NORTH MAHARASHTRA UNIVERSITY,
JALGAON.

Draft Syllabi for the Three-Year Integrated B.Sc. Degree Course First Year B.Sc.

STATISTICAL TECHNIQUES

Syllabus

1. : Population and Sample:

1.1 : Notion of a Statistical population.

1.2 : Types of population-finite and infinite population with illustrations.

1.3 : Variable, Definition, types of variable.

2. : Classification and tabulation.

2.1. : Classification by the method of attributes(only principle of dichotomy)

2.2 : Classifiction by the method of class intervals.

2.3 : Inclusive and Exclusive methods of classifications.

2.4 : Tabulation, Definition, Parts of a table.

2.5 : Types of tables one-way, two-way and Three-way.

2.6 : Simple numerical problems.

3. : Digrammatic and graphical representation.

3.1 : Bar diagram Need and uses.

3.2 : Subdivided and multiple bar diagrams.

3.3 : Histrogram, frequency polygon and frequency curve.

3.4 : Ogive curves (more than and less than type)

4. : Measures of central Tendency.

4.1 : Concept of central tendency of Statistical date.

4.2 : Arithmetic Mean (A.M.) Definition and co putation.

4.3 : Median Definition and Computation.

4.4 : Mode : Definiti n and Computation.

4.5 : Empirical relation between mean mode and median.

4.6 : Simple numerical problems.

5. : Dispersion.

5.1 : Concept of dispersion.

5.2 : Range, definition and computation.

5.3 : Mean Deviation about mean, definition and computation.

5.4 : Standard deviation, definition and computation.

5.5 : Coefficient of variation definition and computation.

5.6 : Concept of skewness.

5.7 : The distributions with +ve, -ve and zero skewness.

5.8 : Pearson's coeffecient of skewness and its interpretation.

NORTH MAHARASHTRA UNIVERSITY,
JALGAON.

Syllabi for the Three-Year Integrated B.Sc.Degree Course
First Year B.Sc.(from June,1992)

STATISTICAL TECHNIQUES

Courses in statistical techniques are so framed as to cater to the needs of students opting for Biological sciences such as Zoology, Microbiology and so on. These courses will be especially helpful to the students engaged in research activities in the above mentioned branches of knowledge.

Note:- 1) A student of the three Year B.Sc. course shall not be allowed to offer statistics and statistical Techeniques simultaneourly in any of the Three Year of the B.Sc. course.

2) Student offering the subject Statistical Techniques in the First Year of the Three Year B.Sc.course may be allowed to offer statistics in the second year in the place of statistical Techniques provided they s satisfy ofther relevat conditions, if any.

3) Student offering the subject, statistics in the First Year of the Three Year B.Sc. course may be allowed to offer statistical Techniques in the second year in place of statistics.

4) A student offering the subject statistical Techniques shall not be eligible for admission to the M.A./M.Sc. (Statistics) course.

5) The student must produce journal at the time of the practicals in each practical paper to the satisfaction of the teacher concerned.

6) The student must produce at the time of the practical Examination his/her laboratory journal along with the completion certificate signed by the Head of the Department of statistics.

7) Of the 100 Marks for each Practical paper examination ten marks shall be reserved for vive-voice and journal each.

8) In this subject, the emphasis is to be placed on the statistical concepts and techniques rather than on mathematical derivations and proofs.

6 : Correlation:

6.1 : Bivariate data.

6.2 : Concept of correlation between two variables.

6.3 : Types of correlations- Positive and negative.

6.4 : Scatter diagram, conclusion about the type of correlation

6.5 : Covariance between two variables, definiton, computation.

6.6 : Karl Pearson's co-efficient of correlation (Y) definition and computation for grouped and ungrouped data.

6.7 : Statement of the properties of co-efficient of correlation. (Y)

(i) $-1 \leq Y \leq +1$

Invariant to change of origin and scale.

6.8 : Spearmens rank correlation co-efficient: definition, computation and interpretation.

