MA301-01 Differential Equations 2016 Spring

Class Meeting: Monday, Wednesday 09:30AM - 10:50AM at WAREHOUSE B, Room 1 (WB1)
Instructor: Yoshifumi Takenouchi, Ph.D. (Office: SC 202)
E-mail: jytakenovich2006@yahoo.co.jp
Phone: 735-2828 (unless emergency use e-mail)
Office Hours:
MWThF 09:00AM - 09:30AM, 10:50AM - 12:30PM, at SC 202
and by an appointment

Main Textbook: John W. Dettman, *Introduction to Linear Algebra and Differential Equations*, Dover Publications, New York (1974,1986), [Chap 5 - Chap 9]
Sub Textbooks: Belinda Barnes, Glenn R. Fulford, *Mathematical Modelling with Case Studies -A differential equation approach using Maple*, Taylor & Francis (2002), [Chap 3, Chap 5 - Chap 7]

(Linda J.S. Allen, *An Introduction to Mathematical Biology,* Pearson Prentice Hall (2007)).

Catalog Course Description: This course covers the study of the fundamental concepts of differential equations with applications.

Course Content: First order differential equations and methods for their solution. Applications of first order equations. Solution of homogeneous linear equations of higher order, mechanical vibrations, nonhomogeneous equations, methods for finding particular solutions, forced oscillations and resonance. Power series solutions, including Bessel functions. The Laplace transform. Linear systems of differential equations. Qualitative properties and existence of solutions.

Rational for Offering Course: The basic content of the course is fundamental for any student wanting to learn about classical applications of mathematics in physics and engineering. Physical phenomena are almost without exception modeled by differential equations. Also, the course introduces students to ideas which permeate higher mathematics, such as linear independence, existence of solutions, etc.

Prerequisite: Grade of C or better in MA204.

Tentative Schedule:
1st-5th week
1st Exam (between 5th week and 6th week)
6th-9th week
2nd Exam (before Spring Break)
11th-14th week
3rd Exam (between 14th week and 15th week)
15th-17th week
Cumulative Final Exam: May 16-18

Grades: The total number of points available is 500. Grades will be no lower than those set forth in the following table. Student's work is usually graded on a partial credit basis. Student's written solutions must include all work needed in order to solve problems. Points will be deducted (or given none) for omitting any work even if the answer is correct.

Quizzes (almost every class)	100pt
1st Exam	100pt
2nd Exam	100pt
3rd Exam	100pt
Final Exam	100pt

A	90-100 %
B	80-90 %
C	70-80 %
D	60-70 %
F	0-60 %

or

Quizzes (almost every class)	125pt
1st Exam	125pt
2nd Exam	125pt
3rd Exam	125pt

A	90-100 %
B	80-90 %
C	70-80 %
D	60-70 %
F	0-60 %

Homework: Homework (Take-home quiz) will be assigned regularly. Homework is an essential component of the course. To be successful, a student must complete all assigned homework even if it is not collected and graded.

Quiz: There will be quizzes in most of classes. No make-up for quizzes. Your total quiz points will be adjusted (out of 100 points possible) at the end of the semester. The main purpose of the quiz is to let you prepare

for "bigger" Exams and cumulative Final Exam. So don't worry too much about your low score on a single quiz. However, **missing FOUR or more quizzes** will result in grade **F** as a course grade regardless of your total points. (Excused absence will be counted as missing half.)

Exams/Final Exam: There will be three exams and a cumulative final exam. All notes and the textbook are prohibited from use on quizzes, on exams and on the final exam. It is crucial to do well on Exams and Final Exam. **Missing any single Exam or Final Exam** will result in grade **F**. Very special circumstances will be handled very specially by consultation with the instructor. Except for true emergencies, these special cases are arranged in advance with the instructor.

