Module Specification

ABOUT THIS DOCUMENT
This module specification applies for the academic year 2019-20
Last revised 19 August 2019 by Clémence Leyrat
London School of Hygiene & Tropical Medicine, Keppel St., London WC1E 7HT.  www.lshtm.ac.uk

GENERAL INFORMATION
Module name Robust Statistical Methods
Module code 2475
Module Organiser Dr Clémence Leyrat
Contact email Clemence.Leyrat@lshtm.ac.uk
Home Faculty Epidemiology & Population Health
Level Level 7 (postgraduate Masters 'M' level) of the QAA Framework for Higher Education Qualifications in England, Wales & Northern Ireland (FHEQ).
Credit 5 credits, within the larger 60-credit Term 1 super-module for each MSc programme. Credits are not awarded for this module individually, but only for successful completion of the Term 1 super-module.
Accreditation Not currently accredited by any other body.
Keywords Statistics; non-parametric test; permutation test; bootstrap; sandwich estimator.

AIMS, OBJECTIVES AND AUDIENCE
Overall aim To introduce the basic principles of robust statistical methods.
Intended learning outcomes By the end of this module, students should be able to:
• Understand, describe and decide when it is, and when it is not, appropriate to use robust methods
• Understand and describe the strengths and limitations of a range of robust methods
• Apply these techniques appropriately in a number of simple settings
Target audience This module is compulsory for the MSc Medical Statistics.

CONTENT
Session content The module is expected to include sessions addressing the following topics:
• A revision of standard statistical procedures and the assumptions underlying them
- Non-parametric and rank-based procedures (including the sign test, the Wilcoxon signed-rank test, the Wilcoxon rank-sum test/Mann-Whitney U test, and the Spearman rank correlation coefficient)
- Randomisation and permutation procedures
- The non-parametric bootstrap
- Sandwich-style estimators of standard errors

### TEACHING, LEARNING AND ASSESSMENT

#### Study resources provided or required
Module Information can be found on the Virtual Learning Environment (Moodle) containing information about each session and a Leganto reading list for the module. All module notes and practical exercises will be made available at the beginning of the module, with the solutions to practical exercises made available towards the end of each practical session, including the corresponding Stata and R code.

#### Teaching and learning methods
Learning will be based on a lecture followed by a relevant practical with all practicals involving the use of computers. An assessment will be given as part of the practical work. A little over half the contact time will be spent in the form of practicals.

#### Assessment details
For the assessment, students will carry out an analysis of data together with submission of a short report.
Formal assessment will also be by written examination, in which one question on Paper 1 of the June exam will be allocated to Robust Statistical Methods.
Resit/deferred/new attempts – Students will take a new Paper 1 written examination. The assignment will be different (but similar in nature) to the original task set.

#### Assessment dates
Paper 1 written examinations will take place in early/mid-June. The assignment will be handed out on **Friday 29 November 2019**, with the short reports due to be handed in on **Friday 13 December 2019**.
Resit/deferred/new attempts – Paper 1 written examinations will take place early/mid-June in the following academic year. Assignments will be assessed during mid/late September of the current academic year.

#### Language of study and assessment
English (please see ‘English language requirements’ below regarding the standard required for entry).

### TIMING AND MODE OF STUDY

#### Duration
5 weeks at 0.5 days per week

#### Dates
Friday mornings in November, Thursday mornings in December

#### Timetable slot
Term 1, weeks 6-10

#### Mode of Study
The module is taught face-to-face in London. Both full-time and part-time students follow the same schedule.

#### Learning time
The notional learning time for the module totals 50 hours, consisting of:
- Contact time ≈ 13 hours
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<tbody>
<tr>
<td>Directed self-study</td>
<td>≈ 10 hours</td>
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<tr>
<td>Self-directed learning</td>
<td>≈ 7 hours</td>
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<tr>
<td>Assessment, review and</td>
<td>revision ≈ 20 hours</td>
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<td>© 2019 Centre for</td>
<td>Medical Statistics (LSHTM)</td>
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<td>Application and ADMISSION</td>
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<td>Pre-requisites</td>
<td>Knowledge of basic statistics and statistical programming using either Stata or R (as taught on Foundations of Medical Statistics) will be assumed. Students should be familiar with the notions of a p-value, confidence interval, t-test, Pearson’s correlation coefficient and – by the final lecture of the module – linear regression.</td>
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<td>English language</td>
<td>A strong command of the English language is necessary to benefit from studying the module. Applicants whose first language is not English or whose prior university studies have not been conducted wholly in English must fulfil LSHTM’s English language requirements.</td>
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<td>requirements</td>
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<td>Student numbers</td>
<td>25-35 (numbers may be capped due to limitations in facilities or staffing)</td>
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<td>Student selection</td>
<td>This module is compulsory for the MSc Medical Statistics. Partial Registration (partial participation) by LSHTM research degree students is allowed for this module. Preference will be given to LSHTM MSc students and LSHTM research degree students. Other applicants meeting the entry criteria will usually be offered a place in the order applications are received, until any cap on numbers is reached. Applicants may be placed on a waiting list and given priority the next time the module is run.</td>
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