Diploma/MSc in Official Statistics
Professional Development Programme

Diploma/MSc in Demography
Diploma/MSc in Social Statistics

DEMO 6020: DEMOGRAPHIC METHODS 1

PROGRAMME, COURSE OUTLINE AND READING GUIDES

27 - 31 October 2014

Dept. of Social Statistics and Demography,
Faculty of Social and Human Sciences,
University of Southampton, Highfield Campus,
Southampton SO17 1BJ.

**Lecturers: Prof. Allan G. Hill and Dr. Jennifer Holland.
Teaching assistant: Ewa Kabzinska.**

Location.

All Sessions will be held in the in the Computer Lab on the second floor of Statistical Science Research Institute, Building 39, Room 2015. Building 39 is just behind the Murray Building reached via Salisbury Road (see map below and online).

https://www.southampton.ac.uk/visitus/campuses/maps/highfield_3d_key.pdf

Refreshments (morning and afternoon tea and coffee) will be served in this building but students will be expected to make their own lunch arrangements.
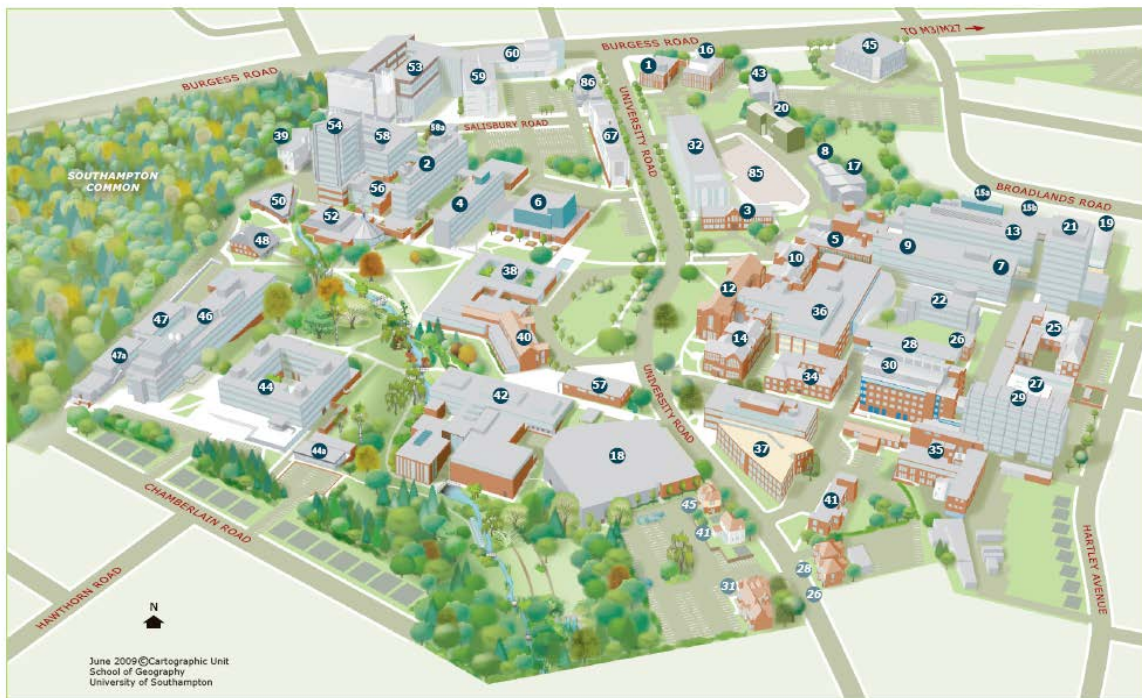
Important! Please bring a calculator with you to all lectures and classes and be prepared to make extensive use of MS Excel throughout the course.

