

UkaTarsadiaUniversity



M.Sc. (Computer Application)

Statistical Methods (040020113)

1st Semester

EFFECTIVE FROM JUNE-2014

UKA TARSADIA UNIVERSITY

M.Sc. (Computer Application) (1st Semester) Syllabus, 2014-2015

Course Code: 040020113

Course Title: Statistical Methods

Course Credits: 4

Total Hours: 48

[Lectures: 04, Tutorial: 00, Practical: 00]

Prerequisites: Nil

Prerequisites By Topics: Nil

Objectives: To introduce basic concepts of probability and statistical inference with discussion of applications to computer science.

1 Data and Descriptive Statistics [09 Hours]

- 1.1. Elements, Variables and Observations, Scales of Measurement
- 1.2. Qualitative and Quantitative Data, Cross-Sectional and Time Series Data
- 1.3. Summarizing Qualitative Data: Frequency, Relative Frequency and Percent Frequency Distributions, Bar Graph and Pie Chart
- 1.4. Summarizing Quantitative Data: Frequency, Relative Frequency and Percent Frequency Distributions, Dot Plot, Histogram, Cumulative Distributions, Ogive
- 1.5. Exploratory Data Analysis: The Stem and Leaf Display, Cross Tabulation and Scatter Diagram

2 Numerical Measures [09 Hours]

- 2.1. Measure of Location: Mean, Median, Mode, Percentiles and Quartiles
- 2.2. Measure of Variability: Range, Inter-quartile Range, Variance, Standard Deviation, Coefficient of variance
- 2.3. Measure of Distribution Shape, Relative Location and Detecting Outliers
- 2.4. Five Number Summary and Box Plot
- 2.5. Mean, Median, Mode for Grouped Data

3 Correlations and Regressions [06Hours]

- 3.1. Types of Correlations and Properties
- 3.2. Karl Pearson's Coefficient of Correlations
- 3.3. Regressions Lines and Equations
- 3.4. Properties of Regression Coefficient

4 Basic of Probability [08 Hours]

- 4.1. Experiments, Counting and Assigning Probabilities
- 4.2. Events and their Probabilities
- 4.3. Basic Relationship of Probability
- 4.4. Conditional Probability
- 4.5. Bayes' theorem(Without Proof)

5 Discrete Probability Distribution [10 Hours]

- 5.1. Random Variables
- 5.2. Discrete Probability Distributions
- 5.3. Expected Value and Variance
- 5.4. Binomial Probability Distribution
- 5.5. Poisson Probability Distribution

6 Continuous Probability Distribution: Normal Probability Distribution [06 Hours]

- 6.1. Normal Curves
- 6.2. Standard Normal Probability Distribution
- 6.3. Probabilities for any Normal Distribution

Course Outcomes:

- C01: Understand the data statistics to use in Data Analysis and visual exploration
C02: Understand the numerical measures to use in Data mining and in computer graphic
C03: Use the correlations and regression in the database and data management, image processing
C04: Understand the basic of probability to use in problem solving in programming languages
C05: Use the Discrete probability distribution in Iterative coding in data error detection and stochastic model
C06: Use the Continuous probability distribution in Graphical model and Automatic verification of real system.

Course Objectives and Course Outcomes Mapping:

To provide the data statistics to understand its logical implementation : C01,C02,C03

To teach the mathematical concepts of probability distribution to understand its application in computer science : C04,C05,C06.

Course Units and Course Outcomes Mapping:

Unit No.	Unit	Course Outcome					
		C01	C02	C03	C04	C05	C06
1	Data and Descriptive Statistics	✓	✓				
2	Numerical Measures		✓	✓			
3	Correlations and Regressions	✓	✓	✓			
4	Basic of Probability		✓		✓	✓	
5	Discrete Probability Distributions		✓		✓	✓	✓
6	Continuous Probability Distribution: Normal Probability Distribution		✓		✓	✓	✓

Hands-on Experience Activity:

- ❖ Students shall be practicing data mining techniques using WEKA on their personal laptops

Modes of Transaction (Delivery):

- ❖ **Lecture method** shall be used but along with it, as and when required, discussion method would be fruitful. It may be supplemented with various appropriate audio-visual aids.
- ❖ **Assignment activity** should be designed and given to group of student for solution.
- ❖ Tutorial should be used to solve students' queries

Activities/Practicum:

The following activities shall be carried out by the students.

