PART B:

STATISTICS COMPLEMENTARY ELECTIVE COURSES

[FOR BSc GEOGRAPHY / PSYCHOLOGY PROGRAMMES]

WORK AND CREDIT DISTRIBUTION

(2019 ADMISSION ONWARDS)

COURSE CODE	COURSE TITLE	SEMESTER	HOURS PER WEEK	CREDIT	EXAM HOURS	MARKS		
						CE	ESE	TOTAL
1C01 STA (G&P)	DESCRIPTIVE STATISTICS	I	4	3	3	10	40	50
2C02 STA (G&P)	STATISTICAL METHODS	II	4	3	3	10	40	50
3C03 STA (G&P)	PROBABILITY AND DISTRIBUTION THEORY	III	5	3	3	10	40	50
4C04 STA (G&P)	INFERENTIAL STATISTICS	IV	5	3	3	10	40	50

EVALUATION

ASSESSMENT	WEIGHTAGE
EXTERNAL	4
INTERNAL	1

INTERNAL ASSESSMENT

COMPONENT	WEIGHTAGE	REMARKS
COMPONENT 1 TEST PAPER	**3**	For each theory course there shall be a minimum of 3 written tests and the average mark of the best two tests is to be considered for internal mark. Each test paper may have duration of minimum one hour.
COMPONENT 2 ASSIGNMENT/ SEMINAR/VIVA	**1**	For each theory course each student is required to submit two assignments or to present a seminar or to attend a viva-voce. Assignments /seminar / viva-voce shall be evaluated on the basis of student performance.

COMPLEMENTARY ELECTIVE COURSE I -: DESCRIPTIVE STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
1	1C01 STA(G&P)	4	3	3

COURSE OUTCOME
Student should be able to
CO1: understand the elementary concept in statistics.
CO2: compute various measures of central tendency
CO3: compute various measures of dispersion
CO4: acquire knowledge in sampling theory.

Unit I: Data Presentation: Collection of data, primary and secondary data; Numerical presentation – raw data, discrete frequency distribution and continuous frequency distribution; Diagrammatic representation of data- line diagram, bar diagram, sub divided bar diagram, histogram, frequency curve, frequency polygon and Pie diagram

(20 Hrs)

Unit II: Measures of central tendency: Basic concepts, various measures –mean, median, mode, geometric mean, harmonic mean, weighted mean, quartiles and simple numerical problems.

(16 Hrs)

Unit III: Measures of dispersion and moments- Absolute and relative measures of dispersion, range, mean deviation quartile deviation, standard deviation, coefficient of variation, Moments- Raw moments, central moments (Definition only); Skewness and Kurtosis-Definition and various measures with simple numerical problems.

(20 Hrs)

Unit IV: Elementary sampling procedures: Concept of population, sample, census and sample surveys, advantages of sampling and limitations; Sampling methods - sampling unit, sampling frame, sampling and non-sampling errors, probability sampling and judgment sampling, basic concepts of simple random sampling, systematic and stratified sampling, situations where they are used.

(16 Hrs)

Books for Study:

1. S.P Gupta: Statistical Methods, Sultan Chand and Sons
2. S.C Gupta and V.K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand and Sons

Books for Reference:

1. Rogger Till: Statistical methods for the earth scientists- An Introduction: Mc Millan.
2. John Silk: Statistical concepts in Geography, George Allan and Unwin
3. Prem S Mann : Introductory Statistics 5th Edition, Wiley

Marks including choice:

Unit	Unit I	Unit II	Unit III	Unit IV	Total
Marks	15	15	15	15	60

About the Pattern of Questions:

Part A - **Short answer** (6 questions x Mark 1 = 6)

- **Answer all questions** (*6 questions x Mark 1 = 6*)

Part B - **Short Essay** (8 questions x Marks 2 each =16)

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

Part C - Essay (6 questions x Marks 3 each =18)

- ***Answer any 4 questions*** *(4 questions x Marks 3 each=12)*

Part D - **Long Essay** (4 questions x Marks 5 each =20)

- ***Answer any 2 questions*** *(2 questions x Marks 5 each=10)*
- **Total marks including choice -60**
- ***Maximum marks of the course- 40***

COMPLEMENTARY ELECTIVE COURSE II: STATISTICAL METHODS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2C02STA (G&P)	4	3	3

COURSE OUTCOME

Student should be able to

CO1: analyze the relation between two real life data.
CO2: compute various index numbers and understand their importance in real life.
CO3: acquire knowledge in time series data.
CO4: compute mortality, fertility and infant mortality rate.

Unit I: Correlation analysis - concept of correlation, method of studying correlation, scatter diagram, Karl Pearson correlation coefficient, Spearman rank correlation coefficient (with and without ties)

(22 Hrs)

Unit II: Regression analysis - Fitting of curves of the form linear, linear regression, regression equations (concept only), relation between correlation and regression coefficients.

(20 Hrs)

Unit III: Index numbers and Time Series - Meaning and use of index numbers, simple and weighted index numbers, Laspeyer's, Paache's and Fisher's index numbers, Test for good index number, cost of living index number.

