KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS

STAT 512: Demographic Methods - Term 252   (3-0-3) 4.00pm-5.15pm UT

Course Description:

Demographic fundamentals, Measurement of mortality, Life table, Multiple decrement life table, Analysis of Marriage, Measurement of fertility, Parity progression, Determinants of fertility, Population growth, Models of population structure, Survival analysis, Cox proportional hazards (single and multiple events), Competing events, Parametric demographic models.

Prerequisites: Graduate Standing

Course Objective:

The main objective of course is to
- present demographic factors and models
- explain different methods of parameters estimation and inference
- demonstrate the use of statistical package(s) to analyze datasets

Course Learning Outcomes:

By the end of this course, students will be able to:
- Develop cox survival regression and other demographic models
- Perform residuals analysis and inference about model parameters
- Use statistical packages to analyze real data sets
- Use the fitted model for prediction/forecasting

Textbook and Package:

1.   Kenneth Wachter (2014). Essential Demographic Methods. Harvard University Press.

Reference:

1.   T. Rowland (2003) Demographic Methods and Concepts. Oxford University Press, Oxford, UK
2.   SH Preston (2000). Demography - Measuring and Modeling Population Processes. John Wiley and Sons Ltd

Instructor: Dr. Mohammad H. Omar   **Office:** Bldg – 5, room – 508.   **Phone:** 2471
E-mail: omarmh@kfupm.edu.sa **(Not by WebCT/Blackboard email)**
Office Hours: UT: 5.30pm-6:30pm or by appointment on MS Teams chat.

Assessment

Activity	Weight
Classwork (Attendance and Participation, Quizzes, and Assignments)	15%
Term Paper Project **Tuesday Apr 7 (week 11)**	20%
MidTerm Exam (Topics 1, 2 & 3) **Monday (Feb 9 – week 5), 6.00 pm – 8.00pm**	30%
Final Exam (Comprehensive) **As announced by Registrar**	35%

Excuse: There will be no make-up for the quizzes, homework, exams, and the final for students who miss any of them except for those who have an extreme case (they need to provide an official excuse with "exam included" checked and issued by Deanship of Student Affairs)

Academic Integrity: All KFUPM policies regarding ethics and academic honesty apply to this course. KFUPM dress codes must also be observed whenever on campus.

Cheating and Plagiarism: KFUPM follows "zero tolerance" approach with regard to cheating and plagiarism.

Cheating in Exams: During examinations (quizzes, exams, etc) cheating or any attempt of cheating by use of illegal activities, techniques and forms of fraud will result in a grade of *F* in the course along with reporting the incident to the higher university administration. Cheating in exams includes (but not restricted to)
  ➢   Looking at the papers of other students,
  ➢   Talking to other students,

➢ Using mobiles or any other electronic devices.

Exam Issues:
➢ No student will be allowed to take the exam without having his/her physical KFUPM ID or National/Iqama ID.
➢ Students are not allowed to carry mobiles, smart watches, or electronic devices to the exam halls/rooms.
➢ Students must take the exam in the place assigned to them.

Missing an Exam:
In case a student misses an exam (MidTerm Exam or the Final Exam) for a legitimate reason (such as medical emergencies), he must bring an official excuse from Students Affairs with the "Exam Included" box checked. Otherwise, he will get zero in the missed exam.

Attendance: Students are **expected** to **attend all class meetings on-time.**
➢ Attendance on time is very important. **More than 10 minutes late = Absence** (regardless of any excuse).
➢ Mostly, attendance is checked within the *first five minutes* of the class. Entering the class after that, is considered as late (**2 lates= 1 Absence**)
➢ Do not leave before end of class. Attendance is marked as "present" only if you are in class for 80% of the duration of the class.
➢ If a student misses a class, he/she is responsible for any announcement made in that class.
➢ According to University rules, after warned **twice** by the instructor, a DN grade will be awarded to any student who excessively accumulates
   • 6 unexcused **absences** in lectures. (20%)
   • 10 **total absences** (excused and unexcused) in lectures. (33.3%)
➢ Only official excuse from KFUPM student affairs office will be accepted. All other excuses (medical centers, governmental offices, etc) are not.