6.9 : Properties of spearman's rank correlation co-efficient (Statement only)

6.10: Simple numerical problems.

7. : Regression.

7.1 : Lines of regession, Fitting of lines of regression by the method of least squares.

7.2 : Properties of regression co-efficients.

7.3 : Relation between correlation co-efficient and regression co-efficients.

7.4 : Simple numerical problems.

8. : Theory of attributes:

8.1 : Attributes and varibbles: Notation dichotomy, class frequency, order of a class positive class frequency, negative class frequency, ultimate class frequency, relation ship among different class frequencies, method of operaters,

8.2 : Fundamental set of class frequencies definition. (up to two attributes.)

8.3 : Definition of independence of two attributes.

8.4 : Yules co-efficient of association (Q) : Co-efficient of colligation (Y).

8.5 : Relationship between Q and Y (without proof)

8.6 : Simple numerical problems.

NORTH MAHARASHTRA UNIVERSITY,
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Syllabi for the Three-Year Integrated B.Sc.Degree Course

First Year B.Sc.

STATISTICAL TECHNIQUES I II

1. : Probability:

1.1 : Experiments and random experiemtns.
Ideas of determinstic and non determinstic models.

1.2 : Definitions:
i) Sample space.
ii) Sample space (finite and infinite)
iii) Event.
iv) Elementary event.
v) Certain event.
vi) Impossible event.

1.3 : Probability (over finite sample space)

1.4 : Conditional probability and independance.

1.5 : Baye's thorem (without proof)

1.6 : Simple numerical problems.

2. : Probability distributions:

2.1 : Concept of random variable.

2.2 : Definition of probability function.

2.3 : Definition of Mathematical expectation and Statements of properties.

2.4 : Bernoulli distribution:definition and properties without proof.

2.5 : Binomal distribution: definition,properties without proof.

2.6 : Poisson distribution: Definition, properties without proof.

3. : Continuous probability distribution:

3.1 : Continuous of probability of density of density function of a continuous random variable.

3.2 : Normal distribution: definition , properties without proof.

3.3 : Computation of probabilites using normal probability tables.

3.4 : Simple problems.

4. : Sampling Destribution:

4.1 : Difinition of a random sample, statistics.

4.2 : Definition of sampling distribution of a statistics.
Standard error of a statistic.

5. : Tests of Significance I.

5.1 : Concept of a test of significance, level of significance, Indea of two tailed and one tailed tests of significance.

5.2 : Idea of large sample tests of significance.

5.3 : Large sample tests for

i) Ho : $\mu = \mu_0$ Hi : $\mu = \mu_0$

ii) Ho : $\mu_1 = \mu_2$ Hi : $\mu_1 \neq \mu_2$

5.4 : Numerical problems.

6. : Test of significance II.

6.1 : Idea of small sample tests of significance.

6.2 : Test for testing.

6.3 : i) Ho : $\mu = \mu_0$ Hi : $\mu = \mu_0$

ii) Ho : $\mu_1 = \mu_2$ Hi : $\mu_1 = \mu_2$

6.3 : X 2 - test of goodness of fit.

6.4 : Y_2 - test for independeance of attributes.

6.5 : X2 - test for testing population variance.

Ho : $\sigma^2 = \sigma_0^2$ Hi : $\sigma^2 = \sigma_0^2$ where is known

6.6 : test for testing Ho : $\sigma_1^2 = \sigma_2^2$, Hi : $\sigma_1^2 = \sigma_2^2$

6.7 : Numerical problems.

7. : Sampling methods.

7.1. : Simple random sampling (SRSWOR AND SRSWR)

7.2 : Writing down all possible samples of given size drawn by SRSWR amd SRSWPR frpm a given finite population.

7.3 : Statemtnss regarding estimates of population mean, populati n total, their standard errore, estimates of standard errors, varification of unbiasedness through simple numerical problems,

7.4 : Stratified random sampling, real life situations where stratification is ap ropriate.

