Certificate Course 2020-2021

CODE:MESACCC202020 & CODE:MESACCC202032

Report

Department of Mathematics & Statistics

Course name : KPSC STATISTICS&MATHEMATICS(STATISTICAL ASSISTANT GRADE II/STATISTICAL INVESTIGATOR GRADE II IN ECONOMICS AND STATISTICS (Category No. 39/2020)

No. of Students attended the class : 61

Class starting date : 20/12/2020

Class end date : 31/03/2021

Total hours : 30 hrs/shift

Name of coordinator : Keerthana S V (Department of Statistics)

Teachers handled the class : Fahadali P H , Sabeena P A(Department of Mathematics)

Certificate distribution date : 01/06/2021

(certificate distributed by Mathematics HOD Ms.Nasreen A)

Certificate Course 2020-2021 :: Syllabus

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PART II MATHEMATICS

Module I (4 marks) Calculus: Relations, functions, limits, continuity, differentiation, indefinite integral and definite integral, First order differential equations.

Module II (4 marks) Number theory and Algebra. Divisibility of numbers, prime factorisation, GCD, LCM, division algorithm, Euclidean algorithm, congruences- linear congruences, Euler's totient function, Little Fermat's theorem, Euclid's theorem - its applications. Polynomials, factorisation, roots, Groups- cyclic groups, permutation groups

Module III (4 marks) Linear Algebra Linear equations, matrices and determinants, vector space, linear dependence, linear independence, basis, dimension. Linear transformations, matrix of linear transformation, rank, nullity, characteristic equation, characteristic values, diagonalization.

Module IV (4 marks) Real Analysis: Properties of real numbers, countability, sequence of real numbers and its convergence, series of real numbers and ites convergence, Riemann integral, double integral and triple integral.

Module V (4 marks) Complex Analysis Complex Numbers, Analytic functions, power series, line integral, Cauchy's integral formula, Cauchy's theorem, singularities, Laurent series, harmonic function.

PART III STATISTICS

1. Descriptive Statistics: Measures of central tendency, Absolute and relative measures of dispersion, Skewness, Kurtosis, Principle of least squares and fitting of curves, Correlation and Regression, Partial and Multiple correlation. (Marks: 2)

2. Probability theory: Definitions, Addition theorem, Multiplication theorem, Conditional probability and Bayes' theorem. Theorem of total probability – Random variables, expectation, moments, generating functions -sequences of random variables and independence of random variables. Law of large numbers, Central limit theorem and its applications. (Marks: 4)

3. Distribution Theory: (i) Discrete distributions – Binomial, Poisson, Geometric, Negative binomial, Hyper-geometric and Multinomial distributions; (ii) Continuous distributions-Uniform, Exponential, Gamma, Beta, Normal, Log-normal, Logistic, Weibull, Pareto and bivariate normal distributions; (iii) Sampling distributions: Student's t, F and Chi-square distributions. (Marks: 4)

4. (i) Estimation: Basic properties of estimators, concepts of sufficiency, UMVUE and completeness, Methods of estimation. (ii) Tests of Hypotheses – Two types of errors ,

significance level, size and power of a test, Tests based on normal, t, Chi-square and F distributions. (Marks: 2)

5. Sampling Theory: Various methods of sampling – Simple random sampling, Stratified random sampling, systematic sampling, PPS Sampling, cluster sampling, adaptive sampling, Ratio and Regression methods of estimation. (Marks: 2)

6. Design of Experiments: Basic properties of experimentation, ANOVA, CRD, RBD, LSD, Factorial designs, BIBD, Split-plot designs. (Marks: 2)

7. (i) Vital Statistics: Rates and ratios of vital events, Mortality and fertility, Measurement of mortality and fertility, Central mortality rate. (ii) Time series analysis: Economic time series and its different components, Additive and multiplicative models, Determination of trend, Construction of seasonal indices. (Marks: 2)

8. (i) Economic statistics; Index numbers, its definitions, applications, price relatives, link and chain relatives. Use of averages: Simple aggregative and weighted average methods, Laspeyre's, Paasche's and Fisher index numbers, Time and factor reversal test of index numbers. (ii) Official statistics: Introduction to Indian Statistical systems, CSO, NSSO, Census, National income statistics, Methods of national income estimation. (Marks: 2