

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

13 – 17 November 2017

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

Lecturers: Prof. Allan G. Hill and Prof. Jakub Bijak
Teaching assistant: TBA

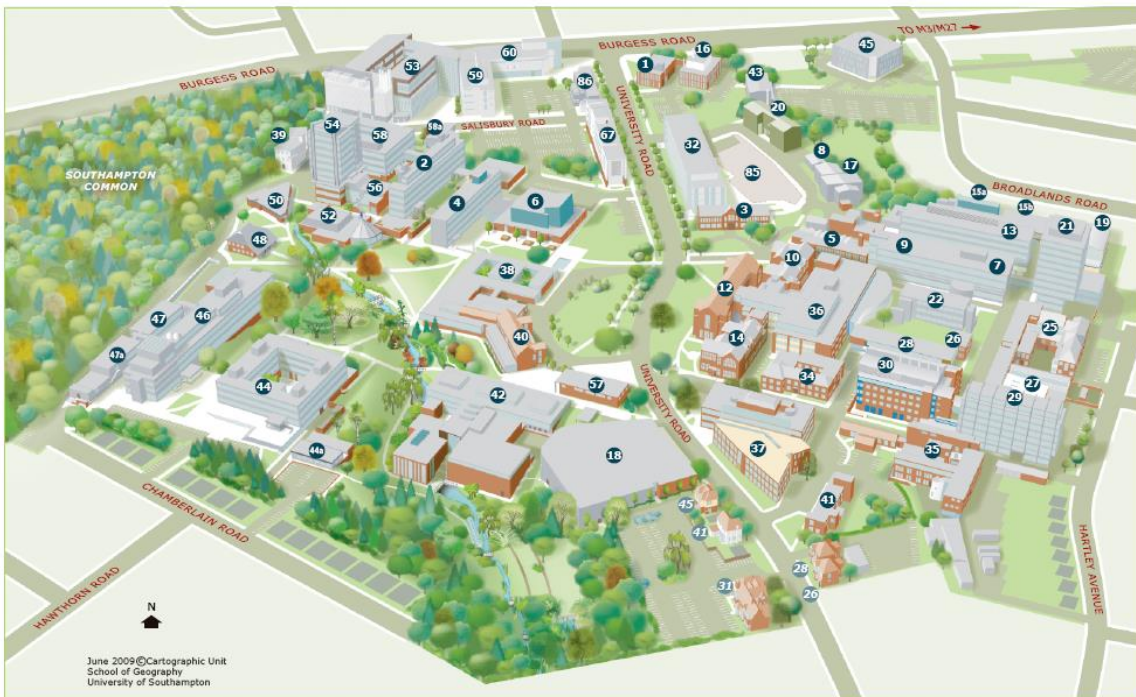
Location.

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.

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/studentervices/academic-life/faculty-handbooks.page>



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.

1.1) Aims of the Module

To introduce students to the core demographic methods and to provide practical experience using such methods.

1.2) Learning Outcomes

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

- (a) *Define* and *interpret* key concepts and measures used in demographic analysis;
- (b) *Identify* principal sources of demographic data and assess their strengths and weaknesses;
- (c) *Specify* and *calculate* the principal demographic measures and *standardise* these measures for comparison and interpretation;
- (d) *Quantify* the components of past, current and future population change, including the effects of changing birth, death and migration rates on age structures and population composition;
- (e) *Describe* the rationale for the use of demographic models and to be able to use such models for practical purposes;
- (f) *Construct* and *interpret* single-decrement life tables;
- (g) *Apply* the cohort-component method to *compute* your own population projection.

1.3) Key Skills

You will develop skills demonstrating your:

- KS1 Ability to identify online sources of demographic data and to distinguish reliable primary sources and their underlying assumptions;
- KS2 Capacity to make use of relevant demographic software;

KS3 Ability to compute demographic parameters, simple extrapolations, life tables, population accounts and cohort component projection using Excel and other relevant programs.

