KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 512: Demographic Methods - Term 222   (3-0-3) 4pm-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
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Office Hours: UT (3.20pm - 3.50pm in bldg. 59) or by appointment.

Assessment

Assessment for this course will be based on attendance, homework, term report, a midterm exams and a comprehensive final exam, as in the following:

Activity	Weight
Classwork (Participation, Quizzes, and Assignments)	15%
Term Paper Project **Tuesday (week 11)**	20%
MidTerm Exam (Topics 1, 2 & 3) **Tuesday (Feb 16– week 5), 4.00 pm**	30%
Final Exam (Comprehensive) **As announced by Registrar**	35%

IMPORTANT NOTE on GRADES: There is no quota on the number of students who can get an A+ grade.
✓ *Attendance* on time is *very* important. Mostly, attendance will be checked within the *first five minutes* of the class. Entering the class after that, is considered as late (**2 lates= 1 Absence**) and
✓ **More than 10 minutes late = Absence** (regardless of any excuse).

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 binder 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==.
  - 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 SOA 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***.

==**Academic Integrity**==: All KFUPM policies regarding **ethics** and **academic honesty** apply to this course.

Exams:

Exam Questions: The questions of the exams are based on the examples, homework problems, and exercises in the textbook and lab manual.

Cheating in Exams: 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 if not having his/her 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 must adhere to the attendance policy of KFUPM. Students are expected to attend all lecture and lans.

- ➢ If a student misses a class, he is responsible for any announcement made in that class.
- ➢ A DN grade will be assigned to the eligible student after being warned twice by his/her instructor.
- ➢ A DN grade will be awarded to any student who accumulates
  - 6 unexcused absences in lectures. (20%)
  - 10 excused and unexcused absences in lecture and recitation classes. (33%)

Note:

- ▪ ***Attendance*** on time is ***very*** important. Mostly, attendance will be checked within the ***first five minutes*** of the class. Entering the class after that, is considered as late (**2 lates= 1 Absence**) and
- ▪ **More than 10 minutes late = Absence** (regardless of any excuse).
- ▪ Only University Blue paper Official excuses will be accepted as valid excuse.

Syllabus (Tentative)

Week	Sections	Topics	Notes
1 (Jan 15 - 17)	Ch 0 and 2	**1. Demographic fundamentals**	.
2 (Jan 22 - 24)	Ch 1	**2. Population Growth**	
3 (Jan 29- Feb2)	Ch 3	**3. Measurement of Mortality**	**Declare your Term paper topic: Sun Jan 29**
4 (Feb 5- 9)	Ch 8	**4. Survival Analysis**	
5 (Feb 12- 16)	Ch 4	**5. Measurement of Fertility**	
Tuesday (Feb 16– week 5), 4.00 pm – Midterm Exam (Topics 1, 2 & 3)			
6 (Feb 19 - 21)	Ch 6	**5. Analysis of Marriage**	**(2 wks):** Midterm grade reports starts. Saudi Founding day (Feb22-23)
7 (Feb 26- Mar2)	Ch 9	**5. Determinants of Fertility, Parity Progression**	
8 (Mar 5- 9)	Ch 5	**6. Models of Population Structure**	
9 (Mar 12- 16)	Ch 9	**7. Life Tables**	
10 (Mar 19 - 23)	Ch 10	**7. Multiple Decrement Life Table**	
Tuesday Mar 30: Term Paper Report due to instructor			
11 (Mar 26 - 30)	8.3 and handouts	**8. Competing Events**	
12 (Apr. 2- 6)	8.7 and handouts	**9. Cox Proportional Hazards (single and multiple events)**	presentations.
13 (Apr 9- 13)	8.7 and handouts	**9. Cox Proportional Hazards (single and multiple events)**	
Ramadhan break & Eid Al-Fitr Holidays (April 14-27)			
14 (Apr 30 - May 4)	8.8 and 7.7 handouts	**10. Parametric demographic models** .	
15 (May 7 - 11)		**Review**	
Final Exam (Comprehensive): will be announced by Registrar			