Attendance: Students are expected to attend every scheduled class. It is the student's responsibility to keep informed of any announcements, syllabus adjustments or policy changes made during scheduled classes. **Those who often come late for the class may not be able to take quiz that day.**

Calculators: A graphing calculator (e.g. TI-83) is required for this course. Students are expected to have a working calculator for quiz / test / exam **with exception**. No calculator swapping is permitted during testing periods.

LAPTOP IS NOT ALLOWED TO USE IN CLASS.

But, of course, I recommend you to use your laptop computer with some software such as Maple, Mathematica, Matlab, etc at home to visualize and/or solve mathematics problems we study in our classes.

Learning Objectives for Students Upon successful completion of this course, students will be able to
1 Demonstrate ability to use the technology surrounding the study of differential equations.
2 Solve first order differential equations and those of higher order.
3 Use power series, Laplace transforms, and linear algebra techniques to solve differential equations.
4 Increase their mathematical maturity and ability to read mathematics and use it to solve applied problems.

5 Make use of appropriate computer software now available as an aid in calculations.

Course SLOs:	**Program Learning Outcomes (PLOs)**	**University Learning Outcomes (ILOs)**	**Method of Assessment**
1	MA PR-1,2	ILO-1,2,3,6,7	Pre-Quizzes, Quizzes, Board work, Exams
2	MA PR-1,2	ILO-1,2,3,6,7	Pre-Quizzes, Quizzes, Exams
3	MA PR-1,2	ILO-1,2,3,6,7	Pre-Quizzes, Quizzes, Exams
4	MA PR-1,2,3,4,5	ILO-1,2,3,5,6,7	Pre-Quizzes, Quizzes, Board work, Discussion in Classes, Computer
5	MA PR-1,2,3,4,5	ILO-1,2,3,5,6,**7**	Assignment, Computer

Math Program Learning Objectives:

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

MA PR-2: Demonstrate the knowledge of current mathematical applications, computing practices and technology use in industry, and science and education.

MA PR-3: Demonstrate ability to use modern software, abstract thinking, and mathematical practices connected to scientific and industrial problems, and demonstrate these skills that are currently used by technologies in society and education.

MA PR-4: Perform skills that enable them to evaluate, propose and convey novel solutions to scientific and business problems, etc.

MA PR-5: Demonstrate a sense of exploration that enables students to pursue lifelong learning and currency in their careers in mathematics, statistics, education, high-tech and bi-tech industries.

NOTE: Math Program Learning Outcomes are undergoing revisions.

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

Disabilities: If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/ADA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

MATH 302-01 Foundations of Higher Mathematics
Spring 2016
MW 14:00-15:20 at SC 121

Instructor: Hideo Nagahashi (office: WB #5)
E-mail: nagahashi_h@yahoo.com
Phone: 735-2788 (unless emergency use e-mail)
URL: http://www.uog.edu/nagahashi

Office Hours:
MW 8:30-11:00 at WB #5
T 8:30-9:30 at WB #5, and by an appointment

Required Text: How to Prove It: A Structured Approach, **2nd edition**, by Daniel Velleman

Catalog Course Description: This course provides a careful introduction to mathematical reasoning using definitions and proofs. Topics covered include set theory, logic and mathematical induction. Prerequisite: Grade of C or better in MA205.

Rational for Offering Course: This course serves as a bridge from the technique-oriented courses such as calculus to the proof-oriented upper-level mathematics offerings. Students need a course which concentrates on the understanding and creation of proofs and the basic tools needed in the upper-level courses, such as logic and set theory, so that they will be ready to apply the understanding and tools to the study of other mathematical ideas.

Prerequisite/Content: Students should have some mathematical maturity and exposure to rigorous mathematics provided in the calculus sequence. However, no specific prerequisite knowledge is necessary. The two thirds of the classes will cover logical symbols, their meanings and the proof strategies using them. Logic and proofs are so to speak the grammar of mathematical language. After you have mastered this "grammar" part, the rest—one third of the classes deal with more advanced (but still fundamental) topics including relations, functions, inductions, and cardinals.

