DEPARTMENT OF STATISTICAL SCIENCES
STATISTICS HONOURS PROGRAMMES 2017

INFORMATION FOR STUDENTS

Honours Programme Convenors

	First Semester:	**Second Semester:**
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Summary of Programmes

The following are the full honours programmes offered in the department:

STA4006W – BCom(Hons) in Statistics
STA4007W – BSc(Hons) in Statistical Sciences
STA4010W – Honours year requirement for BBusSc specialising in Analytics *(4 course credits for the BBusSc curriculum)*

In addition to the above full honours programmes, opportunity is also provided (primarily to fourth year BBusSc students in streams other than Analytics) to take a selection of coursework modules from the honours programme, equivalent to either a full- or half-year course:

STA4011W – This requires completion of 10 credits from the honours programmes listed below, and gives credit equivalent to a full fourth-year level course *(2 course credits for BBusSc)*
STA4016H – This requires completion of 6 credits from the honours programmes listed below, and gives credit equivalent to a half fourth-year level course *(1 course credit for BBusSc)*

Basic Programme Structures

Requirements for each programme are expressed in terms of a numbers of credits (which may or may not bear any relationship to the definitions of "credits" used anywhere else in the university!). Broadly speaking, one credit is the equivalent of half of an honours semester module (typically about 12 formal lectures plus associated practical or assignment work).

Each programme has a set of core modules, all of which have to be passed, plus a number of electives to make up a total required number of credits. Students may fail one elective

module and still get the relevant credit, provided that a mark of at least 40% is attained for that elective. All students must take at least two electives. Students may take more than the required number of electives, and the best of the marks for the required minimum number of electives will be taken into consideration in calculating the final grade. Electives may, with the permission of the programme convenor, be taken from honours modules in other departments.

Core requirements and the total numbers of credits depend on the programme chosen, and in some cases, also on the undergraduate stream followed (i.e. mathematical statistics or applied statistics). The requirements are summarised in the following table.

Core Courses	**Block**	**Credits**	**STA4006/7W**		**STA4010W**	
			Math Stats	**App Stats**	**Math Stats**	**App Stats**
Project	2+3+4	6	✓	✓	✓	✓
Statistical Computing	0+3	3	✓	✓	✓	✓
Matrix Methods	0	0	✓	✓	✓	✓
Theory of Statistics A	1+2+4	4	✓		✓	
Theory of Statistics B	1+2+4	4		✓		✓
Operations Research A	1	2	✓		✓	
Operations Research B	2	2	✓	✓	✓	✓
Analytics	3+4	3			✓	✓
Total Core Credits			17	15	20	18
Total Required Credits			24	24	22	22

The total required credits must be made up by selecting additional modules, either from the core list (where these are not already "core" for the relevant programme), or from the list of elective modules offered by the department (typically counting 2 credits each), or from graduate courses in other departments (with the permission of the programme convenor).

The electives on offer in the department in 2017 (provided that at least 4 students elect to do the module) are as follows:

Module	Block	Credits	Lecturers
Econometrics	3	2	G Barr
Multivariate Statistics	2	2	F Little/S Britz
Decision Modelling	3	2	L Scott/I Durbach
Visualisation	1	2	M Kuttel (Computer Science)
Biostatistics	1	2	F Gumedze/G Distiller
Time Series Analysis	4	2	G Barr
Stochastic Calculus for Finance	2	2	M Mavuso
Portfolio Theory	4	2	-
Analytics	3+4	3	M Lacerda/S Er/J Nyirenda
Analysis of Survey Data	3+4	2	Economics

Note: the Department reserves the right to change the status of core / elective courses.

Timetable

The honours modules are taught in 6-week blocks that correspond approximately with the four terms of the academic year. The exam for each module is written at the end of the block in which the module was offered after a short consolidation period. In 2017, the modules offered within each block are as follows:

Block	Dates	Modules
0	22 Feb – 10 March	Statistical Computing in R*
		Matrix Methods*
1	13 March – 28 April	Theory of Statistics*
		Operations Research A†
		Biostatistics
		Visualisation (Computer Science)
2	15 May – 23 June	Theory of Statistics*
		Operations Research B*
		Multivariate Statistics
		Stochastic Calculus for Finance
3	7 Aug – 15 Sep	Statistical Computing in VBA*
		Analytics‡
		Econometrics
		Decision Modelling
		Survey Data (Economics)
4	2 Oct – 10 Nov	Theory of Statistics*
		Analytics‡
		Portfolio Theory
		Time Series Analysis
		Survey Data (Economics)

* Core module for all honours students
† Core module for honours students in the math stats stream
‡ Core module for BBusSc Analytics students

You may choose as many modules as you like within each block, provided that you have enough credits for your programme. Lecture times will be announced before the start of each block.