2.) Module Staff

The module co-ordinator is **Prof. Allan G. Hill** who will be available for consultation throughout the week (contact details below).

ah4e10@soton.ac.uk

Building 58 / Room 4123

Tel: 023 8059 2564 (x2-2564)

Office hours: By appointment.

Additional staff include Prof. Jakub Bijak

j.bijak@soton.ac.uk

Building 58 / Room 4025

Tel: 023 8059 7486

Office hours: By appointment

TBA / TA (Computer Workshop Demonstrator)

3) Teaching and Learning Methods

The course will be taught by lectures, computer workshops, exercises and problem sets. All lectures and computer workshops are compulsory.

3.1) Lectures

Lectures are scheduled every day in the Southampton Statistical Sciences Research Institute (SSRI), Building 39 following the attached timetable. There will be practical assignments in class and students are expected to review the exercises and class notes in the evenings before each session.

For each session, there will be required and supplemental readings assigned (see *Timetable and Readings and other Sources* below). You are expected to have done the required reading ahead of each lecture; the lectures will build upon these readings which will be discussed in class.

All presentations and exercises as well as additional materials can be freely downloaded from the module Blackboard site. The lectures will be recorded and stored on Blackboard so students can review the slides with the voice-over in their own time. You should still come prepared to take notes. You will be given print-outs of the slides and copies of the exercises in a folder at the outset so you can annotate these during the course.

In the SSRI building, a small library of relevant texts is available. These can be consulted on the spot or borrowed for further study.

3.2) Computer Lab Sessions

Computer Lab Sessions will take place in class interspersed with the presentations. During these sessions, you will apply the methods presented in the lectures and readings to analyse and present demographic data using Excel and a number of different demographic computing packages. You may need to download and/or print the handout for each computer lab session but printed instructions will be included in your course folder.

3.3) Problem Sets

In addition to in-class exercises and the computer lab sessions, additional formative problem sets will be referenced for practice and revision. These are mostly available online through the IUSSP website – details provided in Class. These problem sets will not be marked but will give you the opportunity to practice the demographic methods you are learning in the lectures and readings. Answer sheets will be provided so you can check your workings. Generally, these problem sets will not be discussed in the lecture or the computer lab sessions; if you have questions or would like to discuss your answers, please discuss with the relevant presenter.

4) Blackboard

When registered for the module, you should be enrolled automatically on the module's Blackboard course. 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 right away.

The site contains all the relevant course materials. The lecture slides will be posted in advance of each session as *pdf files and will be available for revision after the end of the module. All the exercises and materials used during the module will also be posted on the module website. After the exercises have been completed, we shall post model answers and commentaries to help with revision.

Other key readings will be posted on the website together with answers to recent past examination papers.

You should check in regularly to ensure you see all announcements and course materials.

5) Calculators and computers

Calculators are required for the 2-hour examination. It is advised that you purchase a calculator early in the semester so that you are familiar with its use well in advance of the examination. You may need to use the calculators for the class exercises but most exercises will require the use of Excel. In the classroom, you will have access to an individual desktop computer with Excel and other relevant programs pre-installed. You may use your own personal laptop and it may be useful to bring a flashdrive to copy your workings from the classroom computers to your own machines.

6) Assessment Methods

The course will be assessed 100% by a 2-hour examination in January 2018. 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.

It is University policy that the only calculators that may be used in University exams are Casio FX85GT and FX85GT Plus or Casio FX570 (all models). These no longer need to carry the University logo. This means that they can be purchased from any retail outlet, including the Student Union shop. You can also use a Casio FX83ES, GT and Plus, which are the older approved models. No other calculator may be used in the examination room and no calculators will be available for loan.

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> and on the module web site. Note that this course have been given under several module codes, so previous papers can be found under module codes DEMO6020, DEMO6002, STAT6033,

and ST645. 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.

6.1) Resit arrangements

In case you need to resit the examination, you will have to take a supplementary examination which will be worth 100% of the module marks in August 2018.

7) 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.

8) 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.
- 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/marketing_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.