Tentative Schedule:

1st-5th week	Jan 20-Feb 17	Ch 1,2	Test 1	Feb 17 (Wed)
6th-11th week	Feb 22-Mar 30	Ch 3	Test 2	Mar 30 (Wed)
12th-15th week	Apr 4-Apr 27	Ch 4,5	Test 3	Apr 27 (Wed)
16th-17th week	May 2-May 11	Ch 6,7	Final Exam	May 16 (Mon) 14:00-15:50

Grades: The total number of points available is 500. Grades will be no lower than those set forth in the following table. Student's work is usually graded on a partial credit basis. Student's written solutions must include all work needed in order to solve problems. Points will be deducted (or given none) for omitting any work even if the answer is correct.

Presentation	50pts
Quiz	50pts
Test 1,2,3	100pts × 3
Final Exam	100pts

A	**85**-100 %
B	**70**-85 %
C	**55**-70 %
D	**40**-55 %
F	0-40 %

Presentation: This course will require your active participation in class. Students are asked to write on the blackboard to explain the content and exercises in front of others. You are encouraged to work together and to see me discussing the content and preparing for the presentation. This will make you learn how to present, discuss and communicate with others. The oral presentation could be informal; it could be even sketchy if you succeed in convincing others. However, one of the SLO's of this course is to learn the process of turning the informal mathematical ideas into the formal narrative proofs. Whenever it is necessary, you will be asked to show the formal proof on board.

Quiz: **QUIZ EVERY CLASS** (in-class or take-home). No make-up for Quizzes. If you miss a Quiz, your point for that Quiz is zero. **THREE** lowest Quiz score will be dropped, and your total Quiz points will be adjusted (out of 50 points possible) at the end of the semester. The main purpose of the Quiz is to let you prepare for "bigger" Tests and the cumulative Final Exam. Do not worry too much about your low score on a single Quiz. However, failure to take **FOUR** Quizzes will result in grade **F** as a course grade regardless of your total points. (Excused absence will be counted as missing *half* if immediately reported.)

Test/Final Exam: There will be three in-class Tests and the **Cumulative** Final Exam. No make-up for Tests and Final Exam. All notes and the textbook are prohibited from use. It is crucial to do well on Tests and Final Exam. Missing any **SINGLE** Test will result in grade **F**. Very special circumstances will be handled very specially by consultation with the instructor. Except for true emergencies, these special cases are arranged in advance with the instructor.

Writing Mathematics: Students who studied a sequence of calculus courses often misunderstand that (doing math = computing numbers + manipulating symbols). In this course you will learn the very different aspects of mathematics. Nowadays almost all mathematical papers are written in the narrative English. You will learn how to write such English. Although your ultimate goal is to be able to write a narrative English proof of Theorems, it is helpful to start your writing from scratch. As the text shows, there *is* a systematic way to start your writing from scratch which is called the "structured approach". When you write a proof, you are encouragd to start from **scratch work** before the final **narrative English proof**. Your work will be graded on the basis of mathematical correctness, clarity, grammar, and style. For take-home Quiz, you may work with classmates. However, your final write-up must reflect on your own understanding. To check your understanding I might ask you to reproduce your writing on board without seeing it.

Visual Understanding: Not only in geometry, pictures and diagrams will help you understand the concept. There are many such examples in this course. You are often required to use pictures/diagrams to reinforce your idea for the presentation and writing.

Final Remark: To write an impressive novel in English, knowing English grammar is not sufficient but necessary. Similarly to create impressive mathematics, **logic is not sufficient but necessary**. This is the first course toward the goal. I hope you master the new point of view toward the "real" mathematics and will join the mathematicians community in the near future.

Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	MA PR 1,5	ILO 1	Homework, Presentations, Quizzes, and Tests
SLO 2	MA PR 1,3,4	ILO 1,3	Homework, Presentations, Quizzes, and Tests
SLO 3	MA PR 1,3	ILO 1,2,3	Homework, Presentations, Quizzes, and Tests
SLO 4	MA PR 1,4,5	ILO 1,2	Homework, Presentations, Quizzes, and Tests
SLO 5	MA PR 3	ILO 1,3	Homework, Presentations, Quizzes, and Tests
SLO 6	MA PR 1,3,4,5	ILO 1,2,3	Homework, Presentations, Quizzes, and Tests
SLO 7	MA PR 6	ILO 7	Homework and Presentations

(Course SLOs)
SLO 1: Implement set theoretic concepts to describe relations between mathematical objects.
SLO 2: Analyze, recognize and design the logical structure of mathematical statements.
SLO 3: Read, understand and explain basic mathematical proofs.
SLO 4: Invent and write down sound mathematical proofs utilizing various methods, including mathematical induction.
SLO 5: Demonstrate knowledge of functions, relations, orders and cardinalities.
SLO 6: Present mathematical statements symbolically, then turn this into the formal narrative proofs.
SLO 7: Discuss mathematics and communicate with others.

(Math PLOs)
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.

(UOG ILOs)
ILO 1: Mastery of critical thinking & problem solving
ILO 2: Mastery of quantitative analysis
ILO 3: Effective oral and written communication
ILO 4: Understanding & appreciation of culturally diverse people, ideas & values in a democratic context
ILO 5: Responsible use of knowledge, natural resources, and technology
ILO 6: An appreciation of the arts & sciences
ILO 7: An interest in personal development & lifelong learning

Special Accommodations: If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/ADA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

Academic dishonesty: All assignments and tests must be your own work. The term "plagiarism" includes, but is not limited, to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials. Plagiarizing in your essay or cheating on tests will be punished with a mark of 0. If a plagiarized essay is not replaced with original work I will assign you a grade of F for the course. There will be no make up for tests. If you are not sure what plagiarism is and how to avoid it in using sources for your work, see www.indiana.edu/~wts/pamphlets/plagiarism.shtml — but be careful when paraphrasing not to change the meaning of scientific information. 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. 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.

Tobacco-free/Smoke-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.

MA351-01 Discrete Structures 2016 Spring

Class Meeting: Tuesday, Thursday 09:30AM - 10:50AM, WAREHOUSE B, Room 1 (WB1)
Instructor: Yoshifumi Takenouchi, Ph.D. (Office: SC Bldg. Rm. 202)
E-mail: `jytakenovich2006@yahoo.co.jp`
Phone: 735-2828 (unless emergency use e-mail)
Office Hours:
MTWTh 09:00AM -09:30AM, 10:50AM - 12:30PM, at SC 202
and by an appointment

Text: Susanna S. Epp, *DISCRETE MATHEMATICS with Applications, 4th ed.,* (2010)

Catalog Course Description: This course introduces the rigorous theoretical framework within which ideas about computer science can be expressed.

Prerequisite: Grade of C or better in MA204.

Rational for Offering Course: The mathematical tools employed in computer science are very different from those needed in physics and engineering. Any student who is planning to continue in computer science needs to be familiar with discrete mathematics and logic. It is also desirable for mathematics majors to see examples of applications and mathematics in areas different from those related to calculus.

Tentative Schedule:
1st-5th week
    1st Exam (between 5th week and 6th week)
6th-9th week
    2nd Exam (before Spring Break)
11th-14th week
    3rd Exam (between 14th week and 15th week)
15th-17th week
    Cumulative Final Exam: May 16-18

Grades: The total number of points available is 500. Grades will be no lower than those set forth in the following table. Student's work is usually

graded on a partial credit basis. Student's written solutions must include all work needed in order to solve problems. Points will be deducted (or given none) for omitting any work even if the answer is correct.

