

(Abstract)

Revised syllabus and model Question paper of *B.Sc Statistics Programme* (6B13STA -Actuarial Statistics) - under Choice Based Credit Semester System - Implemented with effect from 2015 admissions - Orders Issued.

ACADEMIC C SECTION

No. Acad/C2/4500/2014

Dated, Civil Station P.O, 20-07-2017

Read: 1. U.O of Even No. dated 17.05.2014

2. Minutes of the meeting of the BOS in Statistics (UG) held on 20.06.2017.

ORDER

1. As per paper read (1) above, the scheme, syllabus and pattern of question papers for core/open courses in B.Sc Statistics Programme were implemented in the university w.e.f 2014 admission.

2. As there were certain anomalies in the syllabus of B.Sc Statistics programme implemented w.e.f 2014 admission, the meeting of the BOS in Statistics (UG) held on 20.06.2017 vide paper read (2) above, recommended to incorporate certain modifications in the syllabus of 6th Semester core course **6B13STA -Actuarial Statistics** of B.Sc Statistics programme w.e.f 2015 admissions and the Chairman submitted the syllabus and model question paper of the same for implementation w.e.f 2015 admission.

3. The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction to implement with effect from 2015 admission, the revised syllabus and Model question paper of core course **6B13STA - Actuarial Statistics** of B.Sc Statistics programme incorporating the changes as recommended by the Board of Studies in Statistics (UG), subject to report to the Academic Council.

4. The modified pages of the syllabus and model Question paper are appended in the University website.

P.T.O

5. U.O as per the paper read (1) above, stands modified to this extent.

6. Orders, are therefore issued accordingly.

Sd/-

**JOINT REGISTRAR (ACADEMIC)
FOR REGISTRAR**

To

1. The Examination Branch (through PA to CE)

Copy To:

1. The Chairman, BOS in Statistics (UG)

2. PS to VC/PA to PVC/PA to Registrar

3. JR/AR I Academic

4. SF/DF/FC.



Forwarded/By Order

A handwritten signature in black ink, appearing to be "A. J. J.", written over a horizontal line.

Section Officer

For more details; log on www.kannuruniversity.ac.in

CORE COUSE XIII: ACTUARIAL STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6 B 13 STA	5	4	3

Module-I: Valuation of Financial Transactions: - Simple interest; Compound interest – valuation of a single payment, effective rate, fractional periods, nominal rates of interest, changing rates in consecutive periods; Valuation of a series of payment- present value of an annuity, accumulated value of an annuity, evaluation of annuities with changes in interest rate, the equation of value; Common compound interest transactions – fixed interest bonds, housing loans, repayment schedule, changes in the conditions of the loan. (20)

Module-II: Demography: - Introduction; Characteristics of a population- sources of information, classification of data, summary statistics, rates of change, population growth, demographic transition; Individual characteristics- Mortality, the survival function, the life table, characteristics, causes and trends of mortality experience, mathematical models of mortality; Individual characteristics- Fertility, measures of fertility, modern trends in family formation; Population projection, projection models (20)

Module-III: Actuarial Practice: - Principles of insurance; Life insurance- whole life insurance policy, term life insurance policy, endowment insurance policy, unitized insurance, trauma insurance, disability insurance, reverse mortgages, the role of actuary in life insurance; Private health insurance; Superannuation, defined benefit schemes, defined contribution scheme, the role of the actuary in superannuation; General insurance – the role of actuary in general insurance; National insurance. (20)

Module-IV: Valuation of contingent payments (Life annuities) : Discrete random variables, valuation of a single contingent payment, valuation of a series of contingent payments; Premium calculation, whole life insurance, endowment insurance; Relationships between actuarial function (12)

Books for Study

1. M.E. Atkinson and D.C.M. Dickson, An Introduction to Actuarial studies, Second Edition, Edward Elgar Publishing Limited, UK. USA
2. S. David Promislow, *Fundamentals of Actuarial Mathematics*, John Wiley & Sons, Ltd
3. 1. Deshmukh, S.R. (2009) Actuarial Statistics – An Introduction using R, University Press (India) Pvt Ltd., Hyderabad.

