UNIVERSITY OF MUMBAI

The revised and modified syllabus

POST-GRADUATE DIPLOMA IN
APPLIED STATISTICS WITH
SOFTWARE

Department of Statistics

(w.e.f. 2012-13)
The revised and modified syllabus of

POST-GRADUATE DIPLOMA IN APPLIED STATISTICS WITH SOFTWARE

Scheme of Examination:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Title</th>
<th>Internal</th>
<th>External</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper I</td>
<td>Basic Statistics</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Paper II</td>
<td>Marketing Research</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Paper III</td>
<td>Regression and Linear Model</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Paper IV</td>
<td>Decision Making and Forecasting</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Paper V</td>
<td>Six sigma &amp; Statistical Process Control</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Paper VI</td>
<td>Medical Statistics</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Paper VII</td>
<td>Multivariate Techniques</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Paper VIII</td>
<td>Communication Skills, Accounting &amp; Project</td>
<td>100</td>
<td>---</td>
<td>100</td>
</tr>
</tbody>
</table>

First term will consist of first four papers & Second term will consist of next four papers.

PAPER I: BASIC STATISTICS

1. Exploratory Data Analysis
2. Concepts of Probability
Probability generating function, moment generating function, cumulate generating function and cumulant.

Basic discrete and continuous distributions.

Concepts of independence, jointly distributed random variables and conditional distributions, use of generating functions.

Central limit theorem and its application

Concepts of random sampling, statistical inference and sampling distribution.

Methods of estimation and properties of estimators.

Confidence intervals for unknown parameters.

Testing of hypothesis

Concepts of conditional expectation and compound distribution

Simulation

Reference Books:

PAPER II: MARKETING RESEARCH

1. Definition of marketing research and market research, need for marketing research, requirement of good marketing research, manager researcher relationship, competitive and complex nature of Indian markets, role of research in new product development, packaging, branding, positioning, distribution and pricing, ethics in Business Research.

2. Steps in marketing Research.

3. Techniques for identifying management problem and research problem.

4. Meaning & types of research designs-exploratory, descriptive and casual.

5. Exploratory research designs, Sampling & data collection methods

6. Causal research designs: Data collection methods

7. Descriptive research design: Sampling methods, Types of scales, questionnaire design

8. Preparations research proposal

9. Objectives and data needs for consumer research.

10. Objectives and data needs for product research.

11. Objectives and data needs for pricing research

12. Objectives and data needs for advertising research.

13. Consumer segmentation techniques: Chi-square test of independence, Cluster analysis

14. Customer discriminating technique: Discriminant analysis

15. Product positioning techniques: Snake chart, Benefit structure analysis, Multi-dimensional scaling technique, Factor analysis

16. **CHi-squared Automatic Interaction Detector (CHAID)**

17. New product development technique: Conjoint analysis
18. Report writing

Reference Books:


   An applied orientation and SPSS 14.0 student CD.


   Marketing Research: Text & Cases


PAPER III: REGRESSION AND LINEAR MODEL

1. Simple linear regression

2. Multiple linear regression

3. Regression diagnostics

4. Transformation of variable

5. Qualitative Variables as predictors

6. Analysis of collinear data

7. Logistic regression

8. Stepwise regression

9. ONE WAY ANOVA

10. TWO WAY ANOVA
11. Multiway ANOVA and Nested Analysis
12. Comparison of individual means
13. Analysis of covariance
14. One Way Random effect model
15. Two way Mixed Model

Reference Books:


PAPER IV: DECISION MAKING AND FORECASTING


3. Quantitative Tools of Decision Making: Decision Tree, Break-even analysis, Investment appraisal, Critical Path Analysis

4. Qualitative Tools of Decision Making: Qualitative Factors Influencing Decision Making, SWOT Analysis, PESTEL Analysis, Six Thinking Hats Technique, Human Mindset Affecting Implementation of Decision


8. Inventory management and introduction, inventory control, costs in inventory problems, Techniques of Inv. Control and with selective control (ABC analysis, Usage rate and criticality)

9. Techniques of inv. Control and with known demand and E.O.Q with uniform demand, prod. Runs of unequal length, with finite rate of replenishment, Problem of E.O.Q with shortage

10. Techniques inv. Control and with uncertain demand and buffer stock computation, stochastic problems and uniform demand.

11. Techniques inv. Control and with price discounts

12. Break even analysis, Marginal Costing

Reference Books:

3. Spyros G Makridakis Steyan C. Wheelwright Rob J. Hyndman: Forecasting: Methods & Applications

PAPER V: SIX SIGMA AND STATISTICAL PROCESS CONTROL.