Mobile phones: The use of mobiles is *strictly banned* during class. Students are required to keep their phones off/silent and placed inside their pockets during the class timings. Students who want to use electronic devices to take notes **must take permission** from their instructor.

Important Notes:
✓ Homework is due in class every Sunday a chapter is completely covered.
✓ A class quiz is often given at the end of the following week a topic is completely covered.
✓ A formula sheet (check OneNote) and statistical tables will be provided for you in every exam.

Student Responsibilities:
• You are encouraged to participate in the class.
• Keep up with the material presented in class. If you get behind it, it will not be easy to recover.
• Submit assignments on time.
• Teamwork will be encouraged for Project-related activities

General Notes:
• Students are required to carry **pens, note-taking equipment** and a **calculator** to **EVERY lecture and exams**. It is strongly recommended to keep a **binder** for class-notes.
• Students are also expected to bring the book, take notes and organize their solved questions in a **binder** for easy retrieval to help them in study and review for class, exams, etc
   o It is to the student's advantage to keep a folder for storing class notes, homework, and other graded assignments. Students who are **organized** will find it **easier** to find important materials when **studying for exams**.
• To successfully prepare for the exams, students MUST **solve problems** regularly and with discipline. The selected assigned problems are specifically designed to prepare you for major and final exams. So, it is expected that you complete these problems **step-by-step** and with comprehension.
   o If you happen to stumble upon a solution manual somewhere, remember 2 important points. (1) Due to publishing costs and deadlines, these solutions are brief and may have mistakes and (2) in your career as an actuary and your exams and quizzes in this class, you are expected to know every step to a problem and to know if a solution is incorrect. Thus, the best way to solve problem is without these brief solutions.

- ***Never round*** your intermediate results to problems when doing your calculations. This will cause you to lose calculation accuracy. Your answers may then be different from the exam key even when you use the right procedure.
- For every exam, so you need to bring with you ***pens***, ***pencils***, ***a sharpener***, ***an eraser***, and a ***calculator***.

Syllabus (Tentative)

Week	Sections	Topics	Notes
1 (Jan 11 - 13)	Ch 0 and 2	1. Demographic fundamentals	.
2 (Jan 18 - 20)	Ch 1	2. Population Growth	
3 (Jan 25- 27)	Ch 3	3. Measurement of Mortality	
4 (Feb 1- 3)	Ch 8	4. Survival Analysis	Declare your Term paper topic: Tues Feb 3
5 (Feb 8- 10)	Ch 4	5. Measurement of Fertility	
Monday (Feb 9– week 5), 6.00pm – 8.00pm Midterm Exam (Topics 1, 2 & 3)			
6 (Feb 15 – 17)	Ch 6	5. Analysis of Marriage	(2 wks): Midterm grade reports starts.
7 (Feb 24)	Ch 6	5. Determinants of Fertility, Parity Progression	Founding day (Feb 22)
8 (Mar 1 - 3)	Ch 5	6. Models of Population Structure	
9 (Mar 8 - 10)	Ch 9	7. Life Tables	
Mar 15 - 26	Eid Break		
10 (Mar 29 - 31)	Ch 10	7. Multiple Decrement Life Table	
11 (Apr 5 - 7)	8.3 and handouts	8. Competing Events	Tues Apr 7: Term Paper Report due to instructor
12 (Apr 12- 14)	8.7 and handouts	9. Cox Proportional Hazards (single and multiple events)	
13 (Apr 19- 21)	8.7 and handouts	9. Cox Proportional Hazards (single and multiple events)	
14 (Apr 26 - 28)	8.8 and 7.7 handouts	10. Parametric demographic models	
15 (May 3 - 5)	8.8 and 7.7 handouts	10. Parametric demographic models	
16 (My 10)		Review	
Final Exam: See Registrar's schedule			