Education Evaluation Commission

المركزالوطني للتقويم والاعتماد الأكاديمي

National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

ACTU 474
Financial Mathematics

1439/2018

Course Specifications

Institution:King Saud University	Date:	02/03/2018
College/Department: Science, Mathematics		

A. Course Identification and General Information

1. Course title and code:RISK THEORY ACTU474

2. Credit hours:3(3+0+0)
3. Program(s) in which the course is offered. Actuarial and Financial Mathematics Program
4. Name of faculty member responsible for the course: Dr. AbdelkaremBerkaoui
5. Level/year at which this course is offered:7/4
6. Pre-requisites for this course (if any):MATH 380
7. Co-requisites for this course (if any):None
8. Location if not on main campus:
9. Mode of Instruction (mark all that apply): a. traditional classroom   [X] What percentage?   [100%] b. blended (traditional and online)   [ ] What percentage?   [ ] c. e-learning   [ ] What percentage?   [ ] d. correspondence   [ ] What percentage?   [ ] f. other   [ ] What percentage?   [ ]   Comments:

B Objectives

| 1. What is the main purpose for this course?

To provide an understanding of the fundamental concepts of risk theory, and how those concepts are applied in computing premiums using various methods, in constructions adequate models for the aggregate claim for a portfolio of insurance policies including individual and collective models, and in grasping various ways of generating new distributions. |

| 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 FM 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. Utility theory and insurance Actuarial risk, insurance policy, net premium, premium using different utility functions, premium approximation, reinsurance and stop-loss premium.	2	6

2. Individual models
   a. Mixed distributions.
   b. Convolution product.
   c. Transformations:
        i) Moment generating functions,
        ii) Probability generating functions
        iii) Cumulant generating functions.
   d. Approximation:
        i) normal approximation,
        ii) normal power approximation.
   e. Application to reinsurance.
	4	12

3. Collective models.
  a. Compound distribution.
  b. Convolution formula.
  c. Compound Poisson distribution and Sparse vector algorithm.
  d. Panjer recursive formula.
  e. Application to stop-loss premium.
  f. Approximation of compound Poisson distribution.
	5	15

4. Generating new distributions
  a. Scalar multiplication.
  b. Power.
  c. Exponentiation.
  d. Limiting distributions.
  e. Linear exponential family.
  f. The (a,b,0)-class of discrete distributions.
  g. Zero-modified and zero-truncated distributions.
  h. The (a,b,1)-class of discrete distributions.
  i. Extended truncated Negative-Binomial distribution.
	4	12

2. Course components (total contact hours and credits per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical (visit to companies)	Other:	Total
Contact Hours	Planed	45			None		45
	Actual	45			None		45
Credit	Planed						
	Actual	3					3

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

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	To be able to: a. Calculate the net premium and premium based on an utility function. b. Get an approximate value of the premium when the premium equation is hard to solve or the distribution of the claim is quit complex.	Traditional lecture class room	Quizzes Midterm and final exams
1.2	To be able to compute some characteristics of the aggregate claim, including mean, variance, moment generating function and the cumulative distribution function.	Traditional lecture class room	Quizzes Midterm and final exams
1.3	To be able to compute some characteristics of the aggregate claim, when the number of claim is random.	Traditional lecture class room	Quizzes Midterm and final exams
1.4	To be able to generate new distributions from the existing ones following various methods.	Traditional lecture class room	Quizzes Midterm and final exams
2.0	**Cognitive Skills**		
2.1	Solve the equation of the premium.	Problem solving	Quizzes Midterm and final exams
2.2	Compute the cumulative distribution function for the sum of two independent random variables.	Problem solving	Quizzes Midterm and final exams
2.3	Deduce the distribution of the sum of independent random variables by means of the moment generating function.	Problem solving	Quizzes Midterm and final exams
2.4	Compute the characteristics of a compound distribution.	Problem solving	Quizzes Midterm and final exams
2.5	Understand deeper the Gamma and Beta families of distributions.	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	
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.	department committees and college committees.	
4.0	**Communication, Information Technology, Numerical**		
4.1	Present risk theory to others, both in oral and written form clearly and in a well-organized manner	Encourage students to: - obtain the C exam of SOA/CAS - use department and college computing facilities. - use e-mail, lms, internet, college anddepartment websites, and central library.	
4.2	Use IT facilities as an aid to mathematical processes and for acquiring available information		
4.3	Use library to locate mathematical information.		
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

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)

1. Encouraging students to get in touch with the instructor via e-mail.

E Learning Resources

1. List Required Textbooks
   1. S.A. Klugman , H.H. Panjer, and G.E. Willmot, Loss Models from Data to Decisions, 2nd Edition (2008), Wiley.
   2. Marcel B. Finan, An Introductory Guide in the Construction of Actuarial Models: A Preparation for the Actuarial Exam C/4, 2016.

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
2. Technology resources (AV, data show, Smart Board, software, etc.)   AV, data show, Smart Board, LMS (Bb)
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. An evaluation sheet for the course to be filled by the students at the end of each semester.
      2. Take the students' opinion about the course under consideration.
      3. Discussing the course with instructors who teach the same course.

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 book content.
2. Providing a discussion for the course subject by a specialized committee.
3. View other math departments in well-known universities and getting help from them.
4. Consulting some course specialists for course evaluation.

Name of Course Instructor: Dr. Abdelkarem Berkaoui

Signature: Date Specification Completed: 02/03/2018

Program Coordinator: Prof. Dr. Souhail Mohsen Chebbi

Signature   Date Received: 02/03/2018