UNIVERSITY OF KERALA

School of Physical and Mathematical Sciences

Department of Demography

MPhil Programme in Actuarial Science

SYLLABUS

Under Credit and Semester System with effect from 2016 Admissions

UNIVERSITY OF KERALA

Department of Demography
MPhil Programme in Actuarial Science

AIM: The MPhil programme in Actuarial Science aims to enhance a high level of knowledge on the Actuarial theory and practice.

OBJECTIVES: The objectives of this programme are

- To enable students to become efficient decision makers when they have to occupy positions where an actuarial expertise and risk theory are an essential component
- To enthuse students to use such acquired knowledge as a foundation for developing professional skills to promote public interest
- The course also aims to give solid grounding for further intensive studies and research which are now highly in demand in the field of insurance, banking, investment, financial services, risk management, regulatory needs etc.

Structure of the Programme

Semester No.	Course Code	Name of the course	Number of credits
I	DAS-711	Research Methodology	4
	DAS-712	Financial Mathematics	4
	DAS-713 (i)	Life and Other Contingencies	4
	DAS-713(ii)	Business Economics (Micro)	4
	DAS-713(iii)	Business Economics (Macro)	4
	DAS-713(iv)	Techniques of Demographic Analysis	4
	DAS-713(v)	Principles of Insurance – Life, General and Health	4
	DAS-713(vi)	Agriculture Insurance	4
	DAS-713(vii)	Role of Actuaries in Insurance and Other Sectors	4
	DAS-713(viii)	Basic Risk Modelling	4
II	DAS-721	Dissertation	20

Total Credits	**32**

Semester : I
Course Code : DAS - 711
Course Title : Research Methodology
Credits : 4

AIM: This course is a general introduction to social research methods and will cover broad topics: the foundations of social science research, research design, data collection, and data analysis and report writing. This module aims to provide students with an understanding of the principles and skills needed in order to design and conduct research. It will encourage students to critically evaluate the methods, strategies and data that used by social scientists and provide training in analysis of a range qualitative and quantitative data.

COURSE OBJECTIVES: By the end of the course, the students should be able to:

- To develop understanding of the basic framework of research process.
- To develop an understanding of various research designs and techniques.
- To identify various sources of information for literature review and data collection.
- Formulate good research questions and design appropriate research.
- Collect their own data using a variety of methods.
- Analyze both qualitative and quantitative data using computer-based skills.
- Critically evaluate their own research and that of other social scientists.

COURSE CONTENT

Module I: Basic themes of research, Units of Analysis, variables, relations, hypothesis, Stages of research process, Conceptual and Operational Definitions Theory and Models – empirical Research

Module II: Research Design- Meaning of Research Design. Functions and goals of Research Design, characteristics, phases, design for different types of research, pilot study

Module III: Measurement- concepts, attitude measurement, Nature and Levels of measurement and types of scales. Criteria for good measurement - Validity and Reliability Sampling- Sampling design and sampling procedures. Probability Vs. Non-probability sampling techniques, determination of sample size

Module IV: Methods of Data Collection - Discussion on primary data and secondary data, tools and techniques of collecting data. Observational, Survey Research, Qualitative, Secondary data analysis, Questionnaire Construction and Interviewing Case Studies-Content Analysis-Data processing and Analyses- Coding, Tabulation.

Module V: Analysis Methods- Editing and coding, transform raw data into information, basic data analysis, descriptive statistics Univariate, Bivariate, Multivariate, Interpretation and Report Writing, Bibliography, Citation

End-Semester Assessment: Three hour written examination. There will be seven questions asked, of which five has to be answered with equal marks.

