
Lab session: Mining Wikipedia data

Week 5
Lecture: Measuring emotions and personality
Seminar: Basic statistics in R - False discoveries
Lab session: Mining Twitter data

Week 6
Lecture: Big data in the city
Seminar: Visualising data
Lab session: Visualisations

Week 7
Lecture: Data science - your own project

Seminar: Final project
Lab session: Project work

Week 8
Lab sessions: Project work

Week 9
Lab sessions: Project work

Weeks are specified in module weeks, not term weeks.

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate a comprehensive understanding of research methods and results in big data analytics and computational social science
- Understand and identify links between big data resources and real world events
- Demonstrate confidence in discussing research results and their practical business relevance in the real world
- Critically evaluate empirical research

Indicative reading list

Please see Talis bibliography at the following link:
https://rl.talis.com/3/warwick/lists/24BE382E-D616-FFB9-2333-B553B69E0B84.html

Research element

Research skills play a central role in professional data science careers. This module will therefore enable students to develop core research skills, which will also be of benefit for their dissertation and for any further research following this course. These skills include the identification of a question appropriate for a small research project, balancing the interest value of a chosen question with the feasibility of its implementation; and communication of technical research findings in an accessible fashion, both through report writing and data visualisation.

Students will also develop an awareness of a wide array of research findings in the area of data science, as well as the practical quantitative and computational skills required to implement a small data science research project.

Interdisciplinary

This is a strongly interdisciplinary module in the area of data science, aimed to help WBS students make the most of the growing career opportunities in this domain. It will enable students to acquire both practical data science skills and an overview of recent data science research findings, helping students better engage with data scientists trained in other disciplines, such as computer science and statistics.

International

Students on this module will learn about international developments in the field of data science, and will engage with material presented by a range of international experts.

Subject specific skills

Acquire, mine and preprocess large data sets using a range of methods to allow their subsequent application to real world problems
Visualise extensive data sets, applying methods which both allow the visualisation consumer to ask their own questions, and methods which directly answer specific questions
Formulate hypotheses relating to large data sets and apply statistical methods for their evaluation

Transferable skills

Write in an academically appropriate way.

Study

Study time

Type	Required
Lectures	7 sessions of 1 hour 30 minutes (7%)
Seminars	5 sessions of 1 hour (3%)
Other activity	16 hours (11%)
Private study	45 hours 30 minutes (30%)
Assessment	73 hours (49%)
Total	150 hours

Private study description

Private study to include preparation for lectures, seminars and lab sessions

Other activity description

Labs - 1.5 hours per week in weeks 2 to 6 of module, 2 hours in week 7 of module and 3.5 hours per week in weeks 8 and 9 of module

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A4

	Weighting	Study time	Eligible for self-certification
Coursework Exercise	20%	14 hours	Yes (extension)
3000 word individual essay	80%	59 hours	Yes (extension)

Feedback on assessment

Individual feedback on assessed project report via online coursework feedback system.

Availability

Courses

This module is Optional for:

- Year 1 of TIBS-N300 MSc in Finance
- Year 1 of TIBS-N1C2 Postgraduate Taught Business (Accounting & Finance)
- Year 1 of TIBS-N1B0 Postgraduate Taught Business (Marketing)
- Year 1 of TIBS-LN1J Postgraduate Taught Finance and Economics

This module is Option list C for:

- Year 1 of TIBS-N2N1 Postgraduate Taught Management