Subject Description Form

Subject Code	AMA534
Subject Title	Credibility Theory
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** AMA529 Statistical Inference
Objectives	To enable students to have a thorough understanding of credibility theory and simulation methods, and their insurance applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Apply mathematical techniques for credibility theory in actuarial science. (b) Command the knowledge and techniques of the credibility models to access the insurance and financial risks from past experience. (c) Calculate the individual, collective and Bayes premium under a given Bühlmann two urn model. (d) Calculate the credibility premium under a given Bühlmann-Straub model.
Subject Synopsis/ Indicative Syllabus	Modelling insurance claims: insurance claims, payments subject to deductible and maximum limit, individual and aggregate losses, claim frequency and severity, collective risk models and compound distributions, individual risks models and convolutions. Bayesian analysis: conditional and mixed distributions, unbiased estimation, Bayesian estimation, conjugate prior distributions, posterior distributions, predictive distributions, the linear exponential family. Limited fluctuation credibility theory: full credibility, criterion based on claim amount or frequency, partial credibility, credibility premium. Greatest accuracy credibility theory: Bayesian premium, linear approximation, credibility premium, Bühlmann model, Bühlmann-Straub model, exact credibility, empirical Bayes parameter estimation, nonparametric and semiparametric estimates, calculate various measures of tail weight and interpret the results to compare the tail weights.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of mathematical techniques and how the techniques can be applied to solving problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.

<table>
<tr><td rowspan="6">Assessment Methods in Alignment with Intended Learning Outcomes</td></tr>
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Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a	b	c	d
1. Assignments	10%	✓	✓	✓	✓
2. Mid-term test	30%	✓	✓	✓	✓
3. Examination	60%	✓	✓	✓	✓
Total	100 %				

Continuous Assessment comprises of assignments and tests.   A written examination is held at the end of the semester.

Student Study Effort Required

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Assignment/Mini-project	35 Hrs.
▪ Self-study	63 Hrs.
Total student study effort	137 Hrs.

Reading List and References

Klugman, S.A., Panjer, H.H., and Willmot, G.E.	Loss Models: From Data to Decision, 4th Edition	Wiley, 2012
Casualty Actuarial Society	Foundations of Casualty Actuarial Science, 4th Edition http://www.casact.org/pubs/castext.htm	Casualty Actuarial Society, 2001
Bühlmann, H.	A Course in Credibility Theory and its Application	Springer-Verlag, 2005
Herzog, T.N.	Introduction to Credibility Theory, 3rd Edition	ACTEX, 1999