Overview of Timetable

Date	Time	Topic	Notes
Mon 27 Oct			
	9:30 – 11:00 am	Registration. Welcome. Aims. (10:00am) L1. Birth rates, death rates and age structures.	Refresher session using primarily the materials in: Newell, C. (1988) *Methods and Models in Demography*. London: Belhaven. Hinde, A (1998) *Demographic methods*. Arnold, London. Ex. 1. Age-sex structure
		Tea and Coffee	
	11:30 – 1:00 pm	L2. Comparing populations: standardisation.	**Jennifer Holland**: Rates using direct and indirect standardisation methods. Exercise using Excel from the Workbook. Ex 2. standardisation exercise in class. G. Wells (2002) Standardization (of rates). In: Encyclopaedia of Public Health. Online at: http://www.enotes.com/public-health-encyclopedia/standardization-rates
		Lunch	
	2:00 – 3:30 pm	L3. The Lexis diagram and its uses. Illustration with birth history data.	Introduction to period and cohort rates. G. Feeney: Lexis Diagram, Encyclopedia of Population, Volume 2, Macmillan Reference USA, 2003, page 586. Ní Bhrolcháin, Máire. "Period Paramount? A Critique of the Cohort Approach to Fertility." Population and Development Review 18, no. 4 (1992): 599-629. Ex. 3. Period and cohort fertility from birth histories – Accra.
		Tea and coffee	
	4:00 – 5:30 pm	L4. The life table: principles and use.	Palmore, J.A. and R.W. Gardner. 1996. *Measuring Mortality, Fertility, and Natural Increase*. East-West Center: Honolulu. 5th Edition. Pages 35-58. Shryock and Siegel (condensed edition) chapter 15. Hinde, A. 1998. *Demographic methods*. Arnold: London. Chapter 4. Terminology, notation and principles.
Tue 28 Oct			
	9:30 – 11:00 am	L5. Model life table families and relational models.	Preston, S.H., P. Heuveline and M. Guillot. 2000. *Demography: Measuring and Modeling Population Processes*. Blackwell Publishers Ltd.: Oxford. Chapter 3 (skip 3.8, 3.9, 3.10, and Appendix 3.1). Newell, chapters 12 and 13. Also: http://demographicestimation.iussp.org/content/introduction-model-life-tables Shryock and Swanson, Appendix B, part II. Preston, SH. (1976) Chapter 2 – Structure and change in causes of death: an international summary in: *Mortality patterns in national populations*. Academic Press.
		Tea and coffee	
	11:30 – 1:00 pm	Ex 4. Life table calculations: details and class exercise. Advanced: logit model life tables.	Newell, C. (1988) *Methods and Models in Demography*. London: Belhaven. Murray CJL et al (2003) Modified logit life table system: principles, empirical validation, and application. Population Studies 57(2): 165-182.
		Lunch	
	2:00 – 3:30 pm	Lab session: demographic software.	Introduction to Pop Analysis spreadsheets (PAS); the UNFPA/IUSSP Tool for Demographic Estimation.
		Tea and coffee	
	4:00 – 5:30 pm	L6. Censuses as sources of demographic information: historical and contemporary.	See: http://demographicestimation.iussp.org/. Read the sections on Fertility from one census (pp. 51-95 in the printed version; and Adult mortality from one census (pp. 195-256). See for the UK census: http://www.ons.gov.uk/ons/guide-method/census/analysis/index.html http://unstats.un.org/unsd/demographic/sources/census/2010_PHC/default.htm

