PONDICHERRY UNIVERSITY
DEPARTMENT OF STATISTICS

POST GRADUATE DIPLOMA IN STATISTICAL AND RESEARCH METHODS
(SEMESTER PATTERN)

Effective from 2012-2013 (onwards)
PONDICHERRY UNIVERSITY
POST GRADUATE DIPLOMA IN STATISTICAL AND RESEARCH METHODS
(SEMESTER PATTERN)

REGULATION & SYLLABUS

The syllabus shall be effective from the academic year 2012-2013 onwards.

AIM OF THE COURSE:

The P.G. Diploma in Statistical and Research Methods aims to train the students both in the theoretical development and in the real life applications of modern statistical methodology. It will provide a platform for getting exposed to real life data and their statistical analysis.

ELIGIBILITY FOR ADMISSION:

Candidates for admission to the above P.G. Diploma shall be required to have U.G./P.G. degree of Pondicherry University or any other University equivalent thereto with a minimum of 45% of marks in the qualifying examination. For SC/ST/PH a mere pass in the qualifying examination will be sufficient. Candidates studying in the fourth year/ fifth year of the Five year integrated programme are also eligible.

DURATION OF THE COURSE:

The duration of the P.G. Diploma course shall be one academic year of two semesters.

MEDIUM OF INSTRUCTION:

The medium of instruction is English.

ATTENDANCE:

A candidate shall be permitted to appear for the examination in a subject of study only if He/She secures not less than 70% of attendance in the subject concerned.

SCHEME OF EXAMINATION:

All the theory and practical examinations will be of three hours duration. The maximum marks for each subject shall be 100. The weightage of marks for internal assessment and end semester examinations shall be 20 and 80 respectively. Passing minimum for theory and practical examinations should be 40 (internal assessment and end semester marks put together). A candidate who does not pass the examination in any subject(s) shall be permitted to appear in such failed subject(s) in the subsequent semester examinations.

The maximum duration for passing the entire course is two years.
The 20 marks of internal assessment component shall consist of the following:

(a) Written test (2 class tests) = 15 marks

(b) Written assignments = 5 marks

TOTAL = 20 marks

CLASSIFICATION OF SUCCESSFUL CANDIDATE:

1. Candidates who pass all the examinations in the first appearance and secure an aggregate of 75% or above of the total marks in the University examinations shall be declared to have passed the examination for the diploma with Distinction.

2. Candidates who pass all the examinations and secure an aggregate of 60% or above but less than 75% of the total marks in the University examinations shall be declared to have passed the examination for the diploma in First Class.

3. Candidates who pass all the examinations and secure an aggregate of 50% or above but less than 60% of the total marks in the University examinations shall be declared to have passed the examination for the diploma in Second Class.

4. Candidates who pass all the examinations and secure an aggregate of 40% or above but less than 50% of the total marks in the University examinations shall be declared to have passed the examination for the diploma in Third Class.

REVISION OF REGULATIONS AND CURRICULUM:

The University may from time to time revise, amend and change the Regulations and Curriculum, if found necessary.
PONDICHERRY UNIVERSITY
DEPARTMENT OF STATISTICS
POST GRADUATE DIPLOMA IN STATISTICAL AND RESEARCH METHODS
(Effective from the Academic Year 2012 – 2013)

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subjects</th>
<th>Credits</th>
<th>Internal Marks</th>
<th>End Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGDS611</td>
<td>RESEARCH METHODOLOGY</td>
<td>2</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>PGDS612</td>
<td>BASIC STATISTICS</td>
<td>3</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>PGDS613</td>
<td>PROBABILITY AND DISTRIBUTIONS</td>
<td>3</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>PGDS614</td>
<td>PRACTICAL-I</td>
<td>3</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGDS621</td>
<td>STATISTICAL INFERENCE</td>
<td>3</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>PGDS622</td>
<td>APPLIED STATISTICS</td>
<td>3</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>PGDS623</td>
<td>PRACTICAL-II</td>
<td>3</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SEMESTER I
PGDS611 – RESEARCH METHODOLOGY

UNIT 1

UNIT 2

UNIT 3
Logic and scientific Method – Deductive and Inductive Methods – The Case Study Method – Merits and Demerits of Case Study Methods – Survey Methods - Merits and Demerits of Survey Methods – Types of survey – Selecting the Survey Method – Sample surveys – Different Types – Merits and Demerits

UNIT 4
Schedule and Questionnaire – Principle underlying the Construction of Questionnaire – measurement and scaling Techniques – Processing and Analysis of Data

UNIT 5
Interpretation and report writing – Steps – Bibliography – Qualities of a good Research Report

Books for Study:

SEMESTER I
PGDS612 - BASIC STATISTICS

UNIT 1

UNIT 2
Construction of Frequency distribution – Graphical representation of data – Histogram, frequency curves and ogives - Measures of central tendency: Mean, median and mode and their properties

UNIT 3
Measures of dispersion: Range, Quartile deviation, Mean deviation, Standard deviation and their properties – Coefficient of variation – Skewness and Kurtosis – Pearson’s and Bowley’s coefficients of skewness

