A.G& S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

VUYYURU-521165, KRISHNA Dt., A.P.(Autonomous)

Accredited by NAAC with "A" Grade

2021-2022

DEPARTMENT OF STATISTICS

MINUTES OF BOARD OF STUDIES

EVEN SEMESTER

09-04-2022

Minutes of the meeting of BOS in Statistics for B.Sc(MSCs) Degree Courses of AG&SGSiddhartha Degree College of Arts & Science, Vuyyuru, held at 3.00 PM on 09- 04-2022.

N.V. SrinivasaRao *Presiding*

Members Present:

1) N.V. Srinivasa Rao (N.V.SrinivasaRao)	Chairman	Head, Department of Mathematics, AG & SG S Degree College.
2) P. Ravi Kumar (P. Ravi Kumar)	University Nominee	Department of Statistics, Pavitra Degree College, Machilipatnam.
3) G. Chakravarthy (G. Chakravarthy)	Subject Expert	Head. Department of Statistics, P. B. Siddhartha College, Vijayawada
4) D. Sunitha (D.Sunitha)	Member	Lecturer in Mathematics AG & SG S Degree College.
5) A. Bhargavi (A.Bhargavi)	Member	Lecturer in Mathematics AG & SG S Degree College.
6) Noor Mohammad (Noor Mohammad)	Member	Lecturer in Mathematics AG & SG S Degree College.
7) K. Rajya Lakshmi (K. Rajya Lakshmi)	Member	Lecturer in Mathematics AG & SG S Degree College.

Agenda of B.O.S Meeting:

1. To discuss and recommend the Syllabi, Model Question Papers and Guidelines to be followed by question paper setters in Statistics for 2nd Semester as per the guidelines and instructions under APSCHE prescribed by Krishna University from the Academic Year 2021-22.

2. Discussed and recommended the teaching and evaluation methods for approval of Academic Council

3. Any other matter.

Resolutions.

1. To introduce new Syllabi, Model Question Papers and Guidelines to be followed by the question paper setters in Statistics of 2nd Semester from the Academic year 2021-22.

2. To recommed the teaching and evaluation methods to be followed under Autonomous status.The maximum marks for IA is 25 and SE is 75. Each IA written examination is of 1 Hr. duration for 15 marks. The tests will be conducted centrally. The average of two such IA is calculated for 15 marks. 5 marks will be allotted basing on Assignment and 5 marks are allotted for activity. There is no minimum passing for IA and there is no provision for improvement in IA. Even though the candidate is absent for two IA exams/obtain zero marks the external marks are considered (if he/ she gets 40 out of 75) and the result shall be declared as 'PASS' from the Academic year 2021-22.

3. Discussed and recommended for organizing seminars, Guest lecturers, Online Examinations and Workshops to upgrade the knowledge of students for Competitive Examinations for the approval of the Academic Council.

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru, Krishna District

Department of Statistics

Programme Specific Outcomes (PSOs)

PSO1 : Apply the concepts, principles and methods of statistics to various fields of study

PSO2 : Understand the importance and value of statistical principles and convert a problem description into testable research hypotheses

PSO3 : Select appropriate statistical tools to investigate a research hypothesis.

PSO4 : Perform data analysis by apply appropriate statistical methodology and interpret result in a variety of settings

PSO5 : Compute statistical measures using software and programs.

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Course Code	**STAT21C**	Course Delivery Method	Class Room / Blended Mode - Both
Credits	4	CIA Marks	25
No. of Lecture Hours / Week	4	Semester End Exam Marks	75
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2021-22	Year of Offering:	Year of Revision: ----	Percentage of Revision: 0%

Title of the Course : Probability Distributions and Statistical Methods

Course Prerequisites: Students required basic knowledge in Calculus, Algebra and Probability.
Course Description: This course helps the students to familiarize students with the ways in which we talk about uncertainty and look at everyday situations in which probability arises. Also this course aims at providing basic knowledge about theoretical distribution models that can suit different phenomena of interest measured as variables in a continuum.

Course Objectives:

1) To enable the students to develop basic knowledge in theoretical Probability distributions
2) To provide understanding and applying standard continuous probability distribution to different situations.
3) To get the knowledge regarding qualitative factors
4) To understand the relation between quantitative factors
5) To make the estimated values using regression

Learning Outcomes: At the end of the course, the student will

1) Acumen to apply standard discrete probability distribution to different situations.
2) ability to handle transformed random variables and derive associated distributions.
3) The parameters describe an underlying physical setting in such a way that their value affects the distribution of the measured data.