8) Problem Set and Revision Sessions

Since there is a large gap in time between the end of the module and the written examination in January, one or more revision sessions will be arranged. These may take the form of an online exchange or a face-to-face session held before the examination. Participants with individual queries or problems may e-mail the module co-ordinator – Prof. Allan Hill (ah4e10@soton.ac.uk).

9) Academic Integrity

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.

A very useful set of interactive guides is available at: <http://www.studyskills.soton.ac.uk/integrity/index.htm>. 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. There is also further information and resources on the Library page here: <http://library.soton.ac.uk/sash/ai>.

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

10) Support and Troubleshooting

If you have any difficulties or issues with this course please contact the course coordinator, Prof. Allan Hill (ah4e10@soton.ac.uk). You can seek help after the module has ended either by attending the January revision session or by contacting the module co-ordinator by email. You can typically expect a response within 24-48 hours, although response times may be longer during weekends and holiday periods.

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 inform the module co-ordinator and make sure to discuss this with your Personal Academic Tutor.

DAY	9:30 - 11:00 am	11:30 - 1:00 pm	2:00 - 3:30 pm	4:00 - 5:00 pm
MONDAY	L1. Population growth models	L2. Birth and death rates and age structures. Stable models	L3. Period and cohort rates	L4. Period and cohort mortality rates
	Ex1. Forecasting aggregate growth	Ex2. Charting age composition with different changes in fertility and mortality	Ex3. The Lexis diagram	Ex4. Period and cohort fertility in the UK
TUESDAY	L5. Mortality measures	L6. The true cohort life table - survival analysis idea	L7. Period life tables	L8. Abridged life tables: separation factors, older and younger age groups
	Ex5. Crude and age-specific rates	Ex6. Survival measures from cohort life tables	Ex7. $M(x)$ to $q(x)$ and the other life table functions	Ex8. Age at first marriage
WEDNESDAY	L9. Comparison of populations: standardisation	L10. Indirect standardisation: the European fertility project indices	L11. Fertility measures: aggregate and age-specific	L12. Cohort age-specific fertility from a birth history
	Ex9. Direct standardisation	Ex10. The indices of marriage, marital fertility and non-marital fertility	Ex11. TFRs, GFRs, C/W ratios, marital fertility.	Ex12. ASFRs and TFRs from an event history
THURSDAY	L13. Lifetime (parity) and current (ASFR) fertility measures from a census compared	L14. Proximate determinants: fertility	L15. Proximate determinants: estimating contraceptive needs to reach targets	L16. Forecasting fertility with uncertainty.
	Ex13: Parity progression ratios and total fertility rates	Ex14. Application using Accra data.	Ex15. Contraceptive use and total fertility rates.	Ex16. Past fertility forecasts for the UK
FRIDAY	L17. Working with administrative data: inter-censal survival	L18. Cohort-component projections: principles	L19. Uncertainty in population projections	
	Ex17. Net migration to the UK	L18. Cohort-component projections: an illustration	L20. Recapitulation and advice for revision and further study.	

READINGS AND OTHER USEFUL SOURCES.

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.

Core texts:

Hinde, A (1998) *Demographic methods*. Arnold, London. (with Internet site for exercises). HB 881 HIN.

Many copies in Library. From £8 used on Amazon.com.

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

Preston, S.H., Heuveline, P. and Guillot, M. (2001). *Demography: Measuring and Modelling Population Processes*. Oxford: Blackwell. HB849.4PRE

Wachter, KW (2014) *Essential demographic methods*. Harvard UP.

Other general 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 + eBook via the library website

Shryock, HS, & JS Siegel (1976). *The Methods and Materials of Demography*. Condensed edition by EC Stockton. New York: Academic Press. HB 881 SHR

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

Pollard, A.H., Yusuf, F., and Pollard, G.N. (1990) *Demographic Techniques*. 3rd edition. Oxford: Pergamon Press. HB 881 POL

Rowland, D. (2003) *Demographic methods and Concepts*. Oxford: OUP.

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

Online resources.

IUSSP Tools for Demographic Estimation. <http://demographicestimation.iussp.org/>.

