University of Illinois - Urbana Champaign

ASRM 471: Life Contingencies 1

Fall 2020 Course Outline

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Mode of Instruction

The course will be administered via compass and zoom. I will provide two live Zoom sections every week to further explain concepts and answer your questions. The two sections will be held on Tuesdays and Thursdays from 8:30 am to 9:30 am (Champaign Time). I entreat you all to attend the zoom sections.

Objectives

This course aims to offer students the ability to develop actuarial techniques for valuing policies that are dependent on contingent events.

Books

  Chapters 1,2,3,4,5, and 6

- LTAM SOA study manuals

Required Background

- ASRM 210: Theory of Interest
- Calculus 1

Topics

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Dates</th>
<th>Module</th>
<th>Topics</th>
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</thead>
<tbody>
<tr>
<td>1-3</td>
<td>8/24-9/12</td>
<td>Module 1</td>
<td>Future Lifetime Random Variable</td>
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<tr>
<td>Module</td>
<td>Dates</td>
<td>Section</td>
<td>Topics</td>
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| 4-5    | 9/13-9/26 | Module 2 | Survival Functions  
Survival probabilities of death and survival  
Force of mortality  
Complete and Curtate future lifetime  
**Mortality laws**-  
Gompertz and Gompertz-Makeham laws  
Weibull distribution  
Exponential distribution  
Uniform distribution  
Beta distribution |
| 6-7    | 9/27-10/10 | Module 3 | Life tables  
Fractional age assumptions  
Select mortality and Ultimate mortality  
Mortality trends |
| 8-10   | 10/11-10/31 | Module 4 | **Insurance benefits**  
Whole life insurance  
Term life insurance  
Pure endowment  
Endowment assurance  
Deferred contracts  
Variable insurance |
| 11-13  | 11/1-11/21 | Module 5 | **Annuities**  
Whole life annuities  
Term life annuities  
Deferred annuities  
Guaranteed annuities  
Increasing annuities  
Recursive formulae and |
| 14-15  | 11/29-12/9 | Module 6 | **Premium calculations**  
Future loss random variable  
Equivalent principle of net and gross premium calculation for insurance policies and annuities  
The portfolio percentile  
Premium principles  
Profits |
Assessment
 Assignments -60%

Midterm -20%

2 midterms at the end of modules 2 and 5.

Finals – 20%

Grading Scale

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A+</td>
<td>97-100</td>
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<tr>
<td>A</td>
<td>93-96</td>
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<tr>
<td>A-</td>
<td>90-92</td>
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<td>B+</td>
<td>87-89</td>
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<td>B</td>
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<td>B-</td>
<td>76-82</td>
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<tr>
<td>C+</td>
<td>70-75</td>
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<td>50-54</td>
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<tr>
<td>F</td>
<td>&lt;50</td>
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Academic Integrity Statement
The University has the responsibility for maintaining academic integrity so as to protect the quality of education and research on our campus and to protect those who depend upon our integrity.

Expectations for each student
It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and conduct that aids others in such infractions. Students have been given notice of this part by virtue of its publication. Regardless of whether a student has actually read this part, a student is charged with knowledge of it. Ignorance is not a defense.

Further details: https://studentcode.illinois.edu/article1/part4/1-401/

Accommodation Statement
To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible.

DRES Email: disability@illinois.edu
For more details visit DRES’ website: https://www.disability.illinois.edu