

Department of Mathematics
Central Washington University

Math 419A Actuarial Mathematics I
Fall 2016
Hertz 118, 2:00 – 2:50 P.M., (M, W, F)

Instructor: Dr. Yvonne Chueh
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Office hours: M-F 10-10:50; and by appointments

Prerequisite: Math 411A and permission.

Text:

Actuarial Mathematics for Life Contingent Risks, 2nd Edition, 2013, Dickson, D., Hardy, M., Waters, H., Cambridge University Press, ISBN: 978-1-110704-407-4. Exercises are considered part of the required readings.

Math 419A Chapters 1-4; Entire Math 419 sequence covers Chapters 1-13 (Except Section 11.5)

Required supplementary material:

1. Actex manual for SOA MLC exam (Available in the university bookstore) Chapter 2-5
2. MLC Adapt Online class adoption quarterly subscription at [https://www.coachingactuaries.com/Register?&productskus\[0\]=2016FallCWUMLCAdaptClass](https://www.coachingactuaries.com/Register?&productskus[0]=2016FallCWUMLCAdaptClass)

ACADEMIC POLICIES & PROFESSIONAL PROTOCOL

The following policies and protocols have been established based on university policies and state and federal laws. They are equally binding for all students enrolled in each of my classes.

A. Equal Educational Opportunity:

Central Washington University seeks to provide reasonable accommodations for all qualified individuals with disabilities. Accommodations are intended to minimize the functional limitations of a disability and provide the student equal access to the educational process. Please inform me how I might support you in this regard.

B. Discrimination, Intimidation, & Harassment:

Hate speak and racist or sexist dialogue and behaviors will not be tolerated. The right of all students to equal access of the course content in an environment free of prejudice, discrimination, and harassment will be respected and upheld. All illegal behavior will be reported to the proper municipal and university authorities.

C. Professional Participation:

The nature of the course requires that each student be treated with respect, dignity, and sensitivity. While we can agree to disagree in a professional manner, all students are responsible for actively participating in all classroom activities in a positive, sensitive, and contributory manner. **Each class members' professionalism will be evaluated based on the instructor's discretion.**

Students will also be graded on their active, professional participation. **Please turn off your electronic devices completely during class session.** Be advised you will be marked down **without warning** for playing computer games, checking or looking at mobile phones, watching DVDs, talking on the phone, reading the newspaper, grading papers or projects, studying for other exams, working on other class assignments, engaging in incessant talking of a social nature, and / or (but not limited to) behaviors that disturb the learning environment for other students.

D. Attendance Policy:

Punctual attendance is required. You need to be in class to get credit. Extra credit points will be awarded to those students who do not miss class or are absent once. Absences will NOT BE EXCUSED without a published obituary or medical note from health care provider. Documentation will not be accepted until it is officially confirmed by the professor.

When you are absent, please email me by 8:00 a.m. on the date of your absence. The following are the specific attendance policy of this course.

- One informed absence – 1 point deduction
- One uninformed absence – 1.5 points deduction
- One late arrival within 5 minutes– 0.5 point deduction
- One early departure within 5 minutes – 0.5 point deduction
- One late arrival more than 5 minutes– 1 point deduction
- One early departure more than 5 minutes – 1 point deduction

Accumulation of 2 absences and 1 early departure/late arrival – 0 professionalism points of the final grade.

If you are an athlete and have games or practices scheduled during class, you must present appropriate documentation that will excuse you from class before the events take place. A coach or faculty member must officially confirm the documentation.

Please consider taking the class at another time if you cannot be here on a timely and consistent basis.

E. Late Assignments:

Late assignment will not be accepted. No exceptions will be made once deadlines are established. Email submission will not be accepted unless specified in the syllabus or changes made by the instructor. Even if you are absent, this policy follows true. I may allow you to submit your work by email if you provide me with a published obituary or an official medical note.

F. Academic Integrity:

All cheating, plagiarism and forgery will be referred for disciplinary action and automatically result in an "F" for the course. You are obligated to cite all electronic or bibliographic references for works that are not authored or created by you. Please use the format outlined by the American Psychological Association. If for some reason you do not have a complete reference for a document, do the best you

can by providing an author, a date, a workshop site, etc. If a document has been translated, please give credit to the person whose talents made it readable to you or others.

