ESSEX COUNTY COLLEGE

Mathematics Engineering Technologies & Computer Sciences Division

MTH 101 – Statistics and Probability I

Course Syllabus

Course Number & Name: MTH 101 Statistics and Probability I

Credit Hours: 4.0 **Contact Hours:** 4.0 **Lecture:** 4.0 **Lab:** N/A **Other:** N/A

Prerequisites: Grade of "C" or better in MTH 092 or placement

Co-requisites: None

Instructor: Daxay Patel

Email: TBA

Office Hours: By appointment

Course Description: This course provides introduction to the basic ideas and methods of collecting, representing and analyzing data to report findings using elementary techniques from statistics and probability. Topics include the following: frequency distributions; histograms and frequency polygons; measures of central tendency and variability; conditional probability; percentiles; Zcores; normal and binomial distributions, confidence intervals; hypothesis testing; regression and correlation.

Textbook: *Elementary Statistics: A Brief Version*, 5th edition, by Allan G Bluman; published by McGraw Hill, 2010; ISBN13 #: 9780073386096

General Education Goals: MTH 101 is affirmed in the following General Education Foundation Category: Quantitative Knowledge and Skills. The corresponding General Education Goal is as follows: Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Course Goals: Upon successful completion of this course, students should be able to do the following:

1. Demonstrate knowledge of the fundamental concepts and theories from statistics and probability; (GEG 2)
2. Utilize various problem solving and critical thinking techniques together with statistics to set up and solve real world applications taken from a variety of disciplines; (GEG 2)
3. Communicate accurate mathematical terminology and notation in written and/or oral form in order to explain strategies to solve problems as well as to interpret found solutions; (GEG 1, GEG 2)
4. Use calculators effectively as a tool to solve such problems as those described above. (GEG 2)

Measurable Course Performance Objectives (MPOs): Upon successful completion of this course, students should specifically be able to do the following:

1. Demonstrate knowledge of the fundamental concepts and theories from statistics and probability:
   1.1 use descriptive methods of statistics for the purpose of organizing and summarizing data; compute measures of center, variation and position;
   1.2 construct and interpret histograms, frequency polygons, and stem---and---leaf and box plots and draw appropriate conclusions;
   1.3 apply the concepts of experiments, outcomes, events, sample spaces and relative frequency to solve probability problems and construct and interpret probability distributions;
   1.4 recognize, understand, and use the normal probability distribution;
   1.5 use methods of inferential statistics to interpret data for the purposes of interval estimation of means and proportions, decision---making in hypothesis tests, ANOVA, and chi---square procedures;
   1.6 use methods of descriptive statistics on bivariate data to assess the relationship between two variables and interpret correlation coefficients; and
   1.7 use linear regression techniques for purposes of analysis and prediction
2. Utilize various problem---solving and critical---thinking techniques together with statistics to set up and solve application problems taken from a variety of disciplines:

2.1 apply statistical methods to solve varied real---world applications, such as determining whether a new drug is more effective, comparing machines for better efficiency, and assessing whether there is a relationship between two teaching methods

3. Communicate accurate mathematical terminology and notation in written and/or oral form in order to explain strategies to solve problems as well as to interpret found solutions:

   3.1 conduct statistical studies (experimental or observational), including creating the sampling design, interpreting computer results from collected data, and inferring from these results a conclusion consistent with the design

4. Use calculators effectively as a tool to solve such problems as those described above:

   4.1 use calculators and/or computers to calculate permutations and combinations and evaluate formulas to determine parameters such as the mean, variance,and correlation coefficient;
   4.2 use computers to construct frequency distributions, histograms, frequency polygons, and stem--- and---leaf and box plots and draw appropriate conclusions

Methods of Instruction: Instruction will consist of a combination of lectures, class discussions, individual projects, computer lab work, small-group work, computer-assisted instruction, online computer Applets, student oral presentations, and videos and podcasts.

Outcomes Assessment: Exam and homework questions are blueprinted to course objectives. Checklist rubrics are used to evaluate projects for the presence of course objectives. Data is collected and analyzed to determine the level of student performance on these assessment instruments in regards to meeting course objectives. The results of this data analysis are used to guide necessary pedagogical and/or curricular revisions.

Attendance Policy: Regular and prompt attendance is essential for academic success. Faculty members take attendance at each scheduled class session. Students are expected to attend and be on time for all classes. Individual faculty members may establish specific attendance policies. Attendance records will be turned in to the appropriate Division/Department Chair and/or Program Director at the end of the term and in the interim upon request. Any students with more than three unexcused absences will automatically fail the course.

NOTE: The instructor will provide specific weights, which lie in the above-given ranges, for each of the grading components at the beginning of the semester.

