AKKINENI NAGESWARA RAO COLLEGE (AUTONOMOUS)GUDIVADA-521301

(Affiliated to Krishna University Machilipatnam)

Department of Statistics

R-23 (Regulation Syllabus)

AKKINENI NAGESWARA RAO COLLEGE:: GUDIVADA
(An Autonomous college under the jurisdiction of Krishna University, Machilipatnam)

I B.Sc. I-Semester STATISTICS Syllabus Paper: I	Paper Code: **23EAMPC1**	Admitted Batch: 2023-24	No. of Teaching Hours/week:5 No. of Credits : 4
Year of Introduction:2023-24	Year of Offering: 2023-24	Year of Revision: 2023-24	Percentage of Revision:100%
Course Delivery Method: Class Room/Blended Mode-Both	C.I.A:30 MARKS	S.E.E: 70 Marks	Total:100 MARKS

DEPARTMENT OF STATISTICS
PAPER-I:ESSENTIALS AND APPLICATIONS OF MATHEMATICAL,PHYSICAL AND CHEMICAL SCIENCES
UNIT-I :ESSENTIALS OF MATHEMATICS

Complex Numbers: Introduction of the new symbol–General form of a complex number-Modulus-Amplitudeform and conversions
Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of anglesVectors : Definition of vector addition – Cartesian form – Scalar and vector product and problems **Statistical Measures** : *Mean, Median, Mode of a data and problems*

UNIT II: ESSENTIALS OF PHYSICS
Definition and Scope of Physics-Measurements and Units - Motion of objects-Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclearparticles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY
Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry andsignificance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Bio-molecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY
Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex AnalysisApplication of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation,Environmental Monitoring and Sustainable Technologies. Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and DrugDiscovery, Materials Science, Food and Beverage Industry

UNIT V: ESSENTIALS OF COMPUTER SCIENCE

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP,Domain Name Services, applications. Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography- Symmetric & Asymmetric, Malware, Firewalls,Fraud Techniques-Privacy & Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna
Prakashan Media(P)Ltd.4.Basic Statistics by
B.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

DEPARTMENT OF STATISTICS

I B.Sc. II-Semester STATISTICS Syllabus Paper: III	Paper Code:23STA2A	Admitted Batch: 2023-24	No. of Teaching Hours/week:3+2 No. of Credits : 3+1
Year of Introduction:2023-24	Year of Offering: 2023-24	Year of Revision: 2023-24	Percentage of Revision:80%
Course Delivery Method: Class Room/Blended Mode-Both	C.I.A:30 MARKS	S.E.E: 70 Marks	Total:100 MARKS

PAPER-III: Descriptive Statistics (major)

Syllabus

Unit– 1:Statistical Description of Data

Origin, history and definitions of Statistics. Importance, Scope and limitations Statistics. Function of Statistics – Collection, Presentation, Analysis and Interpretation. Collection of data - primary and secondary data and its methods. Classification of data – Quantitative, Qualitative, Temporal, Spatial. Presentation of data – Textual, Tabular – essential parts.

Unit–2:

Measurement Scales –Nominal, Ordinal, Ratio and Interval. Frequency distribution and types of frequency distributions, forming a frequency distribution. Diagrammatic representation of data – Histogram, Bar, Multiple bar and Pie with simple problems. Graphical representation of data: Histogram, frequency polygon and Ogive's with simple problems.

Unit–3:Measures of Central Tendency(MCT)

Arithmetic Mean – properties, methods. Median, Mode, Geometric Mean (GM), Harmonic Mean (HM). Calculation of mean, median, mode, GM and HM for grouped and ungrouped data. Median and Mode through graph. Empirical relation between mean, media and mode. Features of good average.

Unit–4:Measures of Dispersion

Concept and problems – Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non – Central moments and their interrelationship. Sheppard's correction for moments. Skewness and its methods, kurtosis.