All violations of the student code will be reported to the Department of Mathematics, College of the Sciences, Vice President for Student Affairs & other CWU departments for disciplinary action.

Grade Assessment:

1. Class Attendance (50 points)

All students are responsible for actively participating in all classroom sessions in a positive, sensitive, and contributory manner. Please note passivity in discussion/response will be equally as noticeable as active response and discussion in class for the grading reference. In each class meeting session (**worth of 2.5 points**) observed passivity in joining whole class discussion will result in a “Zero” point on this category.

See Attendance Policy: Extra credit points will be awarded to those students who do not miss class or are absent only once. Absences will NOT BE EXCUSED without a published obituary or medical note from health care provider. Documentation will not be accepted until it is officially confirmed by the professor. **Repeated late arrivals /disappearance/early departures will result a drop of the letter grade.**

If you are an athlete and have games or practices scheduled during class, you must present appropriate documentation that will excuse you from class. Please consider taking the class at another time if you cannot be here on a timely and consistent basis.

Please be on time for class. If you are late, have the courtesy not to disrupt the learning environment.

2. Professionalism (25 points)

Punctual attendance is required as part of the **Professionalism** requirement. You need to be in class to earn credit.

Informal assessment on participation: We will treat each other with courtesy, cordial civil manner and sensitivity, flexibility. This “Professionalism” category refers to one’s chosen actions, attitude, and choice of words in the public, during class discussion, in writings, through course assignments, in forms of communications on your grades or sharing personal opinions. This category is evaluated according to the instructor’s discretion.

When class in session, electronic device of all sorts are required to **turn off and put away out of sight**. Any of the following disruptive behaviors will result in **5%** taken off in the final grade **each time of incident**: Playing computer games, repeated early departure, repeated disappearance, and repeated late arrival, repeated cell phone disruptions, **electronic texting, surfing internet**, reading the newspaper, grading papers or projects, studying for exams, working on other class assignments, engaging in **incessant talking of a social nature**, and / or (but not limited to) behaviors that disturb the learning environment for other students. Points will be taken off by the instructor’s discretion (No warnings given). Inappropriate and unprofessional academic behaviors will be reported to CARR (Committee for Academic Recruitment and Retention) for advisement and improvement plan.

To earn all professionalism and attendance points you must exhibit to a HIGH DEGREE the following:

- Collegial Support (5 points)
- Positive Attitude (5 points)
- Perfect Attendance (5 points)
- Active Participation (5 points)
- All materials complete & on time (5 points)

Grading policy:

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|-----------------------------|--------------|
| • Attendance | (50 points) |
| • Professionalism | (25 points) |
| • Actex Chapter Assignments | (125 points) |
| • Adapt Quizzes | (100 points) |
| • Three Tests | (300 points) |
| • Final exam | (100 points) |

Total: 700 points

A perfect score on both of the above categories would result in a total of 700 points. Your course grade will be determined by the percentage p of these points you earn, according the following scale.

A (100-94%) A- (93-90%) B+ (89-87%) B (86-83%) B- (82-80%) C+ (79-77%)
C (76-73%) C- (72-70%) D+ (69-67%) D (66-63%) D- (62-60%) F (59-0%)

Course outlines:

	<u>Topic</u>	<u>Days</u>
I.	Survival Distributions Life Tables	5
	1. The Survival Function	
	2. Time-until-Death for a Person Age x	
	3. Curtate-Future-Lifetimes	
	4. Force of Mortality	
II.	Life Tables	6
	1. Life Tables	
	2. The Deterministic Survivorship Group	
	3. Assumptions for Fractional Ages	

4.	Some Analytical Laws of Mortality	
5.	Select and Ultimate Tables	
III.	Life Insurance	8
1.	Insurance Payable at the Moment of Death	
	-Level Benefit	
	-Endowment	
	-Deferred	
	-Varying Benefit	
2.	Insurance Payable at the End of the Year of Death	
3.	Relationships between Insurance Payable at the Moment of Death and the End of the Year of Death	
4.	Differential Equations for Insurances Payable at the Moment of Death	
IV.	Life Annuities	7
1.	Continuous Life Annuities	
2.	Discrete Life Annuities	
3.	Life Annuities with m -thly Payments	
4.	Relationships between Continuous and Discrete Life Annuities	
5.	Relationships between Life Insurance and Life Annuities	
TESTING		1
TOTAL		27

Class format: Mixture of lectures and in-class problem solving. Students present their solutions of the assigned problems and answer any question raised by the instructor and other students.

