UNIVERSITY OF GUAM
COLLEGE OF NATURAL & APPLIED SCIENCES

MA387-01 Statistics for Sciences Syllabus

Meeting time : MW 11:10-12:20 SC200
Instructor: Dr. Grazyna Badowski
Office: SC*201
Office hours: MW 12:30-2:00, and by appointment.
Phone: 735 2840
Email: gbadowski@triton.uog.edu
Moodle:

CATALOG DESCRIPTION

The topics include exploring data in graphs and in numerical values, introducing basic probability theory for statistics, sampling distributions, estimation theory, testing hypothesis, correlation, variance analysis, and non-parametric statistics. Students develop their own statistical programs to solve statistical problems.
Prerequisite: Grade of C or better in MA161a or higher.

REQUIRED TEXTBOOK AND/OR READINGS

Lecture notes and classroom handouts, all posted on the moodle.

COURSE LEARNING OUTCOMES

Course SLOs:	**Program Learning Outcomes (PLOs)**	**University Learning Outcomes (ILOs)**	**Method of Assessment**
Understand the fundamental ideas of statistics, such as variability, types of variables, distribution, association, and sampling.	MA PR-1	ILO-1 ILO-2 ILO-3	Questions on homework assignments, quizzes and tests. Final Project.
Construct and interpret graphical summaries of data: histograms, boxplots, bar and pie graphs.	MA PR-1 MA PR-4	ILO-1 ILO-2	Questions on homework assignments, quizzes and tests. Final Project.
Calculate and interpret the numerical summaries of data. Use statistics appropriate to the shape of the data distribution to compare center (median, mean, mode) and spread (interquartile range, standard	MA PR-1 MA PR-4	ILO-1 ILO-2	Questions on homework assignments, quizzes and tests. Final Project.

deviation) of two or more different data sets.			
Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of outliers.	MA PR-1 MA PR-3	ILO-1 ILO-2 ILO-3	Questions on homework assignments, quizzes and tests. Final Project.
Define, and apply the concepts of sample space, events, probability, random variables and their distributions to calculate elementary probabilities.	MA PR-1 MA PR-2	ILO-1 ILO-2 ILO-6	Questions on homework assignments, quizzes and tests. Final Project.
Compute conditional probabilities and use them to determine the independence of events, apply the Bayes' rule.	MA PR-1 MA PR-2 MA PR-3	ILO-1 ILO-2 LO-6	Questions on homework assignments, quizzes and tests. Final Project.
Use the sampling distribution of the sample mean to calculate probabilities.	MA PR-1	ILO-1 ILO-2	Questions on homework assignments, quizzes and tests. Final Project.
Calculate and interpret interval estimates of population parameters for single sample and two sample cases.	MA PR-1 MA PR-2 MA PR-5	ILO-1 ILO-2 ILO-3	Questions on homework assignments, quizzes and tests. Final Project.
Perform steps for significance tests about the hypothesis of one or two populations. Understand the concept of p-value.	MA PR-1 MA PR-2 MA PR-3 MA PR-6	ILO-1 ILO-2 ILO-3	Questions on homework assignments, quizzes and tests. Final Project.
Perform an ANOVA and subsequent tests for multiple comparisons.	MA PR-1 MA PR-2 MA PR-4	ILO-1 ILO-2 ILO-3	Questions on homework assignments, quizzes and tests. Final Project.
Construct a chi-square table and perform chi-square tests.	MA PR-1 MA PR-2 MA PR-4	ILO-1 ILO-2 ILO-3	Questions on homework assignments, quizzes and tests. Final Project.
Represent data of two quantitative variables on a scatter plot, compute and interpret the correlation, and describe how the variables are related.	MA PR-1 MA PR-2 MA PR-4	ILO-1 ILO-2 ILO-3 ILO-6	Questions on homework assignments, quizzes and tests. Final Project.
Compute the linear regression to make and interpret the model in the context of the data. Use the linear regression to make predictions.	MA PR-1 MA PR-2 MA PR-4 MA PR-5 MA PR-6	ILO-1 ILO-2 ILO-3 ILO-6	Questions on homework assignments, quizzes and tests. Final Project.

Math Program Learning Outcomes

MA PR-1: *demonstrate critical thinking, problem solving skills* and ability to use mathematical methods by *identifying, evaluating, classifying, analyzing, synthesizing* data and abstract ideas in various contexts and situations.