Unit–5:Elementary Probability

Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events and simple problems. Boole's inequality, Baye's theorem and its applications in real life problems.

SEMESTER-II
COURSE3: DESCRIPTIVE STATISTICS (Major)

<u>**Practical**</u>   Credits:1   <u>2 hrs/week</u>

1. Writing a Questionnaire in different situations.
2. Forming a grouped and ungrouped frequency distribution table.
3. Diagrammatic presentation of data–Bar, multiple Bar and Pie.
4. Graphical presentation of data–Histogram, frequency polygon, Ogive's.
5. Computation of measures of central tendency–Mean, Median and Mode.
6. Computation of measures of dispersion–Q.D. ,M.D and S.D.
7. Computation of non-central, central moments, β_1 and β_2 forungrouped data.
8. Computation of non-central,centralmoments,β_1 and β_2 and Sheppard's corrections forgrouped data.
9. Computation of Karl Pearson's and Bowley's Coefficients of Skewness.

References

1. S. C. Gupta & V. K. Kapoor:Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New

   Delhi.
   2. O.P.Gupta:Mathematical Statistics ,Kedarnath Ramnath &Co.
   3. P.N.Arora & S.Arora: Quantitative Aptitude Statistics–VolII, S.Chand & CompanyLtd.
   4. K.Rohatgi & Ehsanes Saleh: An Introduction to Probability and Statistics, John Wiley & Sons.

DEPARTMENT OF STATISTICS

I B.Sc. II-Semester STATISTICS Syllabus Paper: IV	Paper Code:23STA2B	Admitted Batch: 2023-24	No. of Teaching Hours/week:3+2 No. of Credits : 3+1
Year of Introduction:2023-24	Year of Offering: 2023-24	Year of Revision: 2023-24	Percentage of Revision:100%
Course Delivery Method: Class Room/Blended Mode-Both	C.I.A:30 MARKS	S.E.E: 70 Marks	Total:100 MARKS

Paper: IV: **Random Variables & Mathematical Expectations**

Syllabus

Unit– 1:Univariate Random Variables

Definition of random variable (r.v.), discrete and continuous random variables, functions of random variable. Probability mass function, Probability density function, Distribution function and its Properties. Calculation of moments, coefficient of skewness and kurtosis for a given pmf and pdf.

Unit– 2:Bivariate Random Variables

Bivariate random variable -meaning, joint, marginal and conditional Distributions, independence of random variables and simple problems.

Unit–3:Mathematical Expectation

Mathematical expectation of function a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Properties of expectations, variance, covariance. Chebyshev's and Cauchy - Schwartz inequalities and their applications

Unit–4: Generating functions

Definitions of Moment Generating Function, Cumulant Generating Function, Characteristic Function and Probability Generating Function and their properties. Weak Law of Large Numbers (WLLN), Strong Law of Large Numbers (SLLN).

Unit–5: Limit Theorems

Concept – Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Convergence in probability and convergence in distribution, concept of Central limit theorem. Lindberg – Levy CLT and its applications, Statement of Lyapunov's CLT, relationship between CLT and WLLN.

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SEMESTER-II
COURSE4:RANDOMVARIABLES AND MATHEMATICAL EXPECTATIONS

Practical	Credits:1	2 hrs/week

1. Calculation of moments of univariate random variable to the given pmf.
2. Calculationofcoefficientofskewnessandkurtosisofunivariaterandomvariabletothegiven pmf.
3. Calculation of moments of univariate random variable to the given pdf.
4. Calculationofcoefficientofskewnessandkurtosisofunivariaterandomvariabletothegiven pdf.
5. Problem related to jpmf, mpmf and conditional pmf and its independence.
6. Problem related to jpdf, mpdf and conditional pdf and its independence.
7. Chebyshev's inequality application oriented problems

References

1. S. C. Gupta & V. K. Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
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Paper-I: Descriptive Statistics (Minor)
Syllabuss

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