MODULE SPECIFICATION

Academic Year (student cohort covered by specification)	2025-26
Module Code	2429
Module Title	Population Dynamics & Projections
Module Organiser(s)	José Manuel Aburto
Faculty	Epidemiology & Population Health
FHEQ Level	Level 7
Credit Value	**CATS:** 15 **ECTS:** 7.5
HECoS Code	101408
Term of Delivery	Term 2
Mode of Delivery	For 2025-26 this module will be delivered by predominantly face-to-face teaching modes. Where specific teaching methods (lectures, seminars, discussion groups) are noted in this module specification these will be delivered by predominantly face-to-face sessions.
Mode of Study	Full-time
Language of Study	English
Pre-Requisites	GCSE-level mathematics, together with an understanding of natural logs and exponential growth, are needed to follow the mathematical aspects of material introduced in this module. Calculus is not required. An understanding of basic demographic methods, taught in the term 1 Demographic Methods module, is expected. Alternatively, students can fulfil this prerequisite by studying PAPP101 (Introduction to Demographic Analysis), which is freely accessible online: http://papp.iussp.org/
Accreditation by Professional Statutory and Regulatory Body	None
Module Cap (indicative number of students)	25 (numbers may be capped due to limitations in facilities or staffing)
Target Audience	The module is intended primarily for students on the MSc Demography & Health but is also suitable for others with an

	interest in mathematical modelling, demographic estimation and population forecasts.
Module Description	This is an advanced demographic methods course introducing students to population dynamics, population models (including the use of these models in the estimation of demographic parameters), decomposition techniques and basic population projections.
Duration	5 weeks at 2.5 days per week
Timetabling slot	Slot D2
Last Revised (e.g. year changes approved)	June 2025

Programme(s) This module is linked to the following programme(s)	**Status**
MSc Demography & Health	Compulsory

Module Aim and Intended Learning Outcomes

Overall aim of the module
The overall module aims are to introduce students to • the mathematical theory of changes in population size and structure; • the types and uses of demographic models and their application in demographic estimation; • the principles and practicalities involved in making population projections and forecasts.

Module Intended Learning Outcomes
Upon successful completion of the module a student will be able to: 1. Define and interpret the main measures of fertility, mortality, migration and age structure 2. Describe and assess typical age patterns of fertility, mortality and migration and explain the models commonly used to represent them 3. Evaluate and explain the interactions between the components of population change and the age structure of the population 4. Explain the concept of population momentum 5. Understand tempo distortions in demographic estimation 6. Use R to perform demographic calculations 7. Understand the main approaches used to forecast fertility, mortality and migration 8. Construct national-level population projections using R.

Indicative Syllabus

Session Content
The module is expected to cover the following topics: • Exponential growth (revision of basic concepts) • Population measures of reproductive level and pace • Stable population theory • Models of fertility, mortality and migration, including survival time approaches to fertility and migration analysis • Decomposition techniques in health research. • Population momentum and ageing • Population projections and forecasts • The concepts of quantum and tempo applied to synthetic cohort measures

Teaching and Learning

Notional Learning Hours

Type of Learning Time	Number of Hours	Expressed as Percentage (%)
Contact time	45	30
Directed self-study	20	13
Self-directed learning	60	40
Assessment, review and revision	25	17
Total	**150**	**100**

Student contact time refers to the tutor-mediated time allocated to teaching, provision of guidance and feedback to students. This time includes activities that take place in face-to-face contexts such as lectures, seminars, demonstrations, tutorials, supervised laboratory workshops, practical classes, project supervision as well as where tutors are available for one-to-one discussions and interaction by email.

The division of notional learning hours listed above is indicative and is designed to inform students as to the relative split between interactive and self-directed study.

Teaching and Learning Strategy
The teaching and learning for each of the topics covered in this module revolves around (i) a set of lectures and background reading materials, (ii) individual or group work on practical applications of the methods discussed in the lectures, and (iii) classroom sessions.

Teaching and Learning Strategy
The classroom sessions will be conducted in small groups to facilitate discussion and will not be recorded. The classroom session will first open the floor for a Q&A on the theory. After a short break the practical solutions will be discussed (where applicable, with a demonstration in a statistical computing package). In the classroom sessions we will usually use R. Once a week, we will organise office hours with tutors/lecturer to address any specific questions related to the lecture, practical exercises or the implementation of some of the methods in a statistical computing package.

Assessment

Assessment Strategy
The assessment for this module has been designed to measure student learning against the module intended learning outcomes (ILOs) as listed above. The grade for summative assessment(s) only will go towards the overall award GPA. The assessment will involve producing answering a set of questions related to topics seen in class. Interpretation, figures and files to reproduce results are expected. More specifically, students are expected to: (i) Prepare a document with written responses (in pdf format) with detailed notes discussing the content of the answers. The total for the assessment will be 100% of the allocated grade . All assessments will be marked independently by two markers and reconciled.

Summative Assessment

Assessment Type	Assessment Length (i.e. Word Count, Length of presentation in minutes)	Weighting (%)	Intended Module Learning Outcomes Tested
Written document with answers	2500 words maximum	100	All

Resitting assessment
Resits will accord with Chapter 8a of the LSHTM Academic Manual. Resit/deferred/new attempts - The task will be broadly similar to the original assessment but based on a different example population undergoing a different combination of

Resitting assessment
demographic changes. The next assessment deadline will be during mid/late September of the current academic year.

Resources

Indicative reading list

A full reading list will be made available through the Moodle module page. A key demographic methods textbook that we often refer to in class is: Preston, S., Heuveline, P., & Guillot, M. (2000). Demography: measuring and modeling population processes. 2001. Malden, MA: Blackwell Publishers.

Teaching for Disabilities and Learning Differences

The module-specific site on Moodle gives students access to background reading materials, pre-recorded lectures (most with transcripts), practical materials and solutions.

LSHTM Moodle is accessible to the widest possible audience, regardless of specific needs or disabilities. More detail can be found in the Moodle Accessibility Statement which can also be found within the footer of the Moodle pages. All students have access to "SensusAccess" software which allows conversion of files into alternative formats.

Student Support Services can arrange learning or assessment adjustments for students where needed. Details and how to request support can be found on the LSHTM Disability Support pages.