UNIT 4
Simple correlation – Karl Pearson’s coefficient of correlation – Rank correlation – Regression – lines of regression – Properties of regression coefficients

UNIT 5
Curve fitting – Principle of least squares – Fitting of Straight line and Second degree models - Measures of association

Books for Study:

Books for Reference:
SEMESTER I
PGDS613 - PROBABILITY AND DISTRIBUTIONS

UNIT 1
Introduction to probability theory – Random experiments - Events - Sample space – Classical and Axiomatic approach to probability – Addition theorem - Conditional Probability – Independence of events – Multiplication theorem – Bayes theorem - Simple problems

UNIT 2

UNIT 3
Discrete Distributions – Bernoulli, Binomial, Poisson, Geometric distributions and their characteristic properties - Simple problems

UNIT 4
Continuous distributions - Uniform, Normal, Exponential distributions and their characteristic properties - Simple problems

UNIT 5
Definition of sampling distributions and standard error - t, F and chi-square distributions - their uses and properties (Proofs not required)

Books for Study:


Books for Reference:

SEMESTER I
PGDS614 – PRACTICAL I

1. Construction of Simple and Multiple Bar Diagrams
2. Construction of percentage Bar diagram and Pie Diagram
3. Preparation of Univariate Frequency and Percentage Tables (Discrete and Continuous cases)
4. Preparation of Bivariate Frequency Tables for Discrete variables
5. Computation of discrete statistics namely Mean, Median and mode
6. Computation of Mean deviation, standard deviation and coefficient of variation
7. Computation of Karl Pearson’s and Bowley’s coefficient of Skewness
8. Computation of Karl – Pearson’s Coefficient of Correlation
9. Computation of Spearman’s Rank Correlation Coefficient
10. Fitting of regression lines
11. Fitting of straight line by the method of least squares
12. Fitting of a Parabola by the method of least squares
(Description of the methodology and their application alone is to be emphasized)

UNIT 1

UNIT 2
Statistical Hypothesis testing – Simple and composite hypothesis, Null and Alternative Hypothesis – Types of errors – Critical region – Level of significance – Power of a test – Most powerful test – simple problems for calculating probability of Type I and Type II errors and power of the test

UNIT 3
Tests of significance (Large samples): Test for single mean and proportion, Test for equality of means and proportions (two populations) - Chi-square test for independence of attributes

UNIT 4
Test of significance (small samples): Test for single mean, Test for equality of means and variances (two populations) – Paired t-test

UNIT 5
Non-parametric methods: Sign test – Wilcoxon Signed rank test - Mann Whitney U test - Median test – Test for randomness (Run test) – Kruskal Wallis test – Friedman test

Books For Study:

Books for Reference:
2. Mukhopadhayay, P.(2006); Mathematical Statistics, Books and Allies(P) ltd, Kolkata
SEMESTER II
PGDS622 – APPLIED STATISTICS

UNIT 1
Census and sample surveys – Advantages and disadvantages – Principal steps in a sample survey – Sampling and non-sampling errors - Large scale sample surveys - Sources of Non sampling errors and methods of controlling them - NSSO and CSO and their functions.

UNIT 2
Probability Sampling Methods: Simple Random Sampling with and without replacement techniques - Methodology, comparison, Merits - Stratified Random Sampling – Concept of Proportional and Optimal allocations - Systematic Sampling - Cluster sampling - Two stage and Multi stage sampling methods – Non-probability sampling methods: Quota Sampling – Purposive Sampling

UNIT 3
Time series: Components of a time series – Additive and Multiplicative models – Decomposition of the components of a time series: Evaluation of trend by least square method and moving average methods - Seasonal indices – Method of Simple average - Ratio to moving average – Ratio to trend method

UNIT 4
Index numbers: Definition and uses – Main steps in the construction of index numbers – Weighted Index Numbers: Laspeyre’s, Paasche’s, Fisher’s, Marshall – Edgeworth index numbers - Time and Factor Reversal Test - Fixed and Chain base index numbers – Construction and uses of cost of living index numbers.

UNIT 5
Basic Principles of Experimentation: Replication, Randomization and Local control - Analysis of variance: One way and Two way classification

Books for Study:

Books for Reference :
1. Test for Single and Difference of Means for large samples
2. Test for Single and Difference of Proportions
3. Testing the significance of single mean and equality of means of two population (small samples)
4. Test for significance of difference between two population Means for paired samples using $t$-Test
5. Testing the significance of Correlation coefficient
6. Testing the equality of two population variances for small samples using F-test
7. Test the Goodness of Fit and testing the independence of attributes
9. Analysis of Variance : One way classification
10. Estimation of trend by the method of least squares and moving average
11. Estimation of Seasonal variations using Simple averages and Ratio to trend methods
12. Computations of Weighted index numbers using Laspeyer, Pasche’s, Fisher and Marshall-Edge worth methods
13. Computation of Cost of Living Index Number