

ST911-15 Fundamentals of Modern Statistical Inference

21/22

Department

Statistics

Level

Taught Postgraduate Level

Module leader

Yi Yu

Credit value

15

Module duration

10 weeks

Assessment

50% coursework, 50% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module runs in Term 1 and is usually taken by PhD students in the Warwick Centre for Doctoral Training in Mathematics and Statistics.

Other PhD students should consult the module leader if they are interested in taking this module.

This module is not available to undergraduate or postgraduate taught students.

[Module web page](#)

Module aims

The aims of this module are to provide a basic introduction to ideas of formal statistical inference for students with a strong mathematical background and undergraduate performance. The course will provide all students with a basic background level of knowledge of inference and, others with a platform to use and research in Statistics within their PhD. The course will reflect the modern trends in Statistical Inference towards powerful computationally intensive methods.

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.

Statistical distribution theory
Methods of inference
Maximum likelihood estimation
Elements of Bayesian Inference
Decision Theory Inference
Basic simulation methodologies
Markov Chain Monte-Carlo methods

Learning outcomes

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

- Understand key ideas of parameter estimation.
- Understand how to apply Statistical tools in various applied problems.
- Develop suitable strategies for the extraction of parameters from data sets.

Indicative reading list

1. R. Keener, "Theoretical Statistics"
2. M.J. Schervish, "Theory of Statistics"
3. J. Shao, "Mathematical Statistics"
4. L. Wasserman, "All of Statistics"

[View reading list on Talis Aspire](#)

Subject specific skills

TBC

Transferable skills

TBC

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Private study	120 hours (80%)
Total	150 hours

Private study description

Weekly revision of lecture notes and materials, wider reading, practice exercises and preparing for examination.

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 C1

	Weighting	Study time
Assessed exercises	50%	
3 x assessed exercises due at evenly spaced intervals during term 1. Each problem set will contain a number of individual questions based on the material delivered in the lectures.		
Oral examination	50%	
The oral examination will take place in the week following the end of term 1.		

Feedback on assessment

Written feedback will be provided for the problem sets and oral examination within 20 working days.

[Past exam papers for ST911](#)

Availability

Courses

This module is Core for:

- Year 1 of RSTA-G4P0 Postgraduate Research Statistics

This module is Core optional for:

- Year 1 of TMAA-G3G2 Postgraduate Taught Mathematics and Statistics

This module is Optional for:

- TCOS-F3P6 Complex Systems Science (Erasmus Mundus)
 - Year 2 of F3P6 Complex Systems Science
 - Year 2 of F3PJ Complex Systems Science (Ecole Polytechnique/Chalmers University)
 - Year 2 of F3PK Complex Systems Science (Ecole Polytechnique/Göteborg)
- TCOS-F3P7 Complex Systems Science (Erasmus Mundus) (University of Warwick)
 - Year 2 of F3PH Complex Systems Science (Double Degree with Chalmers University)
 - Year 2 of F3PG Complex Systems Science (Double Degree with Ecole Polytechnique)
 - Year 2 of F3PJ Complex Systems Science (Ecole Polytechnique/Chalmers University)
 - Year 2 of F3PK Complex Systems Science (Ecole Polytechnique/Göteborg)
 - Year 2 of F3P7 Complex Systems Science (University of Warwick)
- Year 1 of TMAA-G1P9 Postgraduate Taught Interdisciplinary Mathematics
- Year 1 of TMAA-G1PD Postgraduate Taught Interdisciplinary Mathematics (Diploma plus MSc)
- Year 1 of TMAA-G1P0 Postgraduate Taught Mathematics
- Year 1 of TMAA-G1PC Postgraduate Taught Mathematics (Diploma plus MSc)

This module is Option list A for:

- Year 1 of TCOS-F3P6 Complex Systems Science (Erasmus Mundus)
- Year 1 of RMAA-G1PG Postgraduate Research Mathematics of Systems

This module is Option list B for:

- Year 1 of TMAA-G1P9 Postgraduate Taught Interdisciplinary Mathematics
- Year 1 of TMAA-G1P0 Postgraduate Taught Mathematics

This module is Option list C for:

- TMAA-G1PD Postgraduate Taught Interdisciplinary Mathematics (Diploma plus MSc)
 - Year 1 of G1PD Interdisciplinary Mathematics (Diploma plus MSc)
 - Year 2 of G1PD Interdisciplinary Mathematics (Diploma plus MSc)
- TMAA-G1PC Postgraduate Taught Mathematics (Diploma plus MSc)
 - Year 1 of G1PC Mathematics (Diploma plus MSc)
 - Year 2 of G1PC Mathematics (Diploma plus MSc)