REFERENCES

- Arlene Finil& Jacqueline kosecoff, How to conduct surveys, - A step by step guide, New Delhi, Sage Publications
- Desai P B, A survey of research in Demography, Mumbai, Popular Prakashan
- Devendra Thakur, Research Methodology in Social Sciences, New Delhi, Deep and Deep Publication
- Goode, William J & Paul K Hatt, Methods in Social Research Mc GRAW HILL, International Book Company
- Julian L Simon, Basic Research Methods in Social Science –The Art of Empirical Investigation, New York, Random House
- Kenneth D Bailey, Methods of Social Research, New York, Macmillon Publishing Company. Inc.
- Kothari C R, Research Methodology Methods and Techniques, New Delhi, WishwaPrakashan
- Nachmias David &ChavaNachmias, Research Methods in the Social Sciences, New York, St.Martin's Press
- Therese L Baker Doing Social Research, New York, Mc. GRAW HILL
- Wilkinson T S & P L BHANDRKAR Methodology and Techniques of Social research Mumbai, Himalaya Publishing House

Semester : I
Course Code : DAS-712
Course Title : Financial Mathematics
Credits : 4

AIM: The course aims to develop a mathematical sense of financial transactions through the

applications of various mathematical techniques. The ease of calculations involving compound interest rates and annuity functions should be achieved.

COURSE OBJECTIVE: Objective of the course is to understand financial problems arise from various industrial situations and to apply different techniques to solve them. The arithmetic and problem solving ability will be sharpened. It also enables a student a professional way of approaching a financial problem involve different types of annuities.

COURSE CONTENT

Module I: Introduction to Actuarial Science – main subjects involved in actuarial science- actuarial profession- professional standards and examination-origin and development of the profession- institutions involved- actuarial profession around the world- actuarial profession in India

Module II: Cash Flow Models and Investments – Introduction- cash flow process- examples of cash flow scenarios- a zero-coupon bond- a fixed interest security- an index-linked security- cash on deposit- an equity- an annuity certain- an interest-only loan- a repayment loan (or mortgage)- simple interest- compound interest- present values- simple discount- investing over a period- converting between different effective rates.

Module III: Interest rates – introduction- nominal rate of interest-definition- accumulation factors- principle of consistency- the force of interest- formules for accumulation factor- present values- the basic compound interest fuctions- interest payable pthly- Present Values and Accumulated values using interest rates – introduction, present values of cashflows-discrete cashflows- valuing cashflows- constant interest rates- payment streams- sudden changes in interest rates- interest income

Module IV: Level Annuities and determination of their values- introduction, present values payment made in arrear- payments made in advance- accumulations- continuously payable annuities- annuities payable pthly- present values- accumulations- non-integer values of n-

Module V: Decreasing and increasing annuities including deferred annuities – varying annuities- annual payments- continuously payable annuities- decreasing payments- special cases- irregular payments- sudden changes in interest rates- compound increasing annuities- deferred annuities-annual payments- continuously payable annuities- annuties payable pthly, Equations of Value and its applications – introduction- the equation of value and the yield on a transaction- solving for an unknown quantity- solving for the amount of a payment- solving for the timing of a payment- solving for the interest rate- uncertain payment or receipt- probability of a cashflow- higher discount rate.

REFERENCES

- Mark S. Joshi" The Concepts and Practice of Mathematical Finance", Cambridge University Press, 2nd Edition (2008)

- Mc Cutcheon and Scott "Introduction to the Mathematics of Finance", Heinemann Professional Publishing, 1989

- Paul Wilmott, Sam Howison and Jeff Dewynne "The Mathematics of Financial Derivatives" Cambridge University Press, 1995

- Ross S.M "An introduction to Mathematical Finance", Cambridge University Press,( )

Semester : I
Course Code : DAS-713(i)
Course Title : Life and Other Contingencies
Credits : 4

AIM: After completion of the course the student will be able to define and apply basic insurance functions and actuarial symbols related to that in practical problems.

COURSE OBJECTIVE: To develop a basic knowledge of survival models, pension related risks and basic insurance contracts, the basic insurance functions and their relationship among each other are discussed in the course.

