SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Statistics)
Semester: IV
Syllabus with Effect from: June-2013

Paper Code: PS04ESTA02	Total Credit: 4
Title Of Paper: Actuarial Statistics	

Unit	Description in Detail	Weightage (%)
	Section I – Probability Models and Life Tables.	

I	Utility theory, insurance and utility theory, models for individual claims and their sums, survival function, curtate future lifetime, force of mortality
	  Life table and its relation with survival function, examples, assumptions for fractional ages, some analytical laws of mortality, select and ultimate tables.
	  Multiple life functions, joint life and last survivor status, insurance and annuity benefits through multiple life functions evaluation for special mortality laws.
		25%

II	Multiple decrement models, deterministic and random survivorship groups, associated single decrement tables, central rates of multiple decrement, net single premiums and their numerical evaluations. Distribution of aggregate claims, compound Poisson distribution and its applications. Distribution of aggregate claims, compound Poisson distribution and its applications.	25%
	Section II – Insurance and Annuities.	
III	**Principles of compound interest:** Nominal and effective rates of interest and discount, force of interest and discount, compound interest, accumulation factor, continuous compounding. **Life insurance:** Insurance payable at the moment's of death and at the end of the year of death-level benefit insurance, endowment insurance, differed insurance and varying benefit insurance, recursions, commutation functions. **Life annuities:** Single payment, continuous life annuities, discrete life annuities, life annuities with monthly payments, commutation functions, varying annuities, recursions, complete annuities-immediate and apportion able annuities-due.	25%
IV	**Net Premiums:** Continuous and discrete premiums, true monthly payment premiums, apportionable premiums, commutation functions, accumulation type benefits. Payment premiums, apportionable premiums, commutation functions accumulation type benefits. **Net premium reserves:** Continuous and discrete net premium reserve, reserves on a semi continuous basis, reserves based on true monthly premiums, reserves on an apportion able or discounted continuous basis, reserves at fractional durations, allocations of loss to policy years, recursive formulas and differential equations for reserves, commutation functions. **Some practical considerations:** Premiums that include expenses-general expenses types of expenses, per policy expenses.	25%

	Claim amount distributions, approximating the individual model, stop-loss insurance.	

Basic Text & Reference Books:-

- Shailaja R Deshmukh (2009) Actuarial Statistics: An Introduction using R. University Press Pvt. Ltd Hyderabad (Text Book).
- N. L. Bowers, H. U. Gerber, J. C. Hickman, D. A. Jones and C. J. Nesbitt, (1986), Actuarial Mathematics', Society of Actuaries, Itasca, III inois, U. S. A. Second Edition (1997)
- Section I – Chapters: 1, 2, 3, 8, 9, and 11,   Section II – Chapters: 4, 5, 6, 7, 13, and 14

Books for Additional References:

- Spurgeon E. T. (1972), Life Contingencies, Cambridge University Press.
- Neill, A. (1977). Life Contingencies, Heinemann.