7.5 : Statements regrding estimates of populati n mean and population total, their standard errors in case of SRSWOR only.

7.6 : Statement of proportional allocation, optimum allocation.

7.7 : Simple numerical problems.

NORTH MAHARASHTRA UNIVERSITY,
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Syllabi for the Three-Year Integrated B.Sc. Degree Course.

Statistifal Techniques (Practical) Paper-III

Syllabus

1) Preparation of Frequency distribution and cumulative frequencey distribution (discrete & continuons type)

2) Tabulation (upto 3 way table)

3) Graphical Represntation.

4) (Bar diagram, Sub_devided Bar diagram, Histogram & Ogive Curves.)

4) Collection & Computation of mean, median & mode.
(for ungrouped & grouped data)
by i) Field work.
ii) Readymade data.

--2-- Practicals.

5) Computation of Range, mean deviation & S.d. , coefficient of variation for i) Field work of expt.No.4.
ii) Readymade data.
(For ungrouped & grouped data.)

-- 2 --

6) Computation of correlation coefficient & Rank correlation.
(For ungroupted & grouped data.)
preparation of bivariate frequency distribution.

-- 2 --

7) Fitting & Regression lines.

8) Problems based on Binomial,Poission_& Geometric distribution

9) Computation of probability on Normal distrubution.

NORTH MAHARASHTRA UNVIERSITY,
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Syllabus for the Course applied statistics at F.Y.B.A.

Applied Statistics (General)

Pre-requisties:-

Knowledge of High school Arithmatic.

Objectives:-

The main objective of this course is to acquaint students with some basic concept of statistics. They will be introduced to some elementary statistical methods of analysis of data.

The study of this paper will extremely be helpful for the students who will study Economics, Geography, Pshycology, B.Ed. degree infuture.

Syllabus.

1) Statistics.

1.1 : Meaning & importance of statistics.
1.2 : Primary & Secondary data.
1.3 : Methods of collection of data.
1.4 : Meanign of questionaire.
1.5 : Requirements of good questionaire.
1.6 : Uses of questionaire.

2. : Frequency Distributions:

2.1 : Notions of discrete & continuous variables.
2.2 : Construction of frequency distributions, discrete and continuous type, Inchusive & Exclusive methods of classiff-ication.
2.3 : Construction of cumulative frequency distributions.
2.4 : Numerical problems.

3. : Graphical and Diagramtic representation.

3.1 : Histogram, Frequency polygon, Frequency curve, Ogive curve. (Less than & more than type)
3.2 : Bar diagram, multiple bar diagram, pie diagram.
3.3 : Uses & limitations of graphical & diagramtice representation
3.4 : Examples & Problems.

4. : Tabulation.

4.1 : Meaning of a statistical table.
4.2 : Construction of statistical tables: Parts of table, rules of tabulatinn.
4.3: Construction of tables with one & two factors of classifi-cation.
4.4 : Requirements of a good table.
4.5 : Uses of tabulation.

4.6 : Simple problems.

5. : Measures of central tendency.

5.1 : Concept of central tendency of statistical data. Requirements of a good statistical central tendency.

5.2 : Arithmetic mean (A.M.) Definition, computation of mean for ungriuped & grouped data by direct method. Combined mean for two groupes only. Merits and demerits.

5.3 : Median: Definition, computation of median for ungrouped and grouped tata by formula & graphical method. Merits&demerits.

5.4 : Mode: Definition, computation of mode for ungrouped and grouped data by formula & graphical method. Merits & demerits.

5.5 : Simple numerical problems.

End of the first term

6. : Measures of Dispersion.

6.1 : Concept of dispersion.

6.2 : Range, Definition, Computation for ungrouped and grouped data, groupe: data by direct method. Mertis and demertis.

6.3 : Standard deviation: Definition, Computation for ungrouped and grouped data by direct method. Mertis and demertis.

6.4 : Coefficient of variation (C.V.) Definition computation& uses of C.V.

6.5 : Simple numerical problems.

