



ATTACHMENT 5.

**T6. COURSE SPECIFICATIONS
(CS)**

Course Specifications

Institution: King Saud University	Date:
College/Department : Science, Mathematics	

A. Course Identification and General Information

1. Course title and code: Actuarial Mathematical models II ACTU. 472	
2. Credit hours: 3(3+0+0)	
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Actuarial and Financial Mathematics Program	
4. Name of faculty member responsible for the course: Pr. Dr. Mhamed Eddahbi	
5. Level/year at which this course is offered: 7/4	
6. Pre-requisites for this course (if any): ACTU 372	
7. Co-requisites for this course (if any):	
8. Location if not on main campus:	
9. Mode of Instruction (mark all that apply):	
a. traditional classroom	<input checked="" type="checkbox"/> What percentage? <input type="text" value="80"/>
b. blended (traditional and online)	<input checked="" type="checkbox"/> What percentage? <input type="text" value="15"/>
c. e-learning	<input checked="" type="checkbox"/> What percentage? <input type="text" value="5"/>
d. correspondence	<input type="checkbox"/> What percentage? <input type="text"/>
f. other	<input type="checkbox"/> What percentage? <input type="text"/>
Comments:	

B Objectives

1. What is the main purpose for this course?

This course is a continuation of the study of Actuarial Mathematical models I ACTU. 372. Topics include characterization of discrete and continuous multiple decrement models in insurance and employee benefits, and multiple life models and prepare students for the second part of the life contingencies segments of actuarial professional examinations (i.e. Exam MLC).

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

Use LMS (Bb) or Webinar to interact with student (discussions, forums, virtual class room).
Use updated syllabus of MLC and Exams from SOA/CAS website.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
1. Multiple Decrement Models: Theory <ul style="list-style-type: none"> a. Multiple Decrement Table b. Forces of Decrement c. Associated Single Decrement d. Discrete Jumps 	2	6
2. Multiple Decrement Models: Applications <ul style="list-style-type: none"> a. Calculating Actuarial Present Values of Cash Flows b. Calculating Reserve and Profit c. Cash Values d. Calculating Asset Shares under Multiple Decrement 	2	6

3. Multiple State Models a. Discrete-time Markov Chain b. Continuous-time Markov Chain c. Kolmogorov's Forward Equations d. Calculating Actuarial Present Value of Cash Flows e. Calculating Reserves	2	6
4. Multiple Life Functions a. Multiple Life Statuses b. Insurances and Annuities c. Dependent Life Models	2	6
5. Interest Rate Risk a. Yield Curves b. Interest Rate Scenario Models c. Diversifiable and Non-Diversifiable Risks	2	6
6. Profit Testing a. Profit Vector and Profit Signature b. Profit Measures c. Using Profit Test to Compute Premiums and Reserves	1	3
7. Universal Life Insurance a. Basic Policy Design b. Cost of Insurance and Surrender Value c. Other Policy Features d. Projecting Account Values e. Profit Testing f. Asset Shares for Universal Life Policies	2	6
8. Participating Insurance a. Dividends b. Bonuses	1	3
Revision and preparation for the final exam	1	3

2. Course components (total contact hours and credits per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical (visit to companies)	Other:	Total
Contact Hours	Planned	42			3		45
	Actual	42			3		45
Credit	Planned	3			3		3
	Actual	3			3		3

3. Additional private study/learning hours expected for students per week.

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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	State the assumptions underlying a multiple state model	Traditional lecture class room, Flipped class room,	Quizzes Midterm and final exams
1.2		Traditional lecture class room, Flipped class room,	Quizzes Midterm and final exams
2.0	Cognitive Skills		
2.1	Understand the concept of a multiple decrement table Understand force of decrement Construct a multiple decrement model using associated single decrements and to apply various assumptions to calculate rates for discrete jumps	Flipped class room, Problem solving	Quizzes Midterm and final exams
2.2	Calculate APV of cash flows under a multiple decrement model Understand surrender charge and cash value Calculate reduced paid up and extended term Calculate asset share under a multiple decrement model	Flipped class room, Problem solving	Quizzes Midterm and final exams
2.3	Model disability income model and permanent disability model as multiple state models Calculate transition and occupancy probabilities for multiple state models Calculate the premiums and reserves for multiple state models	Flipped class room, Problem solving	Quizzes Midterm and final exams
2.4	Under the concept of joint life and last survivor statuses Derive the probability distribution for multiple life statuses and probability involving the ordering of deaths	Flipped class room, Problem solving	Quizzes Midterm and final exams