Tentative Schedule (The Instructor reserves the right to add or drop quizzes as well as other changes necessary to move the progress forward in light of balancing student learning and course objectives. Any change will be announced in class.)

Week

Reading Assignment

1. 9/21-9/23

Life and Annuities basic information, Age-at-death random variables, Future Lifetime of Individual Age x , Actuarial Notation

Text Reading: 2.1, 2.2, 2.4

Actex Reading: 1.1~1.3
Actex Exercise 1: #1~9 (Due on Sept. 23)

2. 9/26-9/30

Curtate Future Lifetime, Force of Mortality
Text reading: 2.3, 2.6
Actex Reading 1.4~1.5
Actex Exercise 1: #10~20 (Due on Sept. 30)

3. 10/3-10/8

Chapter 1 Review
Actex Exercise 1: #21~24 (Due on Oct. 3)
Adapt Quiz 1 (Due on Oct. 5)
Test 1 (Covering Survival Distributions, Actex Chapter 1, Text Chapter 2)
Test 1 on Friday, Oct. 8

4. 10/10-10/15

Life Tables, Life Table Functions, Fractional Age Assumptions, Select-and-Ultimate Tables, Moments of Future Lifetime Random Variables.
Text Reading: 3.1~3.3, 3.7~3.9, 2.5~2.6
Actex Reading: 2.1~2.4
Actex Exercise 2: #1~20 (Due on Oct. 15)

5. 10/17-10/21

Useful Shortcuts
Actex Reading: 2.5
Actex Exercise 2: #21~33 (Due on Oct. 19)
Adapt Quiz 2 (Due on Oct. 21)

6. 10/24-10/28

Class cancelled on Oct. 24, 26
(SOA Annual Meeting).

Test 2 (Covering Life Tables, Actex Chapter 2, Text Chapter 3)

Take-home Test 2 (Due on Oct. 26)

Continuous Life Insurance, Discrete Life Insurance
Text Reading: 4.4.1~4.4.2, 4.4.5~4.4.7
Actex Reading: 3.1, 3.2

Actex Exercise 3: #1~9 (Due on Oct. 28)

7. 10/31-11/4

mthly Life Insurance, Relating Different Policies,
 Recursions, Relating Continuous Discrete and mthly
 Insurance

Text Reading: 4.4.3, 4.4.4, 4.4.8, 4.5**Actex Reading: 3.3~3.7****Actex Exercise 3: #10~25 (Due on Nov. 2)****Adapt Quiz 3 (Due on Nov. 4)**

8. 11/6-11/11

Actex Exercise 3: #26~40 (Due on Nov. 8)**Adapt Quiz 4 (Due on Nov. 11)**

**Test 3 (Covering Life Insurance, Actex Chapter 3,
 Text Chapter 4)**

Test 3 Take Home on Nov. 11 (Due on Nov. 14)**No Class on Nov. 11 (Veterans Day)**

9. 11/14-11/18

Continuous Life Annuities, Discrete Life Annuities
 (Due, Immediate)

Text Reading: 5.4, 5.5, 5.9, 5.10**Actex Reading: 4.1~4.3****Actex Exercise 4: #1~5 (Due on Nov. 16)****Adapt Quiz 5 (Due on Nov. 18)**

10. 11/21- 11/25

Actex Exercise 4: #6~20 (Due on Nov. 21)**THANKSGIVING!! (Nov. 23~25)**

11. 11/28-12/2

mthly Life Annuities, Relating Different Policies,
 Recursions, Relating Continuous Discrete and
 mthly Life Annuities

Actex Exercise 4: #21~47 (Due on Dec. 2)**Adapt Quiz 6 (Due on Dec. 2)**

12. 12/5-12/9

**Final Exam (Covering Life Annuities, Actex
 Chapters 4, Text Chapter 5)**

The Final Exam date will be according to the university schedule.
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