1  7 QC tools, 7 New QC tools
2  Control Charts for variables
3  Six sigma, Lean Sigma
4  Process and measurement system capability analysis
5  Factorial and Fractional factorial experiments for process design and improvement
6  Response surface methods and designs
7  Taguchi techniques
8  Japanese System
9  ISO 9000
10 Project Planning
11 Statistics in software development process

Reference Books:


**PAPER VI: MEDICAL STATISTICS**

1. Phase I, II and III Clinical Trials
2. Randomization
3. Blinding and Placebos
4. Sample size calculation
6. Comparing more than two treatments.
7. Causality, Non-compliance and Intent-to-treat
8. Survival analysis in Phase III clinical trials
9. Early stopping of clinical trials
10. Multiplicity and interim analysis
11. Parallel and Crossover designs
12. Binary Response data, Categorical Data Analysis
14. Meta analysis
15. Repeated measures analysis

Reference Books:

5. Dr. Fieller Nick(2007): Medical Statistics: Clinical Trials

    (Lecture Notes)
PAPER VII: MULTIVARIATE TECHNIQUES

1. The organization of Data
2. Applications of Multivariate Techniques.
3. Data Display and Pictorial Representation.
4. Assessing the Assumption on Normality
5. Detecting Outliers and Data Cleaning
6. Transformations to Near Normality
7. Hotelling’s $T^2$ and Likelihood Ratio Tests
9. Large Sample Inferences about a Population Mean Vector
10. The Classical Linear Regression Model.
11. Graphing the Principal Components
12. Large Sample Inferences
13. The Orthogonal Factor Model
14. Methods of Estimation
15. Factor Scores
16. Factor Rotation
17. Perspectives and a Strategy for Factor Analysis
18. Cluster Analysis
19. Discrimination and Classification
20. Multi Dimensional Scaling

Reference Books:


PAPER VIII Communication Skills, Accounting and Project Communication

Module I: COMMUNICATION SKILLS

1. Spoken & Written communication
2. Preparing and organizing a public speech: Topic selection, Research Methods, Overcoming anxiety, arranging main points, Constructing introductory and concluding remark; Development and delivering informative-style and persuasive-style, speeches; Debating: Fundamentals of debating, Premises and process of debate, Basic rules & language, Building & processing cases, Rebuttal arguments, Timing, Roles of the speakers, Judges & moderator; Debating style: Parliamentary, Academic, Cross- examination informal and impromptu speaking exercises.
4. Personal communication, Business communication, Report Writing.
5. Fundamentals of Presentations: Effective presentation- understanding effective presentation, understanding different types of presentation; Planning presentations: Establishing objectives, Determining objectives, Making realistic objectives;
6. Analysing audience, Selecting supporting material, Understanding the types of supporting materials, Exploring retention & visual aids; Building presentation: Developing introduction, Capturing attention of audience, Organizing body of presentation, Creating conclusions, Closing presentation; Presentation mechanism: Power point, Visual aids, Speaker notes & footnotes, Reviewing presentations.

Reference Books:


**Module II: Accounting**

1. Introduction to Accounting – Basic Accounting Terms, Need and Importance of Book-keeping – Accounting
2. Conceptual Framework of Accounting - Basic assumptions – Basic concepts – Accounting Standards

**Reference Books:**

2. Book Keeping and Accountancy – Choudhari, Chopde.

**Module III : PROJECT**

Students should carry out the project on Statistical Application based on data

**Note:** All the course will be taught using Statistic Software such as R/SAS/SPSS/MINITAB.

Project, Communication skills & Accountancy:

Communication Skill 30
Accountancy 20

Project:

(i) Participation or Role 10
(ii) Evaluation by project guide 20
(iii) Presentation (external assessment) 20

\[
\text{Total} = 50
\]
Resolutions:

1. Students with B.A /B.Sc. (Statistics major) are exempted from entrance test.
2. Fee should be increased from Rs.40000 to Rs. 50,000/-
3. The Programme will not be conducted if number of students is less than 15.
4. We propose to increase the number of seats for PGDASS programme from 50 to 60 as there is huge demand for this programme.

Standard of Passing:

1. A candidate securing a minimum of 200 marks out of 400 marks, with a minimum of 40 marks in each of the four papers, consisting of internal and external examination taken together will be declared to have passed in that examination.
2. If in a paper a candidate secures minimum of 50% marks consisting of internal and external examination taken together, will be exempted from that paper.