Quizzes (almost every class)	100pt
1st Exam	100pt
2nd Exam	100pt
3rd Exam	100pt
Final Exam	100pt

A	90-100 %
B	80-90 %
C	70-80 %
D	60-70 %
F	0-60 %

or

Quizzes (almost every class)	125pt
1st Exam	125pt
2nd Exam	125pt
3rd Exam	125pt

A	90-100 %
B	80-90 %
C	70-80 %
D	60-70 %
F	0-60 %

Homework: Homework will be assigned regularly. Homework is an essential component of the course. To be successful, a student must complete all assigned homework even if it is not collected and graded.

Quiz: There will be quizzes in most of classes. No make-up for quizzes. Your total quiz points will be adjusted (out of 100 or 125 points possible) at the end of the semester. The main purpose of the quiz is to let you prepare for "bigger" Exams and cumulative Final Exam. So don't worry too much about your low score on a single quiz. However, **missing FOUR or more quizzes** will result in grade **F** as a course grade regardless of your total points. (Excused absence will be counted as missing half.)

Exams/Final Exam: There will be three exams and a cumulative final exam. All notes and the textbook are prohibited from use on quizzes, on exams and on the final exam. It is crucial to do well on Exams and Final Exam. **Missing any single Exam or Final Exam** will result in grade **F**. Very special circumstances will be handled very specially by consultation with the instructor. Except for true emergencies, these special cases are arranged in advance with the instructor.

Attendance: Students are expected to attend every scheduled class. It is the student's responsibility to keep informed of any announcements, syllabus

adjustments or policy changes made during scheduled classes. **Those who often come late for the class may not be able to take quiz that day.**

Calculators: Students are expected to have a working calculator for pre-quiz / quiz / exam **with exception**. No calculator swapping is permitted during testing periods.

LAPTOP IS NOT ALLOWED TO USE IN CLASS.

But, of course, I recommend you to use your laptop computer with some software such as Maple, Mathematica, Matlab, etc at home to visualize and/or solve problems we study in our classes.

Learning Objectives for Students Upon successful completion of this course, students will be able to
1. Develop the ability to think abstractly.
2. Appreciate the power and beauty of recursive thinking.
3. Exhibit facility in mathematical problems possessing symmetries, both geometric and algebraic.
4. Understand the idea of algorithm.
5. Become familiar with discrete mathematical structures.

Course SLOs:	**Program Learning Outcomes (PLOs)**	**University Learning Outcomes (ILOs)**	**Method of Assessment**
1	MA PR-1,3	ILO-1,2,3,6,7	Pre-Quizzes, Quizzes, Board work, Exams
2	MA PR-1,2,3	ILO-1,2,3,6,7	Pre-Quizzes, Quizzes, Board work, Exams
3	MA PR-1,2	ILO-1,2,3,6,7	Pre-Quizzes, Quizzes, Board work, Exams
4	MA PR-1,2,3,4,5	ILO-1,2,3,5,6,7	Pre-Quizzes, Quizzes, Board work, Computer
5	MA PR-1,2,3,4,5	ILO-1,2,3,5,6,7	Pre-Quizzes, Quizzes, Board work, Discussion in Classes, Computer

Math Program Learning Objectives:

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

MA PR-2: Demonstrate the knowledge of current mathematical applications, computing practices and technology use in industry, and science and education.

MA PR-3: Demonstrate ability to use modern software, abstract thinking, and mathematical practices connected to scientific and industrial problems, and demonstrate these skills that are currently used by technologies in society and education.

MA PR-4: Perform skills that enable them to evaluate, propose and convey novel solutions to scientific and business problems, etc.

MA PR-5: Demonstrate a sense of exploration that enables students to pursue lifelong learning and currency in their careers in mathematics, statistics, education, high-tech and bi-tech industries.

NOTE: Math Program Learning Outcomes are undergoing revisions.