Date	Time	Topic	Notes
Wed 29 Oct			
	9:30 – 11:00 am	Ex 5. Inter-censal survival and the use of model life tables.	Estimating a life table from inter-censal survival. Deriving measures of adult survival for a population enumerated twice at 10-year intervals. Is this a good way to estimate migration?
		Tea and coffee	
	11:30 – 1:00 pm	L7. Fertility and fertility determinants: the proximate variables.	Bongaarts, J. (1982) The fertility-inhibiting effects of intermediate fertility variables. Studies in Family Planning Vol 4(6/7): 179-189. See: http://demographicestimation.iussp.org/. Read the first part of chapter 7 of the printed book.
		Lunch	
	2:00 – 3:30 pm	Ex 6. Calculating the indices of the proximate determinants of fertility in Accra.	Class Exercise. Stover, J. (1998). Revising the proximate determinants of fertility framework: what have we learned in the past 20 years? Stud Fam Plann, 29(3), 255-267.
		Tea and coffee	
	4:00 – 5:30 pm	L8. Fertility models for forecasting.	Brass, W (1975) Chapter 4 on the fertility polynomial in: Methods for estimating fertility and mortality. Zaba, B (1981) Use of the Relational Gompertz Model in Analysing Fertility Data Collected in Retrospective Surveys, Centre for Population Studies, London School of Hygiene & Tropical Medicine. Preston, S.H., P. Heuveline and M. Guillot. 2000. Demography: Measuring and Modeling Population Processes, Chapter 6.
Thurs 30 Oct			
	9:30 – 11:00 am	L9. The demography of migration.	**Jennifer Holland.** Weeks, JR (2012) Population – an introduction to concepts and issues. Chapter 7 – The Migration Transition. Wadsworth. Excellent summaries of the UK methodology can be found at: http://www.ons.gov.uk/ons/guide-method/method-quality/specific/population-and-migration/population-projections/faq---population-projections/migration/index.html
		Tea and coffee	
	11:30 – 1:00 pm	L10. Population projections – principles and introduction to MORTPAK.	M&E Learning Center. https://training.measureevaluation.org/non-certficate-courses/pap/lesson-8. http://papp.iussp.org/sessions/papp101_s10/PAPP101_s10_060_010.html
		Lunch	
	2:00 – 3:30 pm	Guest Lecture	Small Area estimation of population and demographic rates. Outside lecture by Pete Large (ONS)
		Tea and coffee	
	4:00 – 5:30 pm	Revision Session	Review of Lectures and Exercises to date. Format of the Final Examination. Topics for the final day.
Fri 31 Oct			
	9:30 – 11:00 am	L11. Stable population models and the Lotka equation.	How age distributions are determined by combinations of birth rates, death rates and migration measures. The Lotka equation and the concepts of stationary, stable and quasi-table populations. Newell, chapters 3 and 11. Shryock and Swanson, pp. 136-170.
		Tea and coffee	
	11:30 – 1:00 pm	L12. Principles of indirect estimation of demographic parameters	http://demographicestimation.iussp.org/. Illustrative analysis – Kuwait and South Africa.
		Lunch	
	2:00 – 3:30 pm	Revision Session and extensions of methods presented in Methods I.	From life tables to survival analysis. From cohort-component to probabilistic methods. Dealing with uncertainty and short-term changes. Revising for the Examination. Additional readings and help.
		Tea and coffee	
	4:00 – 5:30 pm	CLOSING	Questions and answers.

Lecturers

The course co-ordinator is **Prof. Allan G. Hill** who will be available for consultation throughout the week (contact details below). **Dr. Jennifer Holland** also contributes to the module. This course and many of the materials used within it were originally prepared by Professor Mairé Ní Bhrolcháin, now retired.

Office	Room 4123, Building 58
Phone	023 8059 2564
Email	ah4e10@soton.ac.uk

Aims of unit

To introduce students to some core basic demographic methods, with particular reference to methods used in official statistics; and to provide practical experience using such methods.

Learning outcomes

On successful completion of this course, you will:
(a) be familiar with the principal sources of demographic data, together with their strengths and weaknesses;
(b) understand the demographic significance of age structures, together with the implications of variations in age structure;
(c) be able to specify and calculate the principal demographic measures, and understand how they are standardised for comparison and interpretation;
(d) understand the rationale for the use of demographic models and to be able to use such models for practical purposes.
(e) be able to construct and interpret simple life tables;
(f) understand the essentials of population change including the effects of changing birth, death and migration rates on age structures.
(g) be familiar with how national and local population estimates are made.