COURSE CONTENT

Module I: Methods of combining compound interest theory and survival models- special nature of pension related risks and problems

Module II: Commutation Tables - calculation of premiums for basic life contracts

Module III: Definition of Basic Life Insurance Contracts

Module IV: Derivation of formula for Mean and variance of the present value of benefits payable under whole life and endowment contracts

Module V: Various Insurance related Symbols - Definition and explaination, Insurance relationships - Proof and applications

REFERENCES

- Alistair Neil "Life Contingencies", Butterworth-Heinemann Ltd., Illustrated Edition (1977)

- Smith B.H "Contingencies of Value", Harward University Press, 1988

- Griffith Davis "Table of Contingencies", Longman & Co, 1825: University of California Library

- Life and Other Contingencies- P F Hooker & L H Longley-Cook – Cambridge – ISBN 0-521-05327-7

- Michael M Parmenter, "Theory of Interest and Life Contingencies with Pension", 3rd Edition.

Semester : I
Code : DAS-713(ii)
Course Title : Business Economics (Micro)
Credits : 4

AIM: After completion of the student should be able to comprehend a financial situation of a company with economic point of view. The course is designed to equip the student to practice actuarial concepts in a real business environment.

COURSE OBJECTIVE: The micro economic environment a firm is working is an integral part of actuarial theory and practice. This course covers the basic micro economic theory of demand-supply analysis along with an introduction to financial sector. The course is designed as collection of four modules which are very much interconnected. No previous knowledge is assumed.

COURSE CONTENT

Module I: Relevance of economics to the world of business- Opportunity cost and scarcity and their relevance to economic choice- Core economic concepts involved in choices made by businesses relevant to selection of outputs- inputs- technology- location and competition- Microeconomics and macroeconomics- Workings of competitive markets- The role of the price mechanism in a free market- the behavior of firms and consumers in such markets- Factors that influence the market demand and supply and how market equilibrium quantity and price are achieved- Markets reaction to changes in demand and supply

Module II: Price and income elasticity of demand- Price elasticity of supply- Calculation of elasticities of demand using both original and average quantities- Factors that affect elasticity- Effect of elasticity on the workings of markets in the short and long run- Risk and uncertainty about future market movements- Concept of utility and describe effects consumer's purchasing decisions- The way insurance companies help to reduce or remove risk. moral hazard" and"adverse selection- Simple insurance problems in terms of utility theory

Module III: Production function- costs of production- revenue and the production function and the relationship between inputs and outputs in the short and long run- Average and marginal product- Meaning and measurement of costs and explain how these vary with output in the short and long run- Total- average and marginal costs- Economies of scale and explain the reasons for such economies and how a business can achieve efficiency in selecting the level o its inputs. Revenue and profit and explain how both are influenced by market conditions- Calculate average and marginal revenue- Profit-maximizing output- Shut-down point in the short and long run.

Module IV: Profit maximization under perfect competition and monopoly- The market power of a firm- Features of a market characterized by perfect competition and explain how firms in such markets determine output and price in the short and long run- Emergence of monopolies- its profit maximizing price and output and how much profit a monopolist makes- Barriers to entry in an industry and a contestable market and how these affect a monopolist's profit- Profit maximization under imperfect competition. Behavior of firms under monopolistic competition and explain type of market only normal profits are made in the long run- Main features of an oligopoly and explain how firms behave in an oligopoly- Competition and collusion of firms in an oligopoly and the strategic decisions of such firms can be explained by game theory.

Module V: Importance of a firm's decisions on product selection and marketing and advertising strategies- Product differentiation- Various marketing strategies that firms can adopt and the elements that could be involved in a marketing strategy effects of advertising and features of a successful advertising campaign. Relationship between growth and profitability- The constraints on a firm's growth and alternative growth strategies- The growth strategy of internal expansion and explain how the firm may pursue vertical integration- product differentiation or diversification to achieve internal expansion.The strategy of merging with, or taking over, other firms- Circumstances a firm might want to form a strategic alliance with other firms- Methods of price determination in practice and factors that affect the ability of a firm to determine its prices- Average cost pricing and price discrimination pricing strategy for multiple products and explain how pricing varies with the stage in the life of a product.