- ❖ To find out the application of Statistical methods in Data mining
- ❖ To solve case study for the Probability distribution namely Discrete Probability Distribution and Continuous Probability Distribution
- ❖ Implementation of Statistical Methods using Programming Language

The following activities shall be carried out by the teacher.

- ❖ To aware students about current practices Statistical Methods in computer science.
- ❖ To introduce the Applications of Correlations & Regressions and Probability Distribution in computer science

Text Book:

1. Anderson, Sweeney and Williams, Statistics for Business and Economics , Cengage Learning

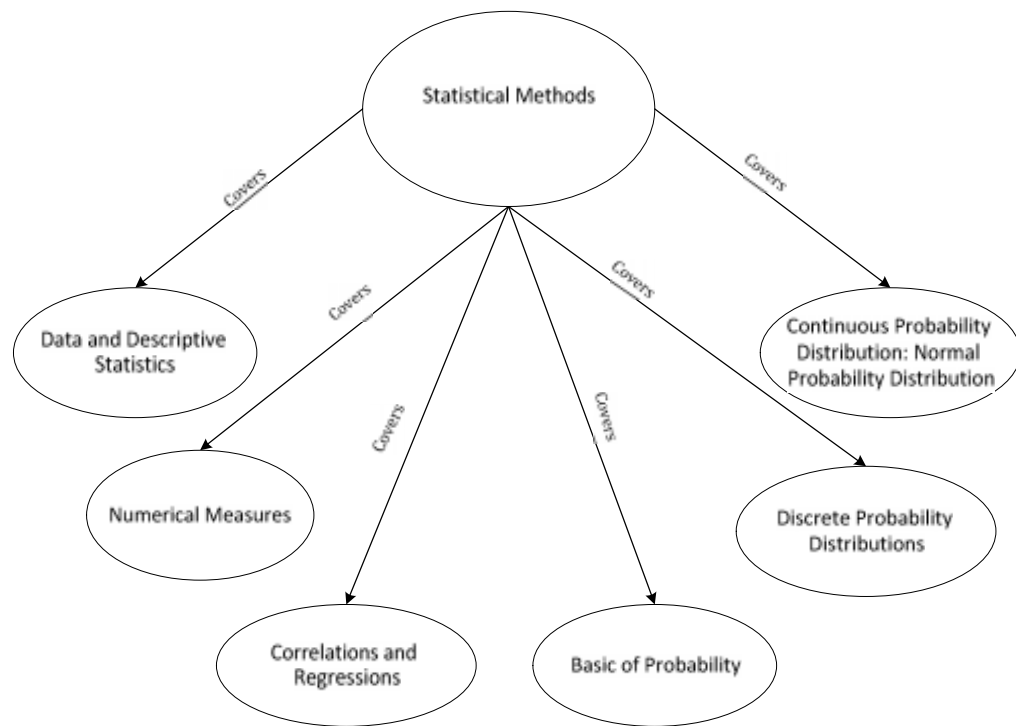
Reference Books:

1. J. Susan Milton and Jesse C. Arnold, Introduction to probability and Statistics, Principles and applications for engineering and the computing sciences, Tata McGraw-Hill Edition
2. S. P. Gupta, Statistical Methods, Sultan Chand & Sons
3. James L. Johnson, Probability and statistics for computer science, Wiley Publication