S. No	Programme Outcomes

PO1.	**Effective Communication**: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology
PO2.	**Effective Citizenship**: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO3.	**Ethics:** Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO4.	**Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development
PO5.	**Critical Thinking**: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO6:	**Specialized Skills / Transferable Skills:** Acquisition of communication and soft, analytical and technological skills that aid in enhancing
PO7.	**Self-directed and Life-long Learning:** Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	**Programme Outcomes Mapping**
CO 1	Develop the basic knowledge in Probability distribution and uncertainty conditions we apply standard discrete probability distributions to identify the probability values.	PO - 5
CO 2	Obtained the knowledge of applications on standard continuous distributions. Also get the knowledge in respect of usage in day-to-day life.	PO - 5
CO3	Analyse the qualitative data	PO - 6
CO 4	Statistically analyze the strengths of relationship between variables.	PO - 7
CO 5	To outline the vital area of regression models applicable in a wide variety of real time situations	PO - 7

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Theoretical Probability Discrete Distributions** Rectangular, Binomial, Poisson, Negative Binomial, Geometric, Hyper Geometric distributions: Definitions, Means, Variances, M.G.F, C.G.F, P.G.F, additive property, limiting cases, memory less property if exists . Simple problems.	**12**

II	**Theoretical Probability Continuous Distributions** Rectangular, Normal, Exponential, Gamma, Beta Distributions: Definitions, Means, Variances, M.G.F, C.G.F, P.G.F, additive property, limiting cases, memory less property if exists . Simple problems.	**12**
III	**Theory of Attributes**: Notations, Dichotomy classification, class and class frequencies, order of classes and class frequencies. Ultimate class frequencies, relation between class frequencies. Consistency of data - Conditions for consistency of data for 2 and 3 attributes only. Independence of attributes- criterion of independence of two attributes. Association of attributes-Yule's coefficient of association and coefficient of colligation. Relationship between coefficient of association and colligation and simple problems.	**12**
IV	**Correlation**: Meaning, Types of Correlation, Measures of Correlation- Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation coefficient (with and without ties), Bi-variate frequency distribution, correlation coefficient for bi-variate data and simple problems. **Multiple and Partial Correlation-** Coefficients of multiple and partial correlations, properties of multiple and multiple correlation coefficients, coefficient of multiple determination. simple problems	**12**
V	**Curve fitting** Principle of least squares, fitting of straight line, fitting of second degree polynomial or parabola. Fitting of power curve and exponential curves. **Regression Analysis**: Introduction, Linear Regression- Regression coefficients, properties of regression coefficients, angle between two lines of regression. Standard error of estimate (residual variance), Explained and unexplained variation, coefficient of determination and simple problems	**12**

Text Book:

Fundamentals of Mathematical Statistics, 12th Edition, Sep 2020, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi

Reference Books:

1. B.A/B.Sc. Second Year Statistics(2010) , Telugu Akademi, Hyderabad.
2. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3. Probability and Statistics, Volume I & II, D. Biswas, New central book Agency (P) Ltd, NewDelhi.
4. An outline of Statistical theory, Volume II,3rd Edition,2010(with corrections) A.M.Goon,M.K. Gupta, B.Dasgupta ,The World Press Pvt.Ltd., Kolakota.
5. Sanjay Arora and Bansi Lal:. New Mathematical Statistics, Satya Prakashan , New Delhi.

Websites of Interest: **http://onlinestatbook.com/rvls/index.html**

Co-Curricular Activities in the class:

1. Pictionary
2. Case Studies on topics in field of statistics

3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples

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Model Question Paper Structure for SEE

Max.: 75 Marks **STAT21C** **Min.Pass : 30 Marks**

Model Paper

Section A

Answer any FIVE of the following **5 x 5M = 25M**

1. In Binomial distribution mean and variance are 4 and 3 respectively. Find mode of the distribution. (Co – 1, L - 1)
2. Show that in Poisson distribution mean and variance are equal. (Co – 1, L - 6)
3. Write the properties of normal distribution. (Co – 2, L - 4)
4. Obtain the mean and variance of Beta distribution of 2^{nd} kind. (Co – 2, L - 5)
5. Explain the types of correlation. (Co – 4, L - 2)
6. Define class and class frequency of an attribute with examples. (Co – 3, L - 1)
7. Write the properties of regression coefficients. (Co – 5, L - 4)
8. Explain the concept of rank correlation. (Co – 4, L - 2)

Section – B

Answer the following **5 x 10M =50M**

9. a) Define Binomial distribution and derive the recurrence relation for central moments. (Co – 1, L - 1)

(OR)

b) (i) A book contain 43 mistakes in 585 pages. Find the probability that there will be no mistake in randomly selected 10 pages of the book.