Course Requirements:

All students are required to:

1. Maintain regular attendance and take part in class discussions.

2. Complete assigned homework and projects on time.

3. Take all exams as scheduled.

Methods of Evaluation: Final course grades will be computed as follows:

Grading:

Home Work:	10%
Test 1	15%
Test 2	15%
Test 3	15%
Test 4	15%
Final Exam	30%

Grading System:

A	**90% - 100%**	**Superior**
B+	**87% - 89%**	**Very Good**
B	**80% - 86%**	**Good**
C+	**77% - 79%**	**Above Average**
C	**70% - 76%**	**Satisfactory**
D	**60% - 69%**	**Passing**
F	**59% - 0**	**Failing**

Academic Integrity: Dishonesty disrupts the search for truth that is inherent in the learning process and so devalues the purpose and the mission of the College. Academic dishonesty includes, but is not limited to, the following:

- plagiarism – the failure to acknowledge another writer's words or ideas or to give proper credit to sources of information;
- cheating – knowingly obtaining or giving unauthorized information on any test/exam or any other academic assignment;
- interference – any interruption of the academic process that prevents others from the proper engagement in learning or teaching; and
- fraud – any act or instance of willful deceit or trickery.

Violations of academic integrity will be dealt with by imposing appropriate sanctions. Sanctions for acts of academic dishonesty could include the resubmission of an assignment, failure of the test/exam, failure in the course, probation, suspension from the College, and even expulsion from the College.

Student Code of Conduct: All students are expected to conduct themselves as responsible and considerate adults who respect the rights of others. Disruptive behavior will not be tolerated. All students are also expected to attend and be on time all class meetings. No cell phones or similar electronic devices are permitted in class. Please refer to the Essex County College student handbook, *Lifeline*, for more specific information about the College's Code of Conduct.

Course Content Outline: This is a tentative course schedule; the instructor reserves the right to make changes on it to make it better for the student`s development. Notice will be given should any changes take place.

Week	Topics to be Covered/ Class Activities
	CHAPTER 1 THE NATURE OF PROBABILITY AND STATISTICS
	Assigned as outside reading for background and establishing context
	CHAPTER 1 THE NATURE OF PROBABILITY AND STATISTICS
1.1	Orientation & Course Introduction/Review of Class Syllabus
	2.1 Organizing Data
1.2	2.2 Histograms, Frequency Polygons, and Ogives
	2.3 Other Types of Graphs
	P76 Misleading Graphs
1.3	P80 Stem & Leaf Plots

Topics to be Covered/ Class Activities

	CHAPTER 3 DATA DESCRIPTION
	3.1 Measures of Central Tendency
1.4	3.2 Measures of Variation
	3.3 Measures of Position
	3.4 Exploratory Data Analysis
1.5	**Test #1** on Chapters 1, 2 & 3
	CHAPTER4 PROBABILITY AND COUNTING RULES
2.1	4.1 Sample Spaces and Probability
	4.2 The Addition Rules for Probability
2.2	4.3 The Multiplication Rules and Conditional Probability
	4.4 Counting Rules
2.3	4.5 Probability and Counting Rules
	CHAPTER 5 DISCRETE PROBABILITY DISTRIBUTIONS
	5.1 Probability Distributions
2.4	5.2 Mean, Variance, Standard Deviation and Expectation
	5.3 The Binomial Distribution
2.5	**Test #2** on Chapters 4 & 5
	CHAPTER 6 THE NORMAL DISTRIBUTION
3.1	6.1 Normal Distributions
	6.2 Applications of the Normal Distribution
3.2	6.3 The Central Limit Theorem
	6.4 Normal Approximation to Binomial Distribution

Topics to be Covered/ Class Activities

	CHAPTER 7 CONFIDENCE INTERVALS AND SAMPLE SIZE
3.3	7.1 – 7.2 Confidence Intervals for the Mean
3.4	7.3 Confidence Intervals for Proportions
	7.4 Confidence Intervals for Variances and Standard Deviations
3.5	**Test #3** on Chapters 6 & 7
	CHAPTER 8 HYPOTHESIS TESTING
4.1	8.1 Steps in Hypothesis Testing
	8.2 z Test for a Mean
4.2	8.3 t Test for a Mean
	CHAPTER 10 CORRELATION AND REGRESSION
4.3	10.1 Correlation
4.4	10.2 Regression
4.5	**Test #4** on Chapters 8 & 10
	CHAPTER 11 CHI-- - SQUARE AND ANOVA
5.1	11.1 Test for Goodness of Fit
5.2	11.2 Tests using Contingency Tables
5.3	11.3 Analysis of Variance (ANOVA)
5.4	Review
5.5	Final Examination