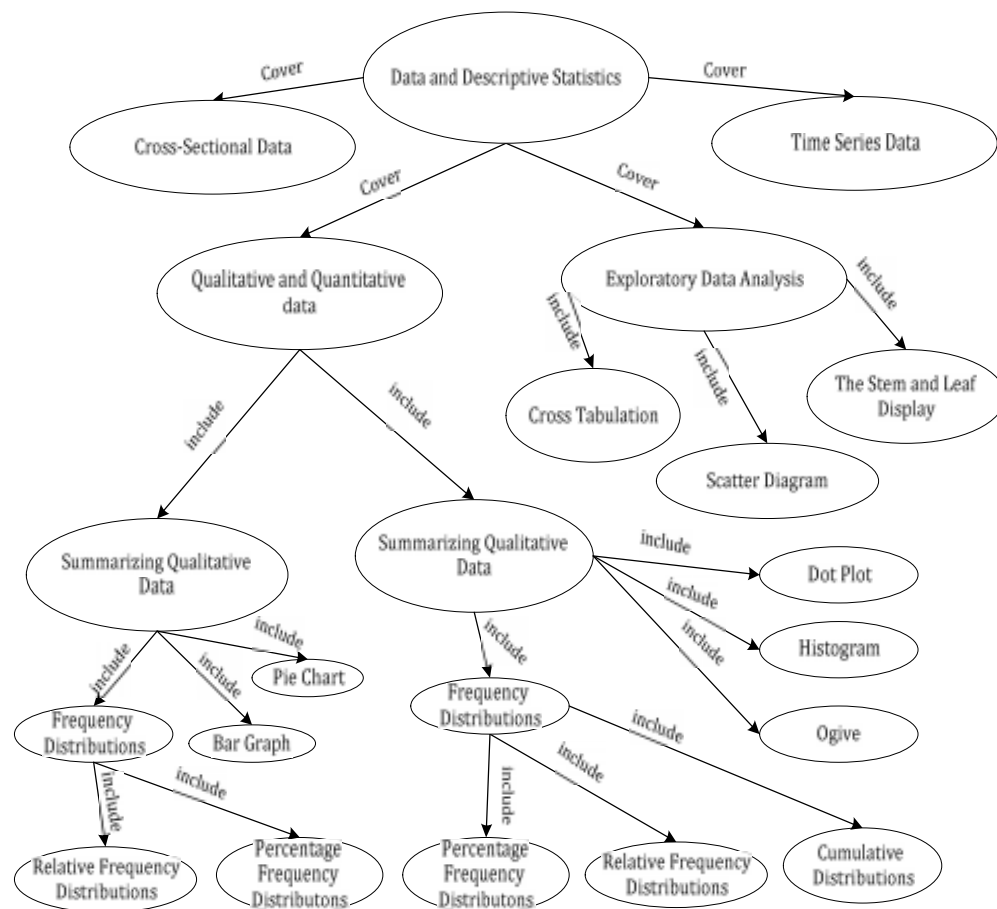
Concept Map:

It is a hierarchical / tree based representation of all topics covered under the course. This gives direct / indirect relationship /association among topics as well as subtopics.