(ii) If a Poisson distribution such that $3P(x=1) = 2P(x=3)$. Find $P(2 \leq X \leq 5)$ (Co – 1, L - 1)

10. a) Show that mean, median and mode are equal in Normal distribution. (Co – 2, L - 6)

(OR)

b) In a distribution exactly normal, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution. (Co – 2, L - 6)

11. a) Write the criteria for independence of three attributes. Find all the remaining class frequencies for the following set of frequencies. N= 23713, (A) = 1618, (B) = 2015, (C) = 770, (AB) = 587, (AC) = 335, (BC) = 428, (ABC) = 158 (Co – 3, L - 1)

(OR)

b) The male population of a particular state is 250lakhs. The number of literate males is 20 lakhs and total number of male criminals is 26000. The number of literate male criminals is 2000. Do you find any association between literacy ad criminality. (Co – 3, L - 1)

12. a) State the Karl Pearson's correlation coefficient and prove that it has between -1 and +1. (Co – 4, L - 5)

(OR)

b) Obtain the rank correlation coefficient of marks of 12 students in statistics and computer science given below (Co – 4, L - 5)

X	58	64	65	55	44	80	65	75	40	55	64	55
Y	52	48	45	62	45	68	62	82	44	45	74	62

13. a) Derive the regression equation of y on x (Co – 5, L - 3)

(OR)

b) Fit the power curve of the type $y = ax^b$ to the following data (Co – 5, L - 3)

X	3	5	8	10	12	13
Y	17	41	94	139	191	220

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Title of the Course : Probability Distributions and Statistical Methods Lab

Offered to: B.SC (M.S.Cs.) **Course Code : STAP21C**

Course Type: Core (P) **Year of Introduction: 2021-2022**

Year of Revision: 2021-22 **Percentage of Revision: 0%**

Semester: II **Credits: 1**

Hours Taught: 30periods **Max.Time: 2** Hours

Course Prerequisites (if any): Nil

S. No	Programme Outcomes
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PO5.	**Critical Thinking**: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

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Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	**Programme Outcomes Mapping**
CO 1	To fit a data into various theoretical probability distributions.	PO – 5
CO 2	Apply and Analyze the qualitative data	PO – 6
CO3	Identify the relations between the variables and estimate.	PO - 7

List of Practicals

1. (a) Fitting of Binomial distribution (Direct Method). (CO – 1)
   (b) Fitting of Binomial distribution (Recurrence Method). (CO – 1)
2. (a) Fitting of Poisson distribution (Direct Method). (CO – 1)
   (b) Fitting of Poisson distribution (Recurrence Method). (CO – 1)
3. (a) Fitting of Normal distribution (Areas Method). (CO – 1)
   (b) Fitting of Normal distribution (Ordinates Method). (CO – 1)
4. (a) Computation of Yule's coefficient of association. (CO – 2)
   (b) Computation of Pearson's and Tcherprows coefficient of contingency (CO – 2)
5. (a) Computation of correlation coefficient for ungrouped data. (CO – 3)
   (b) Computation of correlation coefficient for grouped data. (CO – 3)
6. (a) Fitting of a straight line by the method of least squares. (CO – 3)
   (b) Fitting of a parabola by the method of least squares. (CO – 3)
7. (a) Fitting of power curve $y = ax^b$ by the method of least squares. (CO – 3)
   (b) Fitting of exponential curves $y = ae^{bx}$ & $y = ab^x$ by the method of least squares. (CO – 3)
8. (a) Construction of regression lines for the ungrouped data. (CO – 3)
   (b) Construction of regression lines for the grouped data. (CO – 3)

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Structure of Practical Paper

Total Marks: 50 Marks

(i) For Continuous Evaluation	**:**	**10 marks (Internal Evaluation)**
(ii) For semester end Practical Examination	**:**	**40 marks (External Evaluation)**