REFERENCES

- Economics for Business. by John Sloman, Kevin Hinde and Dean Garrat, Sixth Edition, Pearson

Semester : I
Code : DAS-713(iii)
Course Title : Business Economics (Macro)
Credits : 4

AIM: After completion of the course student should be able to comprehend the structure of the whole economy. The course aims to makes the actuarial student to better locate and define the problem of a particular company in a particular economy. Better and quick response in decision making against a govt policy is must in actuarial practice, which is the aim of this course.

COURSE OBJECTIVE: To understand the role of government in controlling economic and financial variables is massive. The course objective includes deep understanding of supply side policy and its importance. Regulation of unemployment and its importance in determining market demand and other variables should be understood.

COURSE CONTENT

Module I: Extent to which businesses meet the interests of consumers and society in general- Reasons for the social efficiency of perfect markets and the failure markets to achieve social efficiency- The ways in which governments intervene in markets in order to influence business behavior and the drawbacks of such intervention- Whether taxation or regulation could be more useful in correcting markets' shortcomings. competition policy and its effectiveness- Failure of free market to achieve the optimal amount of government can undertake in order to encourage technological advance and innovation.

Module II: Effect of supply- side policies on business and the economy. Types of supply-side policies that can be pursued and their effectiveness- Impact on business of a policy of tax cuts- The major types of policy open to governments to encourage increased competition.

Module III: Globalization and describe its impact on business. Process of globalization-merits and demerits- Importance of international trade- Growth of international trade and its benefits to countries and firms. Advantages of specialization- Trade restriction and protection of domestic industries- Role of the World Trade Organization (WTO) in international trade-Determination of exchange rates and effects of changes in exchange rate on business-Relationship between the balance of payments and the exchange rates- Advantages and disadvantages of fixed and floating exchange rates- Influence of governments and/or central

banks to the exchange rates- the implications of such actions for other macroeconomic policies and for business.

Module IV: The main macroeconomic variables that governments seek to control- Factors determine the level of economic activity and hence the overall business climate- Effect on business output if a stimulus is given to the economy- Actual and potential growth- Periods of boom followed by periods of recession and explain factors which influence the length and magnitude of the phases of a business cycle- Causes and costs of unemployment and how unemployment relates to the level of business activity- Determination of the price level in the economy by the interaction between aggregate supply and aggregate demand in a simple AS-AD model- Causes and costs of inflation and how inflation relates to the level of business activity- GDP and its measurement. Representation of the economy as a simple model of the circular flow of income.

Module V: Function of money- Factors determines the amount of money in the economy- what causes it to grow and what is the role of banks in this process. Determination of interest rates Relationship between money and interest rates- Role of central bank- Role of RBI- The ways through which change in the money supply and/or interest rates affects the level of business activity, Level of business activity and how it affects unemployment and inflation- Effect of a rise in money supply on output and prices- Relationship between unemployment and inflation and whether the relationship is stable- The way how business and consumer expectations affect the relationship between unemployment and inflation and formation such expectations- Policy of targeting inflation and relationship between unemployment and inflation- The course of a business cycle and its turning points- The way through which business cycle is caused by changes in aggregate demand- or changes in aggregate supply- Fiscal rules adopted by the government and discuss if following these rules is a good idea- The way monetary policy works in the India and describes the roles of the Reserve Bank of India- The way targeting inflation influences interest rates and hence economic activity.