	Calculate APV of cash flows that arises from multiple life models Model dependent lifetime using a multiple state model		
2.5	Understand interest rate scenario models Calculate present values and accumulated values with yield curves and interest rate scenario models Identify the diversifiable and non diversifiable risks in a portfolio of insurance policies	Flipped class room, Problem solving	Quizzes Midterm and final exams
2.6	Calculate emerging surplus, profit vector and profit signature Calculate profitability measures of a cash flow stream	Flipped class room, Problem solving	Quizzes Midterm and final exams
2.7	Understand the design of basic universal life insurances Project contract account values and contract surrender values Understand various secondary contract guarantees Model cash flows of basic universal life insurances Calculate benefit reserves for basic universal life insurances	Flipped class room, Problem solving	Quizzes Midterm and final exams
3.0	Interpersonal Skills & Responsibility		
3.1	Study, learn and work independently.	Encourage students to: - participate in class discussion. - participate in college and university activities. - be members of department committees and college committees.	
3.2	Work effectively in teams.		
3.3	Meet deadlines and manage time properly.		
3.4	Exhibit ethical behavior and respect different points of view		
4.0	Communication, Information Technology, Numerical		
4.1	Exchange with others, notions and methods on Actuarial mathematical models both in oral and written form clearly and in a well-organized manner	Encourage students to: - Register and pass MLC exam of SOA/CAS - use department and college computing facilities. - use e-mail, LMS internet, college and department websites, and KSU central library.	
4.2	Use IT facilities of the university to exchange ideas around the world		
4.3	Use SDL (libraries) to get updated with new developments about the course		
5.0	Psychomotor		
	Not applicable	Not applicable	Not applicable

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Tests, Quizzes	3	5%

2	First Midterm exam	6	25%
3	Tests, Quizzes	9	5%
4	Second Midterm exam	12	25%
5	Final	15 or 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

Office hours, exchange questions and answers by email: **10 hours per week**

E Learning Resources

1. List Required Textbooks

1. Actuarial Mathematics for life contingent Risks (Second Edition, 2013) by Dickson, D.C.M. and Hardy, M.R. and Waters, H.R.
2. ACTEX MLC Study Manual with StudyPlus+ Spring 2018, by: Johnny Li, Ph.D., FSA, Andrew Ng, Ph.D., FSA

2. List Essential References Materials (Journals, Reports, etc.)

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

1. <https://www.soa.org>
2. <http://www.casact.org/>

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

LMS (Bb), Webinars, TeamViewer, google apps, virtual classroom,

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
Classrooms, Virtual classroom, TeamViewer

2. Technology resources (AV, data show, Smart Board, software, etc.)
Smart Board, LMS (Bb), TeamViewer, Email, Kahoot

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Surveys, Exams, quizzes

1. Evaluation sheets to be completed by students at the end of each semester.
2. Take the students' opinion about the course under consideration.
3. Revise course syllabus with instructors who teach the same course (if any).

2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department

1. The level of the students in solving homework and quizzes
2. Colleagues' opinions about students' performance in this course.

3. Processes for Improvement of Teaching

1. Encouraging students to get involved in the lecture.
2. Getting the use of tutorial classes.
3. Encouraging the students to read about the subject.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

1. Common Examination
2. Team grading.
3. Exchanging experience by comparing students' results in other departments.
4. Students who believe they are under graded can have their papers checked by a second reader.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

1. Providing reviews to develop the assigned textbook content.
2. Providing a discussion for the course subject by a specialized committee.
3. Compare the program with other well-known established universities.
4. Consulting some course specialists for course evaluation.

Name of Course Instructor: ___ Prof. Dr. Mhamed ED DAHBI _____

Signature: _____  _____ Date Specification Completed: March 11, 2018



Program Coordinator: _____

Signature: _____ Date Received: _____