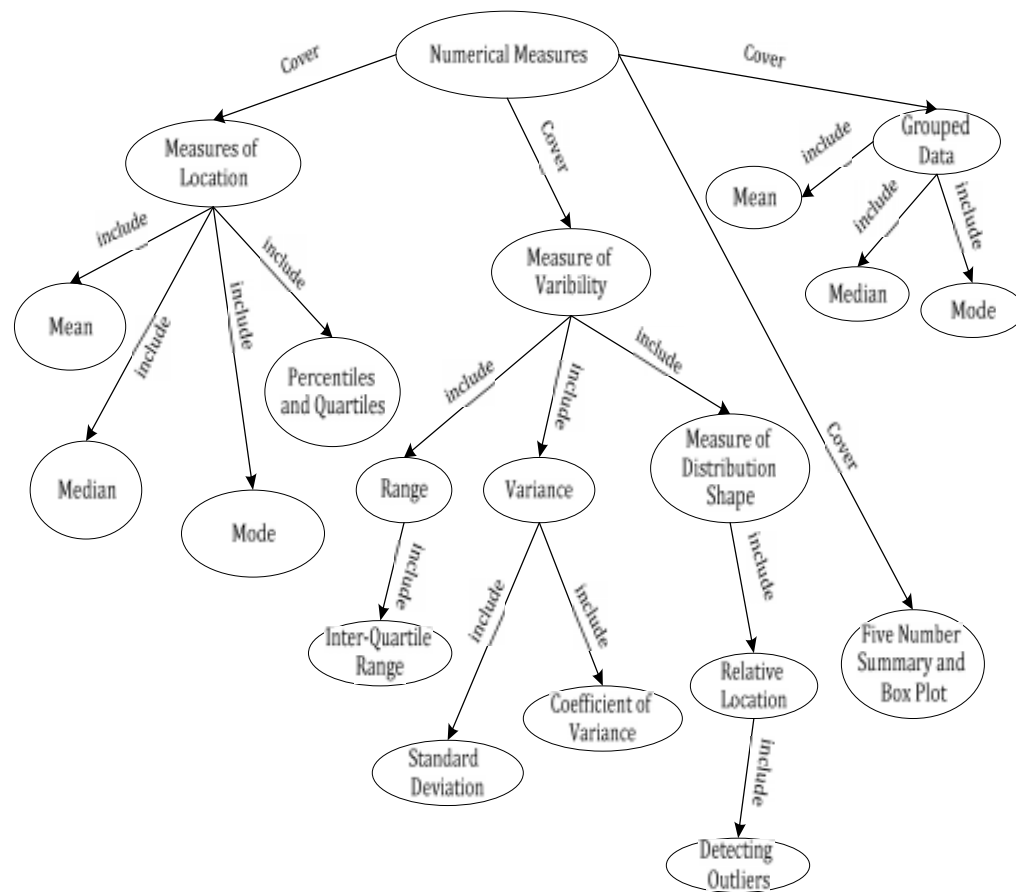
Statistical Methods



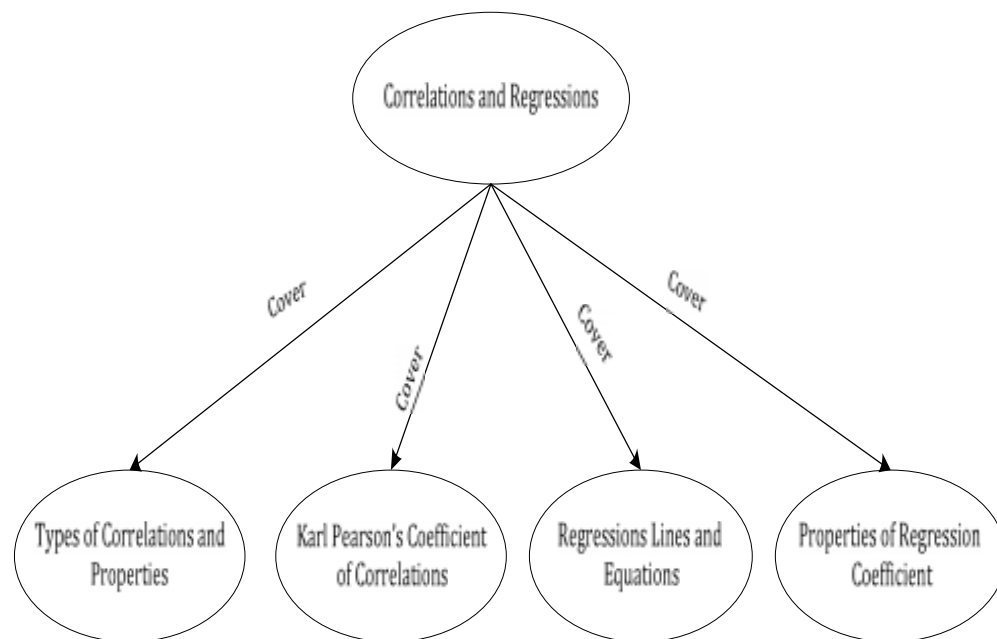
Unit-1: Data and Descriptive Statistics



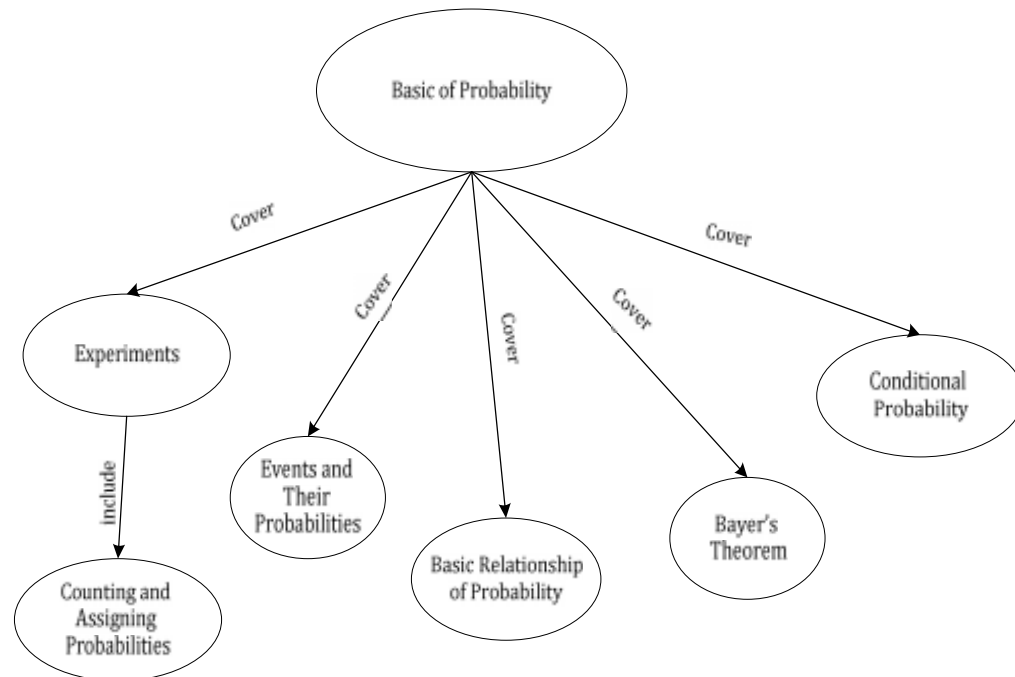
Unit-2: Numerical Measures



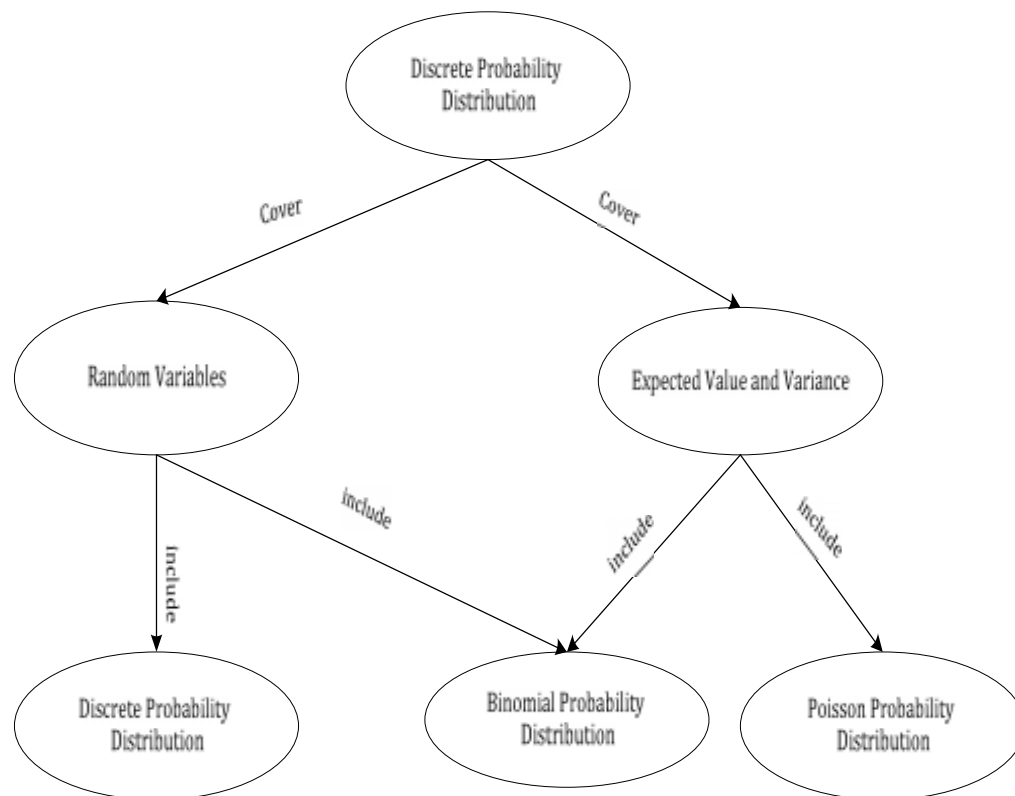
Unit-3: Correlations and Regressions



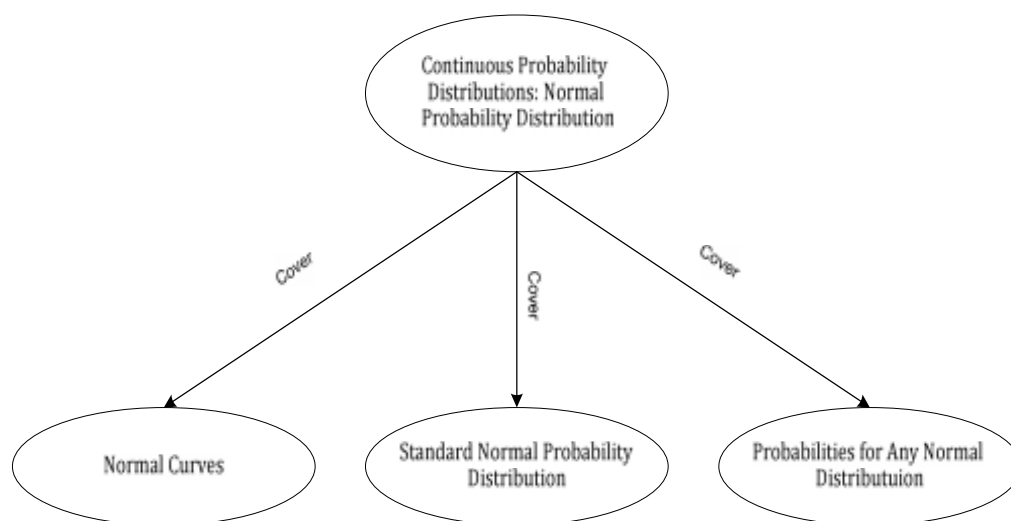
Unit-4: Basic of Probability



Unit-5: Discrete Probability Distribution



Unit-6: Continuous Probability Distribution: Normal Probability Distribution



Assessment:

The weightage of CIE and University examination shall be as per the University regulations.
Composition of CIE shall be

Assessment Code	Assessment Type	Duration of each	Occurrence	Each of marks	Weightage in CIE of 40 marks	Remarks
A1	Quiz	45 minutes	2	20	$4 \times 2 = 8$	Taken at the end of Unit 1 and Unit 4
A2	Unit Test	90 minutes	2	30	$6 \times 2 = 12$	Taken at the end of Unit 2,3 and Unit 5,6
A3	Self-creation parameter (implementation of Statistical method)	1 month	1	20	$1 \times 5 = 5$	Group of 5 student shall implemented any OR method
A4	Internal Examination	3 hours	1	60	$15 \times 1 = 15$	Covering all units

