EC994-15 Applications of Data Science

26/27

Department
Economics
Level
Taught Postgraduate Level
Module leader
Nathan Canen
Credit value
15
Module duration
9 weeks
Assessment
100% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

EC994-15 Applications of Data Science

Module web page

Module aims

Big data is transforming almost every aspect of science and the humanities, driven by the emergence of a data society. This is a society in which increasingly comprehensive aspects of human behaviour and the economy are recorded as data. Employers are recognizing the need for a skilled workforce that can extract value from data, giving rise to the new job description of a data scientist. This course aims to provide economists and social scientist with a solid basis to overcome the deep technical deficit that has been identified among social scientists in the methodologies and practical tools of data science (Rebekah Luff, Rose Wiles and Patrick Sturgis, “Consultation on Methodological Research Needs in UK Social Science”, National Centre for Research Methods, March 2015.)The aim of this module is provide students with a thorough understanding of the most common statistical methods related to high-dimensional data and machine learning techniques, with a particular focus to applications on economic and social data. The course will cover both the theory underpinning these methods and will also feature an intensive applied computing component.

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 syllabus may cover, but is not limited to, the following areas:

- Data Science Use cases (e.g. in academia, business, public sector)
- Linear Methods
- Naïve Bayes
- General Linear models
- Model selection
- Bootstrapping
- Random trees, forests
- Dimensionality reduction (Principal Component, Clustering)
- Supervised learning methods
- Unsupervised learning
- Applications using statistical packages (such as R or others)

Learning outcomes

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

- Subject Knowledge and Understanding:...demonstrate awareness and understanding of key methods available for statistical learning and dimensionality reduction (Lasso, SVM, Networks, Bagging, Clustering).
- Subject Knowledge and Understanding:...demonstrate an understanding of how these methods may be used to in different contexts.
- Subject-specific skills/Professional Skills:...gain an understanding for and an ability to differentiate the appropriateness of different statistical methods.
- Subject-specific skills/Professional Skills An ability to apply data science methods to every day challenges.

Indicative reading list

Reading lists can be found in Talis

Specific reading list for the module

Subject specific skills

Applied Economics
Economic Principles
Research and Debate
Analysis of Optimisation
Analytical Reasoning
Analytical thinking and communication

Concepts of Simultaneity and Endogeneity
Creative Thinking
Policy Evaluation
Problem Solving
Strategic Thinking

Transferable skills

Data-based skills
IT skills
Numeracy and Quantitative Skills
Information Technology
Mathematical, statistical, data-based research skills
Written Communication
Coding Skills (R)

Study

Study time

Type	Required
Lectures	18 sessions of 1 hour (12%)
Other activity	4 hours (3%)
Private study	128 hours (85%)
Total	150 hours

Private study description

Private study will be required in order to prepare for seminars/classes, to review lecture notes, to prepare for forthcoming assessments, tests, and exams, and to undertake wider reading around the subject.

Other activity description

Additional classes

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group B3

	Weighting	Study time	Eligible for self-certification
Assessment component			
Centrally-timetabled examination (On-campus) • Answerbook Pink (12 page) • Students may use a calculator	100%		No
Reassessment component is the same			

Feedback on assessment

The Department of Economics is committed to providing high quality and timely feedback to students on their assessed work, to enable them to review and continuously improve their work. We are dedicated to ensuring feedback is returned to students within 20 University working days of their assessment deadline. Feedback for assignments is returned either on a standardised assessment feedback cover sheet which gives information both by tick boxes and by free comments or via free text comments on Tabula, together with the annotated assignment. For tests and problem sets, students receive solutions as an important form of feedback and their marked assignment, with a breakdown of marks and comments by question and sub-question. Students are informed how to access their feedback, either by collecting from the Department of Economics Postgraduate Office or via Tabula. Module leaders often provide generic feedback for the cohort outlining what was done well, less well, and what was expected on the assignment and any other common themes. This feedback also includes a cumulative distribution function with summary statistics so students can review their performance in relation to the cohort. This feedback is in addition to the individual-specific feedback on assessment performance.

Past exam papers for EC994

Availability

Pre-requisites

Probability and statistics, including linear regression/OLS. Basic maths (Algebra, Analysis). Programming skills are helpful but not a prerequisite.

Courses

This module is Core optional for:

- Year 1 of TPSS-C8P7 Postgraduate Taught Behavioural and Economic Science (Science Track)

This module is Optional for:

- Year 1 of TECS-C8P8 Postgraduate Taught Behavioural and Economics Science (Economics Track)
- Year 1 of TECA-L1P6 Postgraduate Taught Economics
- Year 1 of TECA-L1P7 Postgraduate Taught Economics and International Financial Economics
- Year 1 of TMAA-G1PF Postgraduate Taught Mathematics of Systems
- Year 4 of USTA-G300 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics