

STAT6103 Statistical Programming

Module Outline 2018/2019

Semester 1

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This module outline should be read in conjunction with the Blackboard website for the module and the Degree Handbook for your degree programme. Degree Handbooks are available here:
<https://www.southampton.ac.uk/student-services/academic-life/faculty-handbooks.page>

1. Essential information

Staff:

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Times and Dates:

The module will take place between 29 October and 2nd November 2018.

Assessed Coursework Handout: Friday 2nd November

Assessed Coursework Submission: Monday 4th December

Assignments and Assessments

100% coursework

2. Course content

a) Aims of the Module

The aims of the module are:

To prepare students to input, verify, organise, modify, combine, analyse and present data using a range of computing and statistical methods implemented in the general purpose statistical package R . It also aims to introduce some basic ideas of statistical computing, such as numerical methods used to obtain summary statistics, iterative methods for solving equations, and simulation. Focus is not on detailed explanation of statistical analysis methods, but several of these methods will feature as examples during the module

b) Learning Outcomes

On successful completion of this course, you will be able to:

Enter and manipulate data within R.

Perform standard statistical analyses using R and interpret the resulting output for a wide range of statistical data that arise in government.

Obtain additional information on how to perform advanced statistical analyses using R and then undertake such analyses.

Interface R with data science software to deal with different types of data.

Work independently in retrieving, organising and analysing data from surveys, censuses, and administrative sources.

c) Key Skills

You will develop skills in:

Data management in R, R functions for statistical analysis: linear regression and more, Statistical computing in R, Simulation, Advanced data management and SAS, Interfacing R with Python and other data processing/management software.

d) Recommended Reading

W. N. Venables and D. M. Smith (2005). An Introduction to R. <http://www.r-project.org/>.

Efron, B. and Tibshirani, R. J. (1993). An Introduction to the Bootstrap. London: Chapman and Hall.

Gilks, W. R., Richardson, S. and Spiegelhalter, D. J. (1996). Markov Chain Monte Carlo in Practice. London: Chapman and Hall.

Ripley, B. D. (1987). Stochastic Simulation. New York: Wiley.

Robert, C. P. and Casella, G. (1999). Monte Carlo Statistical Methods. New York: Springer.

e) Blackboard

When registered for the module, you should be enrolled automatically on the module's Blackboard course and you can log on at:

<http://blackboard.soton.ac.uk/>. If you do not have access to the site please let the module coordinator know.

The site contains all the relevant course materials. Hard copies of the slides and handouts for computer workshops will also be provided.

You should check in regularly to ensure you see all announcements and course materials. You will also need to submit your coursework to Turnitin through Blackboard (see section 3d below).

f) **Provisional timetable**

Monday 29th October

10:00 – 11:20	Introduction to the module / Getting Started with R
11:20 – 11:30	Break
11:30 – 13:00	Exercises / Getting Started with R
13:00 – 14:00	Lunch
14:00 – 15:30	Functions, conditionals and loops
15:30 – 15:40	Break
15:40 – 17:00	Exercises

Tuesday 30th October

09:30 – 11:20	Data manipulation / Exercises
11:20 – 11:30	Break
11:30 – 13:00	Plots and graphs
13:00 – 14:00	Lunch
14:00 – 15:30	Linear regressions
15:30 – 15:40	Break
15:40 – 17:00	Linear regressions

Wednesday 31st October

09:30 – 11:20	Linear regressions
11:20 – 11:30	Break
11:30 – 13:00	Exercises: linear regression
13:00 – 14:00	Lunch
14:00 – 15:30	Programming in R (Random numbers)
15:30 – 15:40	Break
15:40 – 17:00	Programming in R (Random numbers)

Thursday 1st November

09:30 – 11:20	Exercises: Programming in R
11:20 – 11:30	Break
11:30 – 13:00	Simulation (bootstrap)
13:00 – 14:00	Lunch
14:00 – 15:30	Simulation / Exercises
15:30 – 15:40	Break

15:40 – 17:00 SAS

Friday 2nd November

09:30 – 11:20 SAS / Python
11:20 – 11:30 Coffee break
11:30 – 13:00 Python
13:00 – 14:00 Lunch
14:00 – 14:30 Coursework / Questions & answers

This timetable is subject to change depending on class progress. The lecturer will be around during Friday afternoon if you have any queries about any of the module material.

3. Assessment and Feedback

a) Assessment methods

The intended learning outcomes for the module will be assessed as follows:
100% coursework which will involve writing functions.

Maximum 6000 words.

b) Resit arrangements

100% coursework

c) Past exam papers

NA

d) Coursework Submission

You should submit coursework electronically via the TurnitinUK plagiarism device on Blackboard, by not later than the published date and time. Turnitin is a plagiarism detection tool which checks your work against electronic sources and other submissions for the same assignment.

Login to the Blackboard site for this module and select the Assignments link from the left-hand menu. Find the coursework and click View/Complete. There will be a series of screens to complete and then you will upload your assessment as an electronic file.

For a tutorial explaining the submission procedure in detail please go to the iSolutions website:

<http://elearn.southampton.ac.uk/blackboard/student/studentplagiarism/>

When you submit an assignment through Turnitin you will receive a confirmation email containing a submission ID number, which is proof that you have submitted your work. Make sure you keep a copy of the confirmation email you receive which will act as a receipt for your electronic submission. If you do not receive a submission ID number or an email it means that you have not submitted. If this is the case you will be penalised. If you think you have submitted but do not receive this email then you should contact the module coordinator as soon as possible.

You are advised to leave plenty of time before the deadline for electronic coursework submission, delays due to computer 'glitches' will not be considered as justification for late submission.

Penalty for late submission

When coursework is set a due date for submission will be specified and there will be associated penalties for handing in work late unless a deadline extension has been formally granted.

Work submitted up to 5 days after the deadline will be marked as usual, including moderation or second marking, and feedback prepared and given to the student. The final agreed mark is then reduced by the factors in the following table.

University Working Days late	Mark
1	(final agreed mark) * 0.9
2	(final agreed mark) * 0.8
3	(final agreed mark) * 0.7
4	(final agreed mark) * 0.6
5	(final agreed mark) * 0.5
More than 5	Zero

For example, if your mark for the coursework is 63% but you hand in your work 3 working days late, then your final mark would be $63 \times 0.7 = 44.1\%$.

Working days are Monday to Friday throughout the calendar year, including student vacation periods (but excluding University closure dates at Easter and Christmas).

Policy for overlength work

Assignment length has been stipulated in section 3a above. Your work will be overlength if you go even one word over the stipulated length or upper limit, there is no percentage leeway over the stated word length. Overlength work will be addressed through marking **only that portion of work that falls within**

the word limit. Your mark will be based on this portion of your work only, with the result that the mark will usually be lowered.

Unless otherwise stated the policy is that:

The word count includes:

- Body of Text
- Section Headings and Subheadings
- Quotes and citations that are within the body of text

The word count excludes:

- Title and Subtitle
- Table of Contents
- Abstracts (if relevant)
- Tables and Figures including captions
- List of figures, list of plates etc.
- Acknowledgements
- Appendices
- Bibliography / List of References

Procedure for coursework extensions

If you know there will be a valid reason why you cannot submit the work by the given deadline you must request an extension as soon as possible.

Coursework extension requests should provide adequate detail of the reasons why you are seeking an extension and be made on the 'Special Considerations and Deadline Extension request form' available on the Form store on the FSS Faculty Student Hub or at

http://www.southampton.ac.uk/quality/assessment/special_considerations.page

Applications must be accompanied by documentary evidence e.g. self-certification of illness form or certification by a qualified doctor specifying nature of illness to include duration and impact on ability to study, letter from qualified counsellor, copy of police incident report, etc.

Your completed form should be submitted to the Student Office who will arrange for your request to be reviewed. The Student Office will contact you via your University email account to let you know once approval has been made. **It is your responsibility to request an extension in a timely manner.**

In cases where further extensions to the original application are requested, students should submit a new application making reference to the original.

e) Feedback

Formative and summative feedback are provided in the following ways:

- Informal verbal feedback will be given during lectures and tutorials for

individual and group work. (You'll need to contribute regularly to group discussions to make the best use of this.)

- Informal written and verbal feedback are often provided by email or during office hours when we respond to queries about assessments, for example.
- Written feedback will be given on your assessed coursework, available via Blackboard. As per Faculty policy our aim is to get coursework back to students within 4 working weeks of submission. For this module that means that you can expect feedback by 10th January. Bear in mind that if you hand in work late, your feedback may be delayed.
- Exam results are published only as a grade. Although individual feedback on examinations is not normally given, feedback on the strengths and weaknesses of the performance of the whole group which took an examination may be available via Blackboard.
- Students are entitled to view their examination scripts on request, your Student Office can advise on the process to be followed. You are only permitted to view an examination script to enable you to see how you can improve your future performance and no mark or other annotation on the script is negotiable or open to alteration. The absence of annotation on a script does not mean that it has not been marked.
- Feedback works two ways – we want to hear from you about any concerns you have and suggestions about how to improve modules. We do this through informal mid semester feedback, which can sometimes be used to make immediate improvements in module delivery, and through a formal questionnaire at the end of the module, which will benefit students taking it in subsequent years. In addition to these, informal feedback from you on how we are doing and what we could do better is welcome anytime.
- For further information about how your work is marked and moderated, university quality assurance processes etc., please visit the marking and feedback section in the University's quality handbook: https://www.southampton.ac.uk/quality/assessment/framework/markings_and_feedback.page?