REFERENCES

- Economics for Business. by John Sloman, Kevin Hinde and Dean Garrat, Sixth Edition, Pearson

Semester : I
Course Code : DAS – 713(iv)
Course Title : TECHNIQUES OF DEMOGRAPHIC ANALYSIS
Credits : 4

AIM: Traditionally, demographic estimation has been based on data collected by census and by a vital registration system. A continuous registration system usually has the task of recording vital events as they occur. When this system is coupled with periodic counts of the population (census), the calculation of demographic parameters becomes possible. Assuming that both the registration and census counts were perfect, demographic parameters could be calculated directly from the data reported and there would be no need for indirect estimation. Unfortunately these data collection systems did not exist or their performance is so poor in many countries. So there is a need for indirect estimation. Demographic models are an attempt to represent demographic process in the form of a mathematical function or set of functions relating two or more measurable demographic variables. The primary purpose of modelling is simplification, to reduce a confusing mass of numbers to a few, intelligible basic parameters, or to make possible an approximate representation of reality without complexity. All demographic processes, especially human reproductive process, cannot be studied directly; it could be studied with help of models. This course aims to equip the students in advanced Demographic Techniques.

COURSE OBJECTIVES: The objectives of the course are

- To get knowledge about the population models and indirect estimation techniques
- To give practical training in indirect estimation
- To introduce advanced techniques of demographic analysis
- To impart practical skills in indirect estimation

COURSE CONTENT

Module I: Sources of data – Census, Vital Statistics, Sample Surveys, Population registers, Quality of Data – Evaluation and Adjustment of Demographic Data Interpolation and Graduation, Population Growth: Measures off Population growth – Balancing Equation, Arithmetic, Geometric, Exponential, Logistic. Doubling Time

Module II: Measures of Mortality and Morbidity, Measures of Fertility Measures of Migration and Urbanization. Standardization – Direct and Indirect Methods, Measures of Nuptiality – Mean Age at Marriage, Singulate Mean Age at Marriage, Life Table: Concepts, Assumptions, Construction of Life tables-Complete and Abridged -.Various types – Force of Mortality, Uses of Life Tables. Single Decrement Associated Life tables, Multiple Decrement Life table – Multi State Life table, Applications Nuptiality Tables, Contraceptive Effectiveness. Working Life Tables

Module III: Structure of Population – Stable, Quasi-stable, Stationary Population, Lotka's Stable Population Theory, Applications – Population Momentums, Reproductive value, Population Estimation and Projections – Methods of Population estimation and Projection –

Mathematical and Cohort Component methods, Assumptions, on fertility, Mortality and Migration

Module IV: Mortality models, Model Life Tables – U. N Model Life Table, Coale & Demney Model Life Tables , Lederman's system of Model Life Tables, Brass Logit System of Model Life Tables, U. N. Model Life Tables for Developing Countries, Stable Population Model Life Tables. Mathematical Models of Fertility, Fertility Models of Brass, Singh, Sheps and Srinivasan, Coale & Trussel, Brass Relaltional Gompertz Model, Bongaarts Model – Demographic basis, uses and general evaluation of the validity of the models, Coales Fertility Models, Migration Models: Model Migration Schedule - An Introduction – Rogers & Castro Model Migration Schedules. Indirect Method of Estimating Migration – Gross Period Migration flows by proportional Adjustment

Module V: Indirect Estimation: Introduction, need and logic , Estimation of vital rates using incomplete information using survey data, using census data, using information form related data – Fertility and Mortality estimation using model stable age distribution, II Estimation of Mortality – Estimation of infant and Child mortality from information on children ever born and children surviving (Brass, Sullivan, Trussel and Pathak) Estimation of Adult Survivorship probabilities from information on Orphanhood and widowhood, estimation of adult mortality using successive census age distribution, Indirect Estimation of Fertility – Estimation of Fertility based information about children ever born – Brass P/F ratio Method, Trussel Modification, Estimation of Fertility from age distribution of a population Reverse Survival Method – Original Method, Own-Children method, Rele's Method, Stable population method, Method using General Population Model

End-Semester Assessment: Three hour written examination. There will be seven questions asked, of which five has to be answered with equal marks.