MA PR-2: *exhibit a sound conceptual understanding* of the nature of mathematics, and *demonstrate advanced mathematical skills* in mathematical analysis, modern algebra and other mathematical discipline(s).

MA PR-3: *argue and reason* using mathematics, *read, create* and *write down* logically correct mathematical proofs, *use exact mathematical language* and *communicate mathematics efficiently* orally, in writing and using information technology tools.

MA PR-4: *apply abstract thinking, mathematical methods, models* and *current practices* in the sciences, including state-of-the-art mathematical software, to solve problems in theoretical mathematics or in a diverse area of mathematical applications.

MA PR-5: *show maturity in mathematical knowledge and thinking* that prepares and encourages students to pursue graduate studies in mathematics or in related fields.

MA PR-6: *demonstrate an appreciation of* and *enthusiasm for* inquiry, learning and creativity in mathematical sciences, a sense of exploration that enables them to *pursue lifelong learning* and *up-to-date professional expertise* in their careers through various areas of jobs, including governmental, business or industrial jobs in mathematics, related sciences, education or technology.

Institutional Expected Student Learning Outcomes

UOG Expected Student Learning Outcomes December 2008

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

ILO1: Mastery of critical thinking & problem solving
ILO2: Mastery of quantitative analysis
ILO3: Effective oral and written communication
ILO4: Understanding & appreciation of culturally diverse people, ideas & values in a democratic context
ILO5: Responsible use of knowledge, natural resources, and technology
ILO6: An appreciation of the arts & sciences
ILO7: An interest in personal development & lifelong learning

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. These rights for students, parents and school officials can be viewed at:
http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html

DSS ACCOMMODATION SERICES

If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact the Student Counseling and Advising Service Disability Support Services office to discuss your specific accommodation needs confidentially. A Faculty Notification letter will be emailed to me specifying your approved accommodations. If you are not registered, you should do so immediately at the Student Center, Rotunda office #5, sssablan@triton.uog.edu or ph/TTY: 735-2460, to coordinate your accommodation request.

ACADEMIC DISHONESTY

Professional and ethical conduct is expected at all times. Unethical conduct includes any form of cheating, including plagiarism. The term "**cheating**" includes, but is not limited to: (1) use of any unauthorized assistance in taking quizzes, tests, or examinations, e.g., looking at other students' answers, using crib notes (including electronic), getting information from another person via any kind of communication; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; or (3) the acquisition, without permission, of tests or other academic material belonging to a member of the University faculty or staff. If you need to use an electronic translator, you must discuss this with me in advance. All assignments and tests must be your own work. Answers you write on the tests must come only from in your head or the information supplied in the test papers; anything else is cheating. Any evidence of cheating will result in a "0" for that assignments and/or exam or possibly an "F" for the entire course – final decision to be determined by me, the course instructor.

TOBACCO-,SMOKE-, and VAPE-FREE CAMPUS

UOG is a tobacco-free campus. Thank you for not using tobacco products on campus, and for helping make UOG a healthy learning and living environment. For more information visit: http://www.uog.edu/smoke-free-uog

COURSE POLICIES

There will be HW assigned every week. You can take the HW up to 3 times. The solutions to the homework will be posted. There will be quizzes every week.

NO MAKE-UPS FOR ANY QUIZZES, TESTS.

The final exam is cumulative.

For all the quizzes, tests and final exam you will have only one attempt. Once you start taking the test, the time will start counting. You can NOT start the test, stop it and come back at the later time.

You need to show the work on your quizzes and tests.

GRADING SYSTEM

Homework	25%
Quizzes	25%
Midterm test	25%
Final exam	25%

COURSE TOPIC/EXAM SCHEDULE

Week #	Topic
1	Types of variables, Sampling methods, Graphs
2	Measures of center, spread, position
3	Sample space, Probability Rules
4	Random Variables, Expected Value
5	Binomial Distribution
6	Normal Distribution, Normal Approximation to Binomial

7	Central Limit Theorem, Midterm Exam
8	CI Population Mean
9	CI Population Proportion
10	TH Population Mean
11	TH Population Proportion, Comparing Proportions
12	Chi-Square Test
13	Correlation, Regression
14	Comparing Means: Independent and Dependent Samples
15	ANOVA
16	Final Exam Review