This site is up-to-date and covers a wide range of demographic methodologies. Additionally, there is a free copy of the text of this site in book form that can be downloaded at:

<http://demographicestimation.iussp.org/content/get-pdf-book-website>.

You will need to REGISTER (an easy process) to access the materials.

IUSSP Population Analysis for Policies & Programmes. <http://papp.iussp.org/>
A training module developed in collaboration with UNFPA. Covers a wide range of demographic topics with practice exercises.

United States Census Bureau Population Analysis System and Spreadsheets.

<http://www.census.gov/population/international/software/pas/>

"PAS is a set of Microsoft Excel workbooks developed by the U.S. Census Bureau containing frequently used procedures and methods in basic demographic analysis. The purpose of the workbooks is to facilitate analysis of available data for the following topics: age structure, mortality, fertility, migration, distribution of population, urbanization, and population projections. The workbooks are distributed with two manuals describing the demographic methods they implement and the procedures they perform." ([US Census Bureau](#), Accessed 30 September 2014)

MortPak - The United Nations Software Package for Mortality Measurement

<http://www.un.org/en/development/desa/population/publications/mortality/mortpak.shtml>

"MORTPAK is a software package for demographic measurement in developing countries, with special emphasis on mortality measurement." ([UN Population Division](#), Accessed 30 September 2014)

SPECIFIC READINGS BY TOPIC

Introduction to formal demography; demographic data; principal demographic measures

Suggested readings:

Newell, chapters 1 and 2

Palmore, chapter 1

Additional readings:

ONS Census 2021 website <https://www.ons.gov.uk/census>

ONS Census Transformation Programme

<https://www.ons.gov.uk/census/censustransformationprogramme>

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

For a global view on Censuses, see:

<http://unstats.un.org/unsd/demographic/sources/census/wphc/default.htm>

Population accounting; population growth; age structures

Required readings:

Newell, chapters 2 and 3.

Shryock and Swanson, pp. 136-140.

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).

Additional readings:

Ballinger. Chapter 3, see especially pages 62-67 [HB 3505 PIT]

Shryock and Swanson, chapter 7 and 8.

Ní Bhrolcháin, M. (2001) Demographic measurement: general issues and measures of fertility. *International Encyclopaedia of the Social and Behavioral Sciences*, Elsevier.
<http://www.sciencedirect.com/science/article/pii/B0080430767021008>

Ní Bhrolcháin, M. (2001) Demographic measurement: nuptiality, mortality, migration and growth. In: *International Encyclopaedia of the Social and Behavioral Sciences*, Elsevier.
<http://www.sciencedirect.com/science/article/pii/B0080430767047562>

Comparing populations: standardisation

Required readings:

Newell, pp. 63-7.

Shryock and Siegel (condensed edition) pp. 234 and 241-244.

Additional readings:

Preston et al, chapter 2. pp. 21-30

Pollard et al, pp. 71-75.

Ní Bhrolcháin, M. (2001) Demographic measurement: general issues and measures of fertility. *International Encyclopedia of the Social and Behavioral Sciences*, Elsevier.

Ní Bhrolcháin, M. (2001) Demographic measurement: nuptiality, mortality, migration and growth. In: *International Encyclopedia of the Social and Behavioral Sciences*, Elsevier.

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

Period and cohorts: the Lexis diagram.

Required readings:

G. Feeney: Lexis Diagram, *Encyclopaedia of Population*, Volume 2, Macmillan Reference USA, 2003, page 586. (Reading available on Blackboard)

Ní Bhrolcháin, Máire. "Period Paramount? A Critique of the Cohort Approach to Fertility." *Population and Development Review* 18, no. 4 (1992): 599-629.

Additional readings:

Vandeschrick, Christophe, and Jean-Marie Wautelet "The Lexis Diagram, a Misnomer." *Demographic Research* 4, no. 3 (2001): 97-124.

The life table (1): principles and use.

Required readings:

Hinde, A. 1998. *Demographic methods*. Arnold: London. Chapter 4.

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.

Additional readings:

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).

The life table (2); stationary populations; model life tables and relational models.