REFERENCES

- Chiang CL, Introduction to Process in Biostatistics
- Chiang CL, The Life Table and its Applications
- CoaleA J, Growth and structure of Human Population
- Coale AJ and P Demeny, Regional Model Life Tables and Stable Populations, Academic Press, New York
- Coale A J &Trussell (1979), Model Fertility Schedule Variations in the Age Structure of Child Bearing in Human Population, Population Index, vol.40
- Keyfitz N, Introduction to Mathematics of Population
- Keyfitz N, Applied Mathematical Demography
- Namboothiri K and C M Suchindran, Life Table Techniques and their Applications
- K B Pathak& F Ram, Techniques of Demographic Analysis
- Pollard C H Mathematical Models in Demography
- R Ramakumar, Technical Demography, John Wiley, New Delhi

- A Rogers, Introduction to Multiregional Demography, Wiley and Sons, New York
- M Sheps and Menken, Mathematical Models of Conception and Birth
- H S Shryock, J S Siegel and Associates, The Methods and Materials of Demography
- S N Singh, A Probability Model for Couple Fertility, Sankhya
- K. Srinivasan, Analytical Models for the Study of Closed and Open Intervals
- United Nations, Manual IV
- United Nations, Model Life Table Complete
- United Nations, Manual X
- United Nations, Model Life Table Abridged

Semester : I
Course Code : DAS-713(v)
Course Title : Principles of Insurance- Life, General and Health
Credits : 4

AIM: On completion of this course the student will be able to appreciate various practices and principles in the insurance industry.

COURSE OBJECTIVE: To impart knowledge into the various techiniques and principles that are practiced in the insurance industry

COURSE CONTENT

Module I: Brief Introduction on origin of insurance and its current applications

Module II: Modern Insurance – Principle of Indemnity and Guarantee- Insurable Interest- Principle of Utmost Good faith- Insurance is a Contract - the basics of insurance contract- Principle of Equity

Module III: Life Insurance contracts and group life insurance Schemes.

Module IV: Health Insurance Contracts distinguished.

Module V: General Insurance Contracts distinguished including Miscellaneous Insurance Contracts, Pension and Employee Benefit contracts

REFERENCES

- Ben G Baldwin "The New Life Insurance Investment Advisor" 2nd Edition, Mc Graw Hill
- Harriett E Jones "Principles of Insurance "FLMI Insurance Education Programme, Life Management Institute LOMA, (Dec 1995)
- Neelam C Gulati "Principles of Insurance Management", Excel Books, New Delhi, (2007)
- Robert I Mehr "Principles of Insurance "Richar D Irwin (Ed.), 8th Edition, 1985

Semester : I
Course Code : DAS-713(vi)
Course Title : Agriculture Insurance
Credits : 4

AIM: Aim of the course is to develop basic knowledge of Indian agriculture and an overview of the agriculture insurance in India

COURSE OBJECTIVE: To familiarize the agriculture insurance in India. To know the benefits of crop insurance and the insurability of agricultural risk.

COURSE CONTENT

Module I: Introduction to Indian Agriculture- Agriculture Situation In India- Role of Agriculture in Indian Economy- agriculture Research & Network.

Module II: Agricultural Census-Phase I- Phase II- Phase III- Phase IV- Agricultural Resources- Land Records(Computerisation etc..)

Module III: Evolution of Crop Insurance In India - Individual Based Crop Insurance- Pilot Crop Insurance Scheme (PCIS)- Comprehensive Crop Insurance Scheme (CCIS), Experimental Crop Insurance Scheme (ECIS)- National Agricultural Insurance Scheme (NAIS)- Farm Income Insurance Scheme (FIIS)

Module IV: Agricultural insurance in India- Types of Agricultural Insurance schemes available- Obligations of Insurers in Rural Sector

Module V: Crop Insurance Design Considerations - Insurability of Agricultural Risks- Crop Insurance- Crop Insurance Vs Agricultural Relief- Crop Insurance As Risk Management- Benefits of Crop Insurance, Why Area Approach Based Crop Insurance Suits the Indian Conditions- Key Elements & Generic Considerations In Crop Insurance Design And Operations

REFERENCE

Rao K.N (2010), 'Agricultural Insurance', Insurance Institute of India, Mumbai.