Additional Information and Requirements

1. Attendance at lectures is compulsory. Inform your lecturer in advance if there are compelling reasons why you are unable to attend. Persistent absenteeism without good reason will result in a DPR.

2. Most compulsory and elective modules require students to hand in practical assignments. You can expect one assignment for every 12 lectures (i.e. 2 assignments for a 2 credit module). Timely submission of practical assignments and class exercises by the due dates is a DP requirement. Late submissions will be penalised at the module convenor's discretion. Failure to submit one or more assignments may result in a DPR for the module.

3. Regular research seminars are held in the department, usually during lunchtime on Mondays. Attendance at seminars is a DP requirement for honours students. The honours convenor will keep an attendance register at seminars and students who attend less than 85% of the seminars will receive a DPR symbol.

4. Printing: You will have access to a departmental printer and may print a maximum of 400 pages during the year without incurring any costs. Your use of the printer will be monitored and you will be required to pay for additional printing once you exceed the 400 page limit.

5. Computer access: Once you are registered, you will have 24-hour access to the honours computer lab via your student card. You may log in to any computer in the honours lab with your student number and network password. The lab is reserved primarily for use by the statistics honours class. Other graduate students or official visitors to the department may also have access to the lab, but *you are not permitted to allow your friends to use these facilities.* Please report strangers to the course convenor immediately. If you are the last person to leave the lab, *make sure that the doors are locked.* Any problems experienced with the computers or printer should be reported to Shakeel Meyer (Shakeel.Meyer@uct.ac.za). Make sure you keep the laboratory clean. Do not leave paper lying around. Do not eat or drink while working at a computer. Do not make a noise. Students violating the above rules will have their access privileges withdrawn.

Projects

The honours project forms an important and substantial part of the programme. In most cases, the project will involve the application of new methods of statistics and/or operations research to non-trivial real world problems. On some occasions, students may be permitted to undertake a project that involves more fundamental research into methods of statistics or operations research.

Further information on the choice of projects and the expected output will be provided at a later stage. The following are some important (provisional) dates to record:

27 March: A list of project topics and supervisors will be posted on Vula. Students should discuss the projects that interest them with the supervisors. Students may also propose their own topics and identify a staff member that is prepared to supervise the topic

5 May: Deadline for submitting a one-page project description and proposed supervisor to the honours convenor

11 Aug: First submission to supervisor (10% of final project grade). This will typically comprise a literature review and may include some preliminary analyses. Supervisors to submit progress report and grade to honours convenor

20 – 24 November: Oral presentations of projects (10% of final project grade)

30 November: Hand in final projects at stats reception by 1pm (80% of final grade)

Very Important:

Please note that you are expected to work continuously on your research project throughout the year. Importantly, this includes the June/July undergraduate vacation period! You should therefore avoid making alternative plans (e.g. long holidays away, full-time internships, etc.) over this time. Note that you will only have roughly 2 weeks to finalise your projects and prepare your oral presentations after the final November exams. This is not enough time to start and finish an entire honours project! By this stage, you should already have a fully written draft and you should spend the time polishing it up for submission.

Plagiarism

Plagiarism is to use another person's work and to present it as one's own. This can occur very easily when working in groups, especially in the computer lab while busy with programming assignments. While group work is encouraged, you must make sure that the work that you hand in is your own. So go home and do the final programming and write-up yourself! The easy availability of information on the internet has made plagiarism much more rife than before. Plagiarism can even occur through the thoughtless downloading of "interesting" material and incorporating this into reports without malicious intent. However, ignorance is no excuse! Plagiarism is intellectual theft and fraud, whether intended or not, and instances of plagiarism which are discovered are dealt with very severely (including expulsion from the University).