Key skills

- Ability to identify online sources of demographic data and to distinguish reliable primary sources and their underlying assumptions.
- Make intelligent use of demographic software programs provided to the class.

Calculators

Calculators will be provided for MOffStat students: you will be asked to sign on receipt and to return the calculator before you leave Southampton. All other students: please bring a calculator to the course with you. You may as an alternative use Excel on your laptop computer.

Teaching and learning methods

The course will be taught by lectures, practical classes and computer workshops. Paper copies of the lecture slides will be handed out before the lecture. Reading is indicated in the next section of this outline.

Blackboard site

When registered for the unit, you should be enrolled automatically on the unit'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 us know so that we can enrol you. The site contains the unit outline, recommended reading, details about the seminars, assignment and exam,

lecture notes, and essay guidelines. Important notices including last minute changes to the programme will be posted on the site—you should therefore check in regularly to ensure you see the announcements and new materials.

Assessment methods

The course will be assessed 100% by a 2-hour examination. The examination paper is in three compulsory sections: Section A comprises a series of short answers and is worth 33% of the marks; Section B has a choice of one of two questions, worth 33% of the marks; Section C has one question, worth 34% of the total marks. Feedback on examination performance will be available online at the time that results are made available.

Past examination papers are available online via the "Quick links" on the right hand side of the Library/Resources page: http://www.soton.ac.uk/library/resources/index.shtml. Note that the module has previously been known as DEMO6002, STAT6033, and ST645, and to find all past papers, you should search under all of these codes.

You should also have a look at the examination feedback from previous years, which is available online at: http://www.southampton.ac.uk/socscinet/pgt/examfeedback/. Note that you should look for the earlier course codes also.

Resit arrangements

In case of resit arrangements, you will have to take a supplementary examination.

Academic integrity

The University places the highest importance on the maintenance of academic integrity in the conduct of its affairs, and has produced a guide to issues of academic integrity for students. This can be found in the University Calendar available online at http://www.calendar.soton.ac.uk/sectionIV/part8a.html, and this is reproduced in the (School's Part 1 handbook/School's Part 2 and 3 handbook/MSc booklet[*]) available on the School of Social Sciences intranet at http://www.soton.ac.uk/socscinet. Please familiarise yourself with what is expected of you in this regard by reading through this information. Your attention is drawn particularly to Appendix 1 of the Academic Integrity Statement, which outlines those things which you must seek to avoid, including cheating and plagiarism.

If academic integrity is deemed to have been breached, there are a range of penalties that may be applied.

Troubleshooting

If you have any difficulties during the course, please approach the course co-ordinator who will be happy to help you, if he can. If this does not resolve the problem, you could discuss the issue with your programme co-ordinator: Dr Solange Correa Onel (MSc Official Statistics).

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 obtain documentation of the difficulty—e.g. a medical certificate. You should then fill in a Special Considerations form and bring it with any documentation to your personal tutor for signature, and eventually to School Office for filing. The difficulty can then be taken into account when the final examination board meets.

Readings

General demographic methods

Selected sections of each of the following texts will be useful to you—you would not be expected to work through all of them from start to finish.

Recommended for purchase.

Newell, C. (1988) *Methods and Models in Demography.* London: Belhaven. HB 881 NEW
Good, introductory text, with exercises and answers. Strong on model life tables and fertility measures. £3 or so used on Amazon.com

OR

Hinde, A (1998) *Demographic methods.* Arnold, London. (with Internet site for exercises).
HB 881 HIN. 12 copies in Library. From £8 used on Amazon.com.

Other texts arranged from easy to more difficult:

Palmore, JA and RW Gardner (1994) Measuring mortality, fertility and natural increase. East-West Center, Honolulu.

Weeks, J.R. (2004) Population: An Introduction to Concepts and Issues. Wadsworth Publishing Company: New York. Ninth Edition.   HB 871 WEE.