Reference Books:

1. Neill, A. (1977) Life Contingencies, Heinemann, London.
2. Newton L. Bowers, Jr, Hans U. Gerber, James C. Hickman, Donald A. Jones and Cecil J. Nesbitt (1997) Actuarial Mathematics, The Society of Actuaries.
3. King, G. Institute of Actuaries Text Book. Part 11, Second edition, Charles and Edwin Layton, London.
4. Donald D.W.A. (1970) Compound Interest and Annuities, Heinemann, London.
5. Hooker, P.F. and Longley Cook, L.W. (1953) Life and Other Contingencies, Volume I and Volume II (1957) Cambridge University Press.
6. Benjamin, B. and Pollard, J.H. (1980) Analysis of Mortality and Other Actuarial Statistics, 2nd edition, Heinemann, London

Marks including choice:

Module I - 20 marks

Module II - 18 marks

Module III - 20 marks

Module IV- 14 marks

Total - 72 marks

Pattern of Questions:

Part A: Short answer (6 questions)

- **Answer all the 6 questions** (6 questions x 1 mark each=6 marks)

Part B - Short essay (9 questions)

- **Answer any 7 questions** (7 questions x 2 marks each=14 marks)

Part C- Essay (6 questions)

- **Answer any 4 questions** (4 questions x 4marks each=16 marks)

Part D - Long essay (4 questions)

- **Answer any 2 questions** (2 questions x 6 each=12 marks)

Total marks including choice – 72

Maximum marks of the course- 48

SIXTH SEMESTER B.Sc STATISTICS (CCSS) PROGRAMME

Core Course: **Statistics**

Paper: 6B13STA - **ACTUARIAL STATISTICS**

(Use of calculators and Statistical tables are permitted)

Time: 3 hrs

Max. Marks: 48

Part A: Short answer

Answer all the 6 questions

(6 x 1 mark =6 marks)

1. Define simple interest and compound interest.
2. Define housing loan?
3. Define fertility and mortality.
4. What is contingent payment?
5. What is a discrete random variable?
6. If an investor deposits Rs. 40,000/- in a bank that pays compound interest at the rate of 6 % p.a. What will be the maturity value after 5 years ?

Part B - Short essay

Answer any 7 questions

(7 x 2 marks =14 marks)

7. How much must be invested now in order to accumulate an amount of Rs 200 at the end of three years, given a compound rate of interest of 5% p.a.?
8. What is life expectancy?
9. What is meant by force of mortality?
10. Explain the principles of life insurance.
11. Write a note on relationship between actuarial functions.
12. What are the mathematical models of mortality.
13. Explain the different types of life insurance.
14. On the basis of survival function $s(x)=e^{-\lambda x}$ for $x \geq 0$ and interest at i p.a. effective , find an expression for A_x .
15. Explain the term accumulated value of an annuity.

Part C- Essay

Answer any 4 questions

(4 x 4marks =16 marks)

16. Distinguish between nominal rates of interest and effective rates of interest.
17. Write the importance of population pyramid in demography.
18. What is a life table? Explain its construction.
19. Explain about various types of life insurances?
20. What are role of the actuary in life insurance? Explain it.
21. Write a short note on general insurance and national insurance.

Part D - Long essay

Answer any 2 questions

(2 x 6 marks=12 marks)

22. What is utility .Explain its importance in insurance?
23. What are the major sources of demographic data? Discuss their limitations.
24. (a) Define the term general insurance.
(b) What are the different types of general insurance policy.
(c) Write the role of the actuary in general insurance.
25. The mortality experience of a population is described by the survival function
$$s(x) = 1 - x^2/900, \text{ for a range of ages } x, 0 \leq x \leq \omega.$$
 - a) For what range of values of x is $s(x)$ suitable as survival function?
 - b) What is the expression for the associated force of mortality?
 - c) By what age is there a 50% probability that a newborn life has already died?
 - d) Calculate the force of mortality at age 25.
 - e) Calculate the probability that a life aged 10 will die before reaching age 25.