For the above reasons, each and every written submission to the Department (projects, reports, assignments, essays) must include the following declaration, which should be signed:

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. Each significant contribution to, and quotation in, this project report from the work of other people has been attributed, and has been cited and referenced.
3. This project is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

Signature _____

In order to avoid unintended plagiarism, it is advisable to get into the habit of systematically recording sources of all information retrieved, and of referencing such information whenever used. The UCT writing centre does provide some guidelines to students on referencing conventions. They tend to favour the so-called Harvard style (referencing by author and year), but many technical journals (mathematical and statistical) prefer numbering of references. On pages 7 and 8, both styles are illustrated, showing both how references appear in the text and how the bibliography is listed. Both examples were generated by the BiBTEX utility in LATEX.

Harvard Reference Style Illustrations

The examples here were generated by the LaTeX *natbib* package, using the author-year (allied to the "Harvard-style") referencing option, with the *apalike* bibliographic style.

A standard in-line reference to an article might be as discussed by Stewart et al. (2004), or perhaps as in Lee and Olson (1999) when citing a chapter in a book. Passing or parenthetical references to a string of related papers are also possible (Belton, 1986; Lootsma, 1993; Tversky and Kahneman, 1981; Stewart, 2005).

Similar styles apply to books, where we could refer to the work of Belton and Stewart (2002), but other books might be noted (Eden and Ackermann, 1998; Ignizio, 1976)

References

Belton, V. and Stewart, T. J. (2002). *Multiple Criteria Decision Analysis: An Integrated Approach*. Kluwer Academic Publishers, Boston.

Belton, V. (1986). A comparison of the analytic hierarchy process and a simple multi-attribute value function. *European Journal of Operational Research*, 26:7–21.

Eden, C. and Ackermann, F. (1998). *Making Strategy: The Journey of Strategic Management*. SAGE Publications, London.

Ignizio, J. P. (1976). *Introduction to Linear Goal Programming*. Sage.

Lee, S. M. and Olson, D. L. (1999). Goal programming. In Gal, T., Stewart, T. J., and Hanne, T., editors, *Multicriteria Decision Making: Advances in MCDM Models, Algorithms, Theory, and Applications*, chapter 8. Kluwer Academic Publishers, Boston.

Lootsma, F. A. (1993). Scale sensitivity in the multiplicative AHP and SMART. *Journal of Multi-Criteria Decision Analysis*, 2:87–110.

Stewart, T. J., Janssen, R., and van Herwijnen, M. (2004). A genetic algorithm approach to multiobjective land use planning. *Computers and Operations Research*, 32:2293–2313.

Stewart, T. J. (2005). Goal programming and cognitive biases in decision making. *Journal of the Operational Research Society*, 56:1166–1175.

Tversky, A. and Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211:453–458.

Numbered Reference Style Illustrations

The examples here were generated by the LaTeX *natbib* package, using the numbers referencing option, with the *abbrvnat* bibliographic style.

A standard in-line reference to an article might be as discussed by Stewart et al. [8], or perhaps as in Lee and Olson [5] when citing a chapter in a book. Passing or parenthetical references to a string of related papers are also possible [1, 6, 9, 7].

Similar styles apply to books, where we could refer to the work of Belton and Stewart [2], but other books might be noted [3, 4]

References

[1] V. Belton. A comparison of the analytic hierarchy process and a simple multi-attribute value function. *European Journal of Operational Research*, 26:7–21, 1986.

[2] V. Belton and T. J. Stewart. *Multiple Criteria Decision Analysis: An Integrated Approach*. Kluwer Academic Publishers, Boston, 2002.

[3] C. Eden and F. Ackermann. *Making Strategy: The Journey of Strategic Management*. SAGE Publications, London, 1998.

[4] J. P. Ignizio. *Introduction to Linear Goal Programming*. Sage, 1976.

[5] S. M. Lee and D. L. Olson. Goal programming. In T. Gal, T. J. Stewart, and T. Hanne, editors, *Multicriteria Decision Making: Advances in MCDM Models, Algorithms, Theory, and Applications*, chapter 8. Kluwer Academic Publishers, Boston, 1999.

[6] F. A. Lootsma. Scale sensitivity in the multiplicative AHP and SMART. *Journal of Multi-Criteria Decision Analysis*, 2:87–110, 1993.

[7] T. J. Stewart. Goal programming and cognitive biases in decision making. *Journal of the Operational Research Society*, 56:1166–1175, 2005.

[8] T. J. Stewart, R. Janssen, and M. van Herwijnen. A genetic algorithm approach to multiobjective land use planning. *Computers and Operations Research*, 32:2293–2313, 2004.

[9] A. Tversky and D. Kahneman. The framing of decisions and the psychology of choice. *Science*, 211:453–458, 1981.