Siegel, JS & DA Swanson (eds.) (2004) The Methods and materials of demography. 2nd edition. San Diego, CA: Elsevier Academic Press.   HB 881 SIE

Siegel, J.S. (2002) Applied Demography: Applications to business, government, law and public policy. London: Academic Press.   HB 849.4 SIE
Excellent on applied aspects, though with American focus and examples. See selected sections of Chapters 1, 3 and 4 on measurement, life tables and data sources, and Chapter 9 on population estimates.

Pollard, A.H., Yusuf, F., and Pollard, G.N. (1990) *Demographic Techniques. 3rd edition.* Oxford: Pergamon Press.   HB 881 POL
A very straightforward and useful text, though not comprehensive.

Rowland, D. (2003) Demographic methods and Concepts. Oxford: OUP.
 A good recent general text on method.   HB849.4 ROW

Poston, D and L Bouvier (2010) *Population and society: an introduction to demography.* Oxford. HB 849.4 POS

Preston, S.H., Heuveline, P. and Guillot, M. (2001). *Demography: Measuring and Modelling Population Processes.* Oxford: Blackwell.   HB849.4PRE
Excellent text; more advanced than those above.

Demographic measurement and standardisation

Ní Bhrolcháin, M. (2001) Demographic measurement: general issues and measures of fertility. *International Encyclopedia of the Social and Behavioral Sciences*, Elsevier.
                    Reserve Collection Box STAT6011
Ní Bhrolcháin, M. (2001) Demographic measurement: nuptiality, mortality, migration and growth. In: *International Encyclopedia of the Social and Behavioral Sciences,* Elsevier.
                    Reserve Collection Box STAT6011

G. Wells (2002) Standardization (of rates). In: *Encyclopedia of Public Health*. Online at:
http://www.enotes.com/public-health-encyclopedia/standardization-rates

Population census
Abbott, O. (2009) 2011 Census coverage assessment and adjustment methodology.
Population Trends 137, 25-32.

White, I. (2009) The 2011 Census taking shape: methodological and technological
developments. *Population Trends* 136: 64-72.

White I. and McLaren E (2008) 'The 2011 Census taking shape: the selection of topics
and questions'. *Population Trends* 135: 8–19.

ONS (2012) 2011 Census – Population and Household Estimates for England and
Wales, March 2011. Statistical Bulletin, 17/20 July 2012. *Available online.*

Population estimates
Ormiston-Smith, N., J. Smith and A. Whitworth (2006) An international comparative
study on the use of the cohort component method for estimating national populations.
Population Trends 125: 37-46.[1]

ONS (2005) *Making a population estimate in England and Wales.* National Statistics
Methodological Series No. 34 (document due to be updated).

Siegel, J.S. (2002) *Applied Demography: Applications to business, government, law and public policy.*
London: Academic Press, Chapter 9.   HB 849.4 SIE

See the IASA/Institute websie on probabilistic projections:
http://www.iiasa.ac.at/web/home/research/researchPrograms/WorldPopulation/Research/probabilistic_projections.html.

Small area population estimates
Bates, A. (2006) Methodology used for producing ONS's Small Area Population
Estimates. *Population Trends*, **125**, 30-36.

Siegel, J.S. (2002) *Applied Demography: applications to business, government, law and public policy.*
San Diego: Academic Press, Chapter 9.

Bates, A. (2008) The development of a 'Postcode Best Fit' methodology for producing
Population Estimates for different geographies. *Population Trends* 133: 28-34.

Allan G. Hill.
17 October 2014

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[1] *Population Trends* was published quarterly by ONS up to the last issue in September 2011, when it was
discontinued. It was an excellent source on population matters in the UK, as well as including quarterly
updates of routine vital statistics series. It is available online on the ONS website at
http://www.ons.gov.uk/ons/publications/all-releases.html?definition=tcm%3A77-27989 and also in the
Hartley Library at HA/HB3583.