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

Disabilities: If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not

registered with the EEO/ADA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

MATH 385 Applied Statistics
Spring 2016
MW 12:30-13:50 at HSS 304

Instructor: Hideo Nagahashi (office: WB #5)
E-mail: nagahashi_h@yahoo.com
Phone: 735-2788 (unless emergency use e-mail)
URL: http://www.uog.edu/nagahashi

Office Hours:
MW 8:30-11:00 at WB #5
T 8:30-9:30 at WB #5, and by an appointment

Text: Elementary Statistics, A Step by Step Approach, **7th Edition** by Bluman

Catalog Course Description: This course covers: statistical inference, sampling theory, hypothesis testing, correlation, and non-parametric statistics as applied to the social, life and physical sciences and to business. Prerequisite: Grade of C or better in MA151 or equivalent course.

Rational for Offering Course: Applied Statistics covers the important field of data processing analysis. This process is a basis for good decision making.

Tentative Schedule:

1st-6th week	Jan 20-Feb 24
7th-12th week	Feb 29-Apr 6
13th-18th week	Apr 11-May 11

Ch 7,8
Ch 9,10
Ch 11,12

Test 1	Feb 24 (Wed)
Test 2	Apr 6 (Wed)
Test 3	**May 16 (Mon) 12:00-13:50**

Grades: The total number of points available is 400. Grades will be no lower than those set forth in the following table. Student's work is usually graded on a partial credit basis. Student's written solutions must include all work needed in order to solve problems. Points will be deducted (or given none) for omitting any work even if the answer is correct.

Quiz	100pts
Test 1	100pts
Test 2	100pts
Test 3	100pts

A	90-100 %
B	80-90 %
C	70-80 %
D	60-70 %
F	0-60 %

Homework: Homework is assigned from the required Textbook. Homework is an essential component of the course. To be successful, do all assigned problems even if it is not collected and graded.

Quiz: **QUIZ EVERY CLASS** (in-class or take-home). No make-up for Quizzes. If you miss a Quiz, your point for that Quiz is zero. Instead **THREE** lowest Quiz score will be dropped, and your total Quiz points will be adjusted (out of 100 points possible) at the end of the semester. The main purpose of the Quiz is to let you prepare for "bigger" Tests and the cumulative Final Exam. Do not worry too much about your low score on a single Quiz. However, failure to take **FOUR** Quizzes will result in grade **F** as a course grade regardless of your total points. (Excused absence will be counted as missing *half* if immediately reported.)

Test: There will be three in-class Tests. No make-up for Tests. All notes and the textbook are prohibited from use. It is crucial to do well on Tests. Missing any **SINGLE** Test will result in grade **F**. Very special circumstances will be handled very specially by consultation with the instructor. Except for true emergencies, these special cases are arranged in advance with the instructor.

Attendance: Students are expected to attend every scheduled class. It is the student's responsibility to keep informed of any announcements, syllabus adjustments or policy changes made during scheduled classes. ***I will give warning if a student often comes late for the class. Once you get the warning, you cannot take quiz when you are late next time and it will be counted as missing that quiz.***

Calculators: A graphing calculator (e.g. TI-83) is required for this course. Students are expected to have a working calculator for Quiz/Test/Final **with exception**. No calculator swapping is permitted during testing periods.

PC/Mac/Tablet/Cell etc. are not allowed to use for Quiz/Test.

Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	MA PR 1,2,3	ILO 1,2,3	Homework, Quizzes, and Tests
SLO 2	MA PR 1,2,3	ILO 1,2,3	Homework, Quizzes, and Tests
SLO 3	MA PR 1,2,3	ILO 1,2,3	Homework, Quizzes, and Tests
SLO 4	MA PR 1,2,3	ILO 1,2,3	Homework, Quizzes, and Tests
SLO 5	MA PR 1,2,3	ILO 1,2,3,6	Homework, Quizzes, and Tests
SLO 6	MA PR 1,2,3	ILO 1,2,3,6	Homework, Quizzes, and Tests

(Course SLOs)
SLO 1: Calculate and interpret interval estimates of population parameters for single sample and two sample cases.
SLO 2: Perform steps for significance tests about the hypothesis of one or two populations. Understand the concept of p-value.
SLO 3: Perform an ANOVA and subsequent tests for multiple comparisons.
SLO 4: Construct a chi-square table and perform chi-square tests.
SLO 5: Represent data of two quantitative variables on a scatter plot, compute and interpret the correlation, and describe how the variables are related.
SLO 6: Compute the linear regression to make and interpret the model in the context of the data. Use the linear regression to make predictions.