7. : Skewness:

7.1. : Concept of skewness of frequency distribution.

7.2 : Types of skewness: Positive skew, negative skew, Zero skew.

7.3 : Karl pearsons coefficient of skewness:

Definiton, $Sk = \frac{\text{Mean} - \text{Mode}}{\text{S.D.}}$

Interpretation of Sk.

7.4 : Simple numberical problems.

8. : Index numbers: I (with special reference to price I.N.)

8.1 : Meaning of I.N.

8.2 : Steps in the construction of price I.N.

8.3 : Difficulties in the construction of price I.N.

8.4 : Unweghted & weighted I.N.

8.5 : Computation of price I.N. by using.

1) Laspyre's method.

ii) Paasche's method.

iii) Fishers method.

8.6 : Simple numerial problems.

9) Time series.

9.1 : Meaning of time series;
9.2 : Components of time series.
9.3 : Estimation of secular trend by moving avera e method.
9.4 : Simple numerical problems.

10. : Census.
10.1: General principles of censis.
10.2: Defacto & Dejure method.
10.3: Indian census 1981 & 1991.

N.B.: 1) Students are allowed to write the answers either in English or in Marathi.

2) Students are allowed to use the calculators during the examination.

NORTH MAHARASHTRA UNIVERSITY,

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Syllabus for the Course STATISTICAL PREREQUISITES for F.Y.B.A. Students, STATISTICAL PREREQUISITE.

PREREQUISITES Knowledge of High School.

Objectives:-

The main objective of this course is to acquaint students with some basic concept of statistics. For the study of the subjects, Geography, Economics, Pshycology etc.at the degree and post graduate level the knowledge of this course will extremely be helpful to the students.

Syllabus

1.) Statistics.
1.1 : Meaning and importance of statistics.
1.2 : Relationshi with ot er sceinces.
1.3 : Population and sample.
2.1 : Notion of a statistical population, types of populations, and a sample from populations with illustrations.
2.2 : Description of simple random sampling with and without replacement (SRSWR and STSOR), stratified random sampling & systematic sampling.
3. : Collection of data.
3.1 : Primary and secondary data.
3.2 : Methods of collection of primary data.
3.3 : Meaning of questionaire.
3.4 : Requirements of a good questionire.
3.5 : Uses of questionire.
4. : Classification and Tabulation.
4.1 : Classification: meaning and characteristics of an ideal classification.
4.2 : Types of classification.
4.3 : Formation of frequency distribution.
4.4 : Tabulation of data : meaning & definition.
4.5 : Rules of Tabulation.
4.6 : Types of Tabulation. (One way & two way only)
4.7 : Simple problems.
5. : Diagramatic & Graphical Representation.
5.1 : Bar diagram, PI diagram.
5.2 : Histogram, Frequency polygon, frequency curve, ogive curve (class than & more than).
5.3 : Uses and limitations of diagramatic & graphical representation

6. : Central Tendency.

6.1 : Concept of central Tendency.

6.2 : Measures of central tendency : Mean, Median & Mode (For grouped & ungrouped data).

6.3 : Requirements of a good measures of central tendency.

6.4 : Simple numerical problems.

7. : Dispersion.

7.1 : Concept of Dispersion.

7.2 : Measures of Dispersion. Range, standard deviation. (For grouped and ungrouped data).

7.3 : Properties & Uses of range & S.D.

7.4 : Examples & Problemes.

8. : Correlation:-

8.1 : Concept of correlation, Definition.

8.2 : Methods of studying correlation : 1) Scatter diagram, 2) Karl-Pearsons coefficient of correlation (ungrouped data only).

8.3 : Interpretation of correlation coefficient.

8.4 : Spearman's Rank correlation coefficient.

9. : Tests of Significance:-

9.1 : Large sample tests : For testing singnificance of single mean, & two sample means, from two populations.

9.2 : Simple problems.

10. : X - tests :- 1) Goodness of fit.
2) Independance fof attributes (2 X2 contingency table.)

Simple problems.