Semester : I
Course Code : DAS- 713(vii)
Course Title : Role of Actuaries in Insurance and Other Sectors
Credits : 4

AIM: Aim of the course is to develop basic knowledge of Indian agriculture and an overview of the agriculture insurance in India

COURSE OBJECTIVE: To familiarize the agriculture insurance in India. To know the benefits of crop insurance and the insurability of agricultural risk.

COURSE CONTENT

Module I: Role of Actuaries in life and general insurance – establishing estimates for unpaid claim liabilities, premium pricing, surrender value calculations, management of savings and underwriting, solvency calculations

Module II: Role of Actuaries in Health Insurance – product development, pricing, product management, competition studies - modelling, profit testing, reserving, solvancy calculations, high risk pool analysis, health utilization and trend forecasts, health risk status analysis, population disease prevelance forecasting

Module III: Role of actuaries in private pensions and other employee benefits – advised to stake holders on design of occupational pension schemes, funding requirements of occupational pension schemes and its solvancy requirements, stochastic asset – liability model

Module IV: Role of Actuaries in ERM(Enterprise Risk Management) – function as a CRO (Chief Risk Officer), advising the company on risk appetite and risk limits, building companies risk models, performing stress trusts, identify emerging risks, execution and valuation of risk mitigation

Module V: Role of actuaries in banking. Recommendation for approval and monitoring market risk limits ,Measurement of interest rate risks in the banking book ,Computation of loan equivalent exposure on account of IRS , Computation of VaR of FOREX positions ,Monitoring of Investment Trading book as well AFS book as assigned limits , Vetting from Risk perspective of all investment proposals. ,Monitoring of liquidity risks through MAL/Liquidity Recap/Lending Ratio reports , Preparation of ICAAP, Stress Testing, Preparation of market risk MIS reports for Asset Liability

REFERENCE

Barclay Jaffe A J, "Hand Book of Statistical Methods for Demographers", Washington,

Semester : I
Course Code : DAS- 713(viii)
Course Title : Basic Risk Modelling
Credits : 4

AIM: Aim of the course is to develop basic knowledge of Indian agriculture and an overview of the agriculture insurance in India

COURSE OBJECTIVE: To familiarize the agriculture insurance in India. To know the benefits of crop insurance and the insurability of agricultural risk.

COURSE CONTENT

Module I: Random Variables and definition of basic Cramor- Lundberg risk model, Hazard rate function, Moments, Transforms such as Probability Generating Functions, Moment Generating Functions, Characteristic Functions , Laplace Transform

Module II: Counting Random Variables, Continuous random variables, distributions – Negative binomial distribution,

Module III: Functions of random variables, Joint density and distribution function, Conditional distributions , Sum of random variables

Module IV: Counting processes - Poisson process, Renewal process, Renewal function, Recurrence times of a renewal process, Delayed Renewal process, Mixed Poisson process, Compound Poisson process, P_olya - Aeppli process

Module V: Weibull distribution, Pareto distribution, The Log normal distribution, Inverse Gaussian distribution, Erlang distribution

REFERENCE

Risk Management and Insurance – Trieschmann, Gustavson, Hoyt – ISBN 10- 0324016638

Semester: II
Course Code: DEM 721
Course Title: DISSERTATION
Course Credit: 20

AIM: This twenty credit course provides the students an opportunity work on a specific area in Demography in which they are interested in by taking up a specific problem of interest in any area of Demography and submit a detailed report on the same after a scientific investigation of the problem.

COURSE OBJECTIVE: By the end of the course the students will be able to

- Carry out scientific research on any area in Demography and health
- Design and carry out research and analyze data using any software package
- Write a detailed report of the scientific research carried out

Course Description: The dissertation allows students to consolidate and extend the knowledge and skills acquired during the coursework and apply these in a practical way in a public health setting. There will be faculty supervisors helping the students in doing the project work and to write a dissertation on the same.