(Math PLOs)
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.

(UOG ILOs)
ILO 1: Mastery of critical thinking & problem solving
ILO 2: Mastery of quantitative analysis
ILO 3: Effective oral and written communication
ILO 4: Understanding & appreciation of culturally diverse people, ideas & values in a democratic context
ILO 5: Responsible use of knowledge, natural resources, and technology
ILO 6: An appreciation of the arts & sciences
ILO 7: An interest in personal development & lifelong learning

Special Accommodations: If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/ADA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

Academic dishonesty: All assignments and tests must be your own work. The term "plagiarism" includes, but is not limited, to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials. Plagiarizing in your essay or cheating on tests will be punished with a mark of 0. If a plagiarized essay is not replaced with original work I will assign you a grade of F for the course. There will be no make up for tests. If you are not sure what plagiarism is and how to avoid it in using sources for your work, see www.indiana.edu/~wts/pamphlets/plagiarism.shtml — but be careful when paraphrasing not to change the meaning of scientific information. 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. 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.

Tobacco-free/Smoke-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.

MA*387 Statistics for Sciences

Meeting time : ONLINE
Instructor: Dr. Grazyna Badowski
Office: SC*201
Office hours: By appointment.
Phone: 735 2840
Email: grazyna.badowski@gmail.com
Moodle: enrollment key: MA387-01f2fGB
TA:

Statistics is a collection of concepts, principles, and methods that help scientists learn about the world. It is an important tool in daily life. It helps us understand the world.

Catalog course 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.

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

Course Objectives:
1. To develop the ability to use the tools and techniques of statistics;
2. To develop an intuitive understanding of the fundamental theorems and ideas of statistics;
3. To become aware of the uses of statistics in business and economics;
4. To develop the ability to apply statistics in problem solving in natural and social sciences.

Topics:

1. Summary of the data by using graphs.
2. Estimates of population parameters.
3. Significance tests about the hypothesis for one or two populations.
4. ANOVA and subsequent tests for multiple comparisons.
5. Chi-square tests.
6. Regression line.

Course delivery method
This course delivered via distance learning will enable students to complete academic work in a flexible manner, completely online. Course materials and access to an online learning management system will be made available to each student. The nature of an on-line course requires a significant amount of independent work. The student will be provided with structure, resources, guidance, and feedback for learning the course material. The student, however, is responsible for managing time, completing assignments on time, completing the readings, and making inquiries as needed to complete the course effectively.
Students are expected to complete all course work **on time**. Therefore, no extensions or last-minute exceptions are anticipated. Feedback will be provided by the course instructor and the grader.
Due to the busy schedules of the students, all work and discussions are asynchronous, meaning you are not required to be on-line at a specific time with the professor or other students. However, the University requires that each student access the classroom at least weekly during the semester. You may use your assignments, a message, a question, or a scheduled contact to fulfill this requirement. Naturally, you should check the course Announcements at the beginning of each week for important course information and reminders. Likewise, you should check the Forums section of our classroom and contribute to the discussions initiated there.

Grading policy

Homework	20%
Quizzes	20%
Midterm test	20%
Final exam	20%
Project	20%

There will be HW assigned and collected every week. The homework will be due each Tuesday 11:59PM. You need to upload HW on the moodle in pdf format. You do not need to type, you can just scan it and save as pdf. For some HW you will need to use EXCEL or other software.
There will be quiz posted every week, the students will have a limited time to access the quiz (usually Th 6am – F 6pm)
Two lowest Hw scores and two lowest quizzes scores will be dropped.
There will be no make-up tests. The final exam is cumulative.