Required readings:

Newell, pp. 120-21, chapters 12 and 13.

IUSSP Population Analysis for Policies & Programmes Training Module: PAPP103 - S01: Demographic models: model life tables

http://papp.iussp.org/sessions/papp103_s01/PAPP103_s01_010_010.html

Additional readings:

Preston, S.H., P. Heuveline and M. Guillot. 2000. *Demography: Measuring and Modeling Population Processes*. Blackwell Publishers Ltd.: Oxford. Chapter 3, section 3.7, pp.53-58.
Murray CJL et al (2003) Modified logit life table system: principles, empirical validation, and application. *Population Studies* 57(2): 165-182.

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.

Fertility and fertility determinants.

Required readings:

Bongaarts, J. (1982) The fertility-inhibiting effects of intermediate fertility variables. *Studies in Family Planning* Vol 4(6/7): 179-189.

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.

Bongaarts, J. (2015) Modeling the fertility impact of the proximate determinants: Time for a tune-up. *Demographic Methods*, 33(19), 535-560. <http://www.demographic-research.org/volumes/vol33/19/>

IUSSP Tools for Demographic Estimation. First part of Chapter 7 "Description of method". <http://demographicestimation.iussp.org/content/get-pdf-book-website>

Additional readings:

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.

The demography of migration

Required readings:

Weeks, JR (2012) *Population – an introduction to concepts and issues*. Chapter 7 – Migration. Wadsworth. [HB 871 WEE]

OECD (2015) Is this humanitarian migration crisis different? *Migration Policy Debates*, 7. <http://www.oecd.org/els/mig/Is-this-refugee-crisis-different.pdf>

Bijak, J, Disney, G and Wisniowski, A (2015) How to forecast international migration. ESRC Centre for Population Change Briefing Papers, 28.

http://www.cpc.ac.uk/publications/cpc_briefing_papers/pdf/BP28_How%20to%20forecast%20international%20migration.pdf

Additional readings:

Castles, Stephen, Hein de Haas and Mark J. Miller. 2013. *The Age of Migration: International Population Movements in the Modern World*. Palgrave Macmillan. Chapter 1 & 2. [JV 6032 CAS]

Excellent summaries of the UK methodology on migration estimates 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>

Population projections (1): Survival ratio methods; Closed cohort component projections.

Required readings:

Hinde (1998) Chapters 16 and 17.

Newell (1988), Chapters 15.

Bijak, J et al (2015) Letter to the Editor: Probabilistic Population Forecasts for Informed Decision Making. *Journal of official statistics* 31 (4): 537–544.

Additional reading:

Keilman N (2001) Data quality and accuracy of United Nations population projections, 1950-1995. *Population Studies* 55(2): 149–164

Keilman N (2008) [European demographic forecasts have not become more accurate during the past 25 years](#), *Population and Development Review*, 34(1)

ONS (27 May 2016) Subnational Population Projections: Quality and Methodology Information. ONS Information Paper. <http://tinyurl.com/subnational-popprojectionONS> (pdf linked at the bottom) Ormiston-

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 website on probabilistic projections:

http://www.iiasa.ac.at/web/home/research/researchPrograms/WorldPopulation/Research/probabilistic_projections.html.

Population projections (2): Open cohort component projections.

Required readings:

Hinde (1998) Chapters 16 and 17.

Newell (1988), Chapters 15.

Additional reading:

Rogers A (1990) Requiem for the Net Migrant. *Geographical Analysis*, 22(4), 283–300.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1538-4632.1990.tb00212.x/pdf>

Population Projections (3): Population momentum; Stable population.

Required readings:

Newell (1988) Chapter 11.

Knodel, J. 1999. "Deconstructing Population Momentum." *Population Today* 27(3):1-2,7.

http://www.prb.org/pdf/pt_mar99.pdf

Additional reading:

Preston, et al. chapter 7 Bates, A. (2006) Methodology used for producing ONS's Small Area Population Estimates. *Population Trends*, **125**, 30-36.

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.

29 September 2017