SYBA
SEMESTER -III

Subject: Statistics Practical (Special-II)
ST-23863: PRACTICALS

Pre-requisites: Knowledge of the topics in theory.

Objectives:

1. To fit various discrete and continuous probability distributions and to study various real life situations (Using calculators and $Ms - EXCEL$).
2. To identify the appropriate probability model, that can be used.
3. To use forecasting and data analysis techniques in case of univariate and multivariate data sets.
4. To use statistical software packages.
5. To test the hypotheses particularly about mean, variance, correlation, proportions, goodness of fit.
6. To study applications of statistics in the field of economics, demography etc.

Notes:

1. Students must complete all the practicals to the satisfaction of the teacher concerned.
2. Students must produce the laboratory journal along with the completion certificate signed by the Head of the Department at the time of practical examination
3. Use of computer software whenever possible to be encouraged.

Preparation by Internal Examiner for Section I (Online examination) :

1) Keep at least 15 computers with latest configuration ready with battery backup and necessary software at the examination laboratory.
2) Trivariate and bivariate data set of 10 to 20 items be fed in computer MSEXCEL spreadsheet (Trivariate data set for multiple regression plane) before the commencement of examination. Appropriate data set for time series: linear, quadratic, exponential trend fitting, exponential smoothings be entered in spreadsheet.
3) Any other type of data required for time to time also be entered in computer spreadsheet.

Instructions to Examiners:

1) Students are not expected to fill data items at the time of examination. They are expected to use MSEXCEL commands to operate on data set which are already fed.
2) The question on section I are compulsory and there is no internal option.
3) The commands of the nature attached in specimen are to be asked, so that the total marks of all asked commands will be exactly 20.

Sr. No.	Title of the Practical	No. of Practicals
1	Fitting of negative binomial distribution and computation of expected frequencies.	1
2	Fitting of normal distribution and computation of expected frequencies.	1
3	Applications of negative binomial and multinomial distributions.	1
4	Applications of exponential and normal distributions.	1
5	Model sampling from normal distribution using i) distribution function, ii) Box-Muller transformation.	1
6	Estimation of trend by moving averages.	1
7	Estimation and forecasting of trend by exponential smoothing, curve fitting (Linear and second degree), plotting of residuals.	1
8	Fitting of AR (1) model	1
9	Estimation of seasonal indices by simple averages and ratio to trend using moving averages	1
10	Estimation of seasonal indices by ratio to linear trend by least square method	1
11	Stratified sampling I and II	2
12	Fitting of negative binomial distribution & probability curve using $Ms-EXCEL$.	1
13	Fitting of normal distribution & normal probability curve using $Ms-EXCEL$.	1
14	Exponential smoothing using $Ms-EXCEL$.	1
15	**Project**: Project based on analysis of data collected by students in groups of maximum **6** students. (Project is equivalent to five practical's)	5

SYBA
SEMESTER -IV

Subject: Statistics Practical (Special-II)
ST-23864: PRACTICALS

Pre-requisites: Knowledge of the topics in theory.

Objectives:

1. To test various hypotheses of significance like averages, population proportions, independence of attributes, variance etc. included in theory (using calculators, *R* software).
2. To study statistical tools for quality control management through control charts.
3. To compute probabilities of discrete and continuous probability distributions using R software.
4. To use *R* software for finding basic summary statistics.

Notes:

1. Students must complete all the practicals to the satisfaction of the teacher concerned.
2. Students must produce the laboratory journal along with the completion certificate signed by the Head of the Department at the time of practical examination
3. Use of computer software whenever possible to be encouraged.

Preparation by Internal Examiner for Section I (Online examination):

1) Keep at least 15 computers with latest configuration ready with battery backup and necessary software at the examination laboratory.
2) Any other type of data required for time to time also be entered in computer spreadsheet.

Instructions to Examiners:

1) Students are not expected to fill data items at the time of examination. They are expected to use R commands to operate on data set which are already fed.
2) The question on section I are compulsory and there is no internal option.
3) The commands of the nature attached in specimen are to be asked, so that the total marks of all asked commands will be exactly 20.

Sr. No.	Title of the Practical	No. of Practicals
1	Test for proportions and construction of confidence interval	1
2	Test for means and construction of confidence interval i) $H_0: \mu = \mu_0$, σ^2 known and σ^2 unknown ii) $H_0: \mu_1 = \mu_2$, σ_1^2 and σ_2^2 both known iii) $H_0: \mu_1 = \mu_2$, $\sigma_1^2 = \sigma_2^2 = \sigma^2$ unknown iv) $H_0: \mu_1 = \mu_2$(paired t-test)	2
3	Tests based on χ^2 distribution i) Goodness of fit ii) Independence of attributes (2 × 2, r ×s contingency table) iii) Mc Nemar's test$H_0: \sigma^2 = \sigma_0^2$, μ unknown, confidence interval for σ^2	2
4	Tests based on F distribution $H_0: \sigma_1^2 = \sigma_2^2$ for i) means known ii) means unknown	1
5	Control charts for variables ($\overline{X}$ and R chart)	2
6	Control charts for attributes (p-chart) with sample size fixed and sample size variable.	2
7	Control charts for attributes (c-chart)	1
8	Use of basic R software commands c( ), scan( ), rep( ), seq( ), min, max, sort, extract, data.frame, matrix, accessing resident data sets etc.	1
9	Finding summary statistics using summary ( ) and fivenum( ). Calculate arithmetic mean (AM), geometric mean (GM), harmonic mean (HM), median, mode, quantiles, range, quartile deviation (QD), variance, coefficient of variation (CV) using R software.	1
10	Computation of probabilities of negative binomial, multinomial, normal, exponential, gamma, t, χ^2, F using R software	1
11	Tests based on proportions, means, χ^2 distribution, F distribution using R software.	1
12	**Project**: Project based on analysis of data collected by students in groups of maximum **6** students. (Project is equivalent to five practical's)	5