Final grade: 900-1000 = **A**, 800-899 = **B**, 700-799 = **C**, 600-699 = **D**, 0-599 = **F**

Software:
For some homework and a project you will need to use software. You can just use EXCEL but if you have access to SPSS, you can also use SPSS. There is also another nice software that you can use online and it stores your data but it costs $13.75 per 6 months.

Students with disabilities
If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with EEO/ADA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

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All assignments and tests must be your own work. The term "plagiarism" includes, but is not limited, to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials. Plagiarizing in your essay or cheating on tests will be punished with a mark of 0. If a plagiarized essay is not replaced with original work I will assign you a grade of F for the course. There will be no make up for tests. If you are not sure what plagiarism is and how to avoid it in using sources for your work, see www.indiana.edu/~wts/pamphlets/plagiarism.shtml— but be careful when paraphrasing not to change the meaning of scientific information. 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. 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.

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COMPUTER PROJECT GUIDELINES

Choose the topic that is interesting to YOU. State the research questions you hope to answer with your data. Good projects begin with very clear and well-defined hypotheses. You should think of questions that interest you first, then worry about how to collect and analyze data to address those questions.

Data Collection

You may collect your own data using a questionnaire or by conducting an experiment, or you may use pre-existing archival data. If you wish, you may choose a data set that may be used for a report or project for another class.

Guidelines for Writing Report of Your Project.

Research Question

State the research questions you hope to answer with your data. Describe why this question is of interest or Is important to answer. State any hypotheses you have about what you expect to find and why.

Methods

Describe the method used to obtain your data. For example, if you use a survey, describe how the survey was designed, how your sample was chosen, and include a copy of the survey with your report. If you are using archival data (data obtained previously by another researcher), describe how the data was originally gathered, and how you obtained the dataset.

Describing Your Dataset

Describe what each variable measures. A copy of the dataset with labeled variables must be attached to your report. If your data set is extremely large, handing in a subset of observations is acceptable.

Description of Statistical Analyses, Procedures Used, and Reporting of Results

After providing the description of your dataset and research question, you should apply what you have learned about descriptive statistics, graphical methods, and inferential statistics to your data set. Focus on methods that help you answer your research question. The goal is not to do an unfocused exhaustive data analysis ie., do not calculate every statistic and procedure you have learned for every variable, but rather demonstrate that you are proficient at selecting appropriate statistical methods, using Excel (or other software) on a basic level, and interpreting and presenting the results.

Interpretation of Results

Interpret the results of your analyses. What do they mean statistically and in terms of your research question? Discuss the reliability and validity of your data, and appropriateness of the statistical analyses performed. Include suggestions for future research.

Grading of the project: The point distribution for the project will be as follows:

1. (50 points) Planning and data collection.
   a) The research question(s) and test hypothesis stated clearly.
   b) Data collection methods described clearly. The data set included together with description of variables.
2. (50 points) Statistical Analysis.
   a) Appropriate statistical procedures carried out and interpreted correctly.
3. (100 points) Writing and Presentation.
   a) Writing is clear and concise.
   b) Graphs, tables, statistical analyses, and any attachments neatly presented.
   c) Presentation clearly organized with three parts:
      i. Research question/hypothesis
      ii. Data collection and statistical analysis
      iii. Conclusions/future research.

Rubric for grading project presentations.

MA 387 Title: _____Name of presenters: _____

Points	0	1	2	3
1.Hypothesis/research question stated clearly.				
2. Data collection methods described, appropriate data collected.				
3. Description of data variables clear.				
4. Analysis clear; chose appropriate tests and graphs for the question and data.				
5. Correct conclusions were presented.				
6. Problem interesting.				
7. Learnt something new from the presentation.				
8. Presentation was well organized and easy to follow.				
9. The presentation was convincing and reflected a good understanding of the topic.				

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 deviation) of two or more different data sets.	MA PR-1 MA PR-4	ILO-1 ILO-2	Questions on homework assignments, quizzes and tests. Final Project.
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