For the feedback to be effective, it is important that you work with the feedback given and identify how you can improve your work in the future. Should you need further information about your work, get in touch with whoever marked the work.

4. Grade Descriptors and Marking Criteria

Social Statistics and Demography follow the standard the University grade descriptors available here:

http://www.southampton.ac.uk/quality/assessment/framework/principles_and_definitions.page#assessment_descriptors when marking assessed work. The marking criteria and/or marking rubric for each individual piece of assessment on this module will be made available on Blackboard and with the instructions for each assessment. Note that the rating given for each

criterion is descriptive and does not necessarily relate in a direct numerical way to the mark achieved.

5. Academic Integrity and Referencing

The University places the highest importance on the maintenance of academic integrity and expects that all students will familiarise themselves with the Regulations Governing Academic Integrity available at: <http://www.calendar.soton.ac.uk/sectionIV/academic-integrity-regs.html>

Procedures will be invoked to investigate suspected breaches of academic integrity when concerns are raised during the marking process or in connection with suspected cheating in examinations. We are aware that students may have experienced differing standards at other institutions (including those overseas) but it is essential that you take steps to ensure your full understanding of the standards expected at Southampton as significant penalties can be imposed if these standards are breached.

It is often helpful to discuss ideas and approaches to your work with your peers, and this is a good way to help you think through your own views. However, work submitted for assessment should always be entirely your own, except where clearly specified otherwise in the instructions for the assignment. In some instances working in groups will be required, and there may be occasions when work is submitted from the whole group rather than individuals. In these instances the instructions will make it clear how individual contributions to the joint work should be identified and will be assessed. If you are in any doubt, check with the person setting the assignment. If you have worked with others you should make sure that you acknowledge this in any declaration you make.

Please note that you are NOT permitted to discuss the assignment or to show any other student your written work or computer programmes or outputs. Copying includes using another student's computer program, output or graphics.

A very useful set of interactive guides is available at <http://library.soton.ac.uk/sash/what-is-academic-integrity>. These aim to help you gain a better understanding of academic integrity and develop your skills so that your assessed work does not accidentally plagiarise the work of others.

Referencing

There are many styles of referencing used in academic publications. Unless otherwise specified the style known as the Harvard system is preferred in our Faculty. Details about how to use the Harvard referencing system can be found through the following Hartley library link:

<http://library.soton.ac.uk/sash/referencing> or by downloading the guide from: http://library.soton.ac.uk/ld.php?content_id=4660789.

If in doubt about what is required in any particular assignment, what referencing styles are appropriate etc., always ask. Your tutor or module coordinator will be able to point you in the direction of appropriate sources of advice and information.

Unfortunately, Academic integrity breaches sometimes occur. The regulations distinguish between two types of breaches of academic integrity: minor (first-time offences, "committed through inexperience or lack of understanding and ... limited in scope or their effect"), and major. The minor breaches are dealt with by individual markers, through the regular feedback process. However, everything that is not a minor breach, including all repeated cases, is a major one.

The major breaches are dealt with either by the Faculty Academic Integrity Officer or by an Academic Integrity panel, depending on the severity of the alleged breach. The outcomes from this process can vary with the maximum penalty that can be given the termination of the programme – **so please treat Academic Integrity seriously.**

6. Support and Troubleshooting

If you find yourself experiencing any study skills difficulties contact the Academic Skills Hub, level 2 in the Hartley Library, Monday - Friday: 10:00 – 12:00 & 14:00 – 16:00. <http://library.soton.ac.uk/sash>

You can also access specialized study support from Enabling Services: https://www.southampton.ac.uk/edusupport/study_support/index.page If you experience any specific difficulties with the content of the module, please contact the module coordinator.

If you are not satisfied with the response contact your Personal Academic Tutor or the Programme Coordinator.

If you have a major difficulty during the course, such as a health problem that prevents you from attending lectures or seriously interferes with your work, you should make sure to discuss this with your Personal Academic Tutor.