Definition and use of time series, Components of time series, measurement of secular trend semi average, moving average and least square method (linear function only)

(20 Hrs)

Unit IV: Vital Statistics - Sources of vital statistics, rates and ratios, various measures of mortality and fertility-CDR, SDR, infant mortality rate, CBR, SBR, TFR, GRR, NRR age specific birth rate

(10 Hrs)

Books for Study:

1. S.P Gupta: Statistical Methods, Sultan Chand and Sons
2. S.C Gupta and V.K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand and Sons

Books for Reference:

1. Rogger Till: Statistical methods for the earth scientists- An Introduction: Mc Millan.

2. John Silk: Statistical concepts in Geography, George Allan and Unwin
3. Prem S Mann : Introductory Statistics 5th Edition, Wiley

Marks including choice:

Unit	Unit I	Unit II	Unit III	Unit IV	Total
Marks	15	15	20	10	60

About the Pattern of Questions:

Part A - **Short answer** (6 questions x Mark 1 = 6)

- **Answer all questions** (*6 questions x Mark 1 = 6*)

Part B - **Short Essay** (8 questions x Marks 2 each =16)

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

Part C - Essay (6 questions x Marks 3 each =18)

- ***Answer any 4 questions*** *(4 questions x Marks 3 each=12)*

Part D - **Long Essay** (4 questions x Marks 5 each =20)

- ***Answer any 2 questions*** *(2 questions x Marks 5 each=10)*
- **Total marks including choice -60**
- ***Maximum marks of the course- 40***

COMPLEMENTARY ELECTIVE COURSE III: PROBABILITY AND DISTRIBUTION THEORY

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3C 03 STA (G&P)	5	3	3

COURSE OUTCOME

Students should be able to

CO1: evaluate the probability of events

CO2: understand the concept of random variable with examples in real life.

CO3: familiarize with different discrete probability distributions

CO4: understand the characteristics of different continuous distribution.

Unit I : Probability theory - Random experiment, Sample space, events, classical definition, frequency and axiomatic approaches to probability, Addition theorem, conditional probability, multiplication theorem, independence of events, Baye's theorem and its practical applications.

(25 Hrs)

Unit II: Random Variable and Probability distribution: Random variable - discrete and continuous types, probability mass function, probability density function, distribution function, mathematical expectation. Simple problems on discrete case only.

(20 Hrs)

Unit III: Standard discrete and continuous theoretical distributions: Binomial and Poisson distributions – different characteristics and fitting of binomial and Poisson distributions, Features and properties of Normal distribution and Exponential distributions**.**

(25 Hrs)

Unit IV: Sampling distributions: Statistic, standard error, distribution of sample mean, chi square, student's t and F-distributions-definition, mean and variance (Without derivation), interrelation between them. (Statement only)

(20Hrs)

Books for Study:

1. S.P Gupta: Statistical Methods, Sultan Chand and Sons

Books for Reference:

1. John E Freund, Roanld E Walpole: *Mathematical Statistics* 4th Edition, Prentice HallIndia Pvt Ltd.

2. David Ebdon, Basil Blackwell: *Statistics in Geography*-A practical approach, Oxford.
3. Murrau R Spiegel: *Theory and problems of statistics*, Schaums Outline series

Marks including choice:

Unit	Unit I	Unit II	Unit III	Unit IV	Total
Marks	15	15	20	10	60

About the Pattern of Questions:

Part A - **Short answer** (6 questions x Mark 1 = 6)

- **Answer all questions** (*6 questions x Mark 1 = 6*)

Part B - **Short Essay** (8 questions x Marks 2 each =16)

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

Part C - Essay (6 questions x Marks 3 each =18)

- ***Answer any 4 questions*** *(4 questions x Marks 3 each=12)*

Part D - **Long Essay** (4 questions x Marks 5 each =20)

- ***Answer any 2 questions*** *(2 questions x Marks 5 each=10)*
- **Total marks including choice -60**
- ***Maximum marks of the course- 40***

COMPLEMENTARY ELECTIVE COURSE IV: INFERENTIAL STATISTICS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4C04 STA (G&P)	5	3	3

COURSE OUTCOME
Student should be able to
CO1: estimate the parameters
CO2: understand the concept of statistical hypotheses.
CO3: apply parametric and nonparametric tests.
CO4: apply ANOVA

Unit I: Estimation theory: Parameter, statistic, estimator, estimate, point estimation- desirable properties of a good Estimator- unbiasedness, consistency, sufficiency and efficiency (definition only); Interval estimation: Definition, Confidence interval for mean, proportion, difference of means and difference of proportions.

(25 Hrs)

Unit II : Testing of hypotheses: Null and alternative hypotheses, simple and composite hypotheses, two types of errors; size and power of a test, most powerful test.

(20 Hrs)

Unit III: Large and small sample tests: Definition, Test for mean, proportion and variance, difference of means and proportions, chi square test for goodness of fit and independence of attributes, F-test, Non parametric test: Mann - Whiteney U test.

(25 Hrs)

Unit IV: Analysis of variance: One way and two way classification, linear hypothesis, total, between and within sum of squares, ANOVA table, solution of problems using ANOVA tables. Kruskal -Wallis test.

(20 Hrs)

NOTE: Numerical computations involved in Assignments submitted may preferably be done using any computer packages.

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Books for Reference:

1. John Silk: Statistical concepts in Geography, George Allan and Unwin
2. Prem S Mann : Introductory Statistics 5th Edition, Wiley

Marks including choice:

Unit	Unit I	Unit II	Unit III	Unit IV	Total
Marks	18	15	17	10	60

About the Pattern of Questions:

Part A - **Short answer** (6 questions x Mark 1 = 6)

- **Answer all questions** (*6 questions x Mark 1 = 6*)

Part B - **Short Essay** (8 questions x Marks 2 each =16)

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

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Part D - **Long Essay** (4 questions x Marks 5 each =20)

- ***Answer any 2 questions*** *(2 questions x Marks 5 each=10)*

- **Total marks including choice -60**
- ***Maximum marks of the course- 40***