- ❖ Syllabus for each CIE parameter shall be covered by the date of the corresponding test.
- ❖ No make-up work shall be accepted for missed or failed tests.
- ❖ Group of five students should implement method of Operation Research using any programming language.
- ❖ Student may receive up to 10% marks towards the Assignment if implement functionality such as dynamically implementation and step by step demonstration of problem.
- ❖ Late submission shall be penalized as 5% of full marks per day for maximum two days after the cut-off date. No submission shall be accepted thereafter with the corresponding mark set to 0.

Course Assessment with Course Outcomes Mapping

Assessment	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
A1	✓	✓		✓	✓	
A2		✓	✓	✓	✓	✓
A3	✓	✓	✓	✓	✓	✓
A4	✓	✓	✓	✓	✓	✓

Question Bank:

Question Bank must be prepared which consists of several types of questions namely Multiple Choice Questions, Fill in the blanks, Short type questions, Long type questions and Comprehensive exercises. Comprehensive exercises will be applicable for all units

Academic Honesty:

Coursework is assumed to be accomplished individually (otherwise stated). Any portion of submission taken directly from anywhere (like statements in assignment/report etc.) without modification must be accompanied with the properly formatted reference giving credit to the author and to the source.

UFM:

- ❖ If two or more submitted papers are too similar for coincidence, a penalty shall be imposed that shall usually be the same for the student who did the original as for the one copying from it.
- ❖ Any ascertained fact of breaking institute policy shall be associated with one or all of the following: (i) zero marks for the work; (ii) report to the Course coordinator; (iii) report to the Director.

Discussion Group:

Students are welcome to post on the Course Discussion Board available on SRIMCA View Course Webpage. It is responsibility of the concern Course teacher to maintain Discussion Board.

Attendance:

- ❖ Attendance means being present for the entire class session. Those arriving significant late or leaving significantly early without prior permission shall be counted as ABSENT for the entire class session.
- ❖ Concern teacher must clearly state his/her attendance policies at the first class meeting.