UNIVERSITY OF GUAM
UNIBETSEDÅT GUAHAN

College of Natural & Applied Sciences
**Division of Mathematics & Computer Science**

MA 110 Basic Mathematical Applications Fanuchanan (Fall) 2023

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| **Class Meeting:** | MW 11:00 – 12:20 a.m. | Moodle |
| **Instructor:** | Zoltan Szekely, Ph.D. | Associate Professor |
| **Office:** | SC 106 "Sakay" | **Phone:** 735-2830 |
| **Email:** | zszekely@triton.uog.edu | |
| **Office Hours:** | MTTh 4:00 – 6:00 p.m. | |

**Catalogue Course Description:**
The Basic Mathematical Applications course covers *linear, quadratic, polynomial, exponential* and *logarithmic functions,* and their applications to *finance* and *economics*. This course also introduces solving *systems of linear equations*, *matrix operations*, and a treatment of *linear programming* which includes the graphical method.
*Prerequisite*: MA 085 Level II or Placement.

**Rationale for Offering the Course:**
This course satisfies the *GE requirement for Math* in the Essential Skills category, preparing students not only for how to make a living but also how to live a productive and fulfilling life. Students will also learn how to *critically interpret quantitative data* and use *mathematical modeling*.

**Intended Student Learning Outcomes (SLOs):**
After completing the course, successful students will be able to
1. *demonstrate* familiarity with linear, quadratic, exponential and logarithmic functions,
2. *apply* the concept of function in making models for problem solving,
3. *solve* systems of equations and *perform* operations on matrices,
4. *construct* mathematical models and solutions for optimization problems graphically.

**Format/Activities in the Class:**
It is an online course using Moodle. Participate at *each class session on time*. Learning mathematics requires that you work and *practice mathematics every day*. Dialogue and cooperative learning are encouraged. You will learn *clear communication* of your ideas. Your instructor is hard of hearing. Please, type your questions into the chat column during BigBlueButton sessions. You

may also email me any time. As a requirement, you will need a *TI-83, TI-84* or equivalent *graphing calculator* in this class.

**Textbook:** *Mathematical Applications for the Management, Life and Social Sciences* by Harshbarger, Reynolds,11th edition, we will cover *Chapters 0-6* as time allows, in a timely schedule.

**Assignments, Quizzes, Tests:**
You will have to *read the textbook for each class in advance* and review the section. Please, practice a good number of *homework exercises* from the textbook. Please note that all work, quiz or test you submit must reflect *your own individual efforts*. Keep in mind that the scores (including the overall *semester score*) you earn in this class *will be in direct correlation with the individual effort you invest in studying your subject!*

Please, be ready for 20-25-minute-long *multiple-choice Quizzes* at any time with questions similar to your homework assignments. You are recommended to *practice both even and odd numbered exercises* from your textbook. There will be a two-part Midterm Test at about half-way of the Session. A preliminary time schedule is listed below. Timing may change depending on the progress we make with the class material. The *Final Test is cumulative.*

**Format of Quiz and Test Submissions:**
Quizzes will have time limitations. Please, complete your Quizzes in the given time limit. Each Quiz can be attempted only once, at the assigned time during class. You will have immediate score information and feedback after taking a Quiz.

**Tentative Course Calendar:**

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|---|---|---|---|
| Weeks 0-2 | *Chap 0 Algebraic Concepts*<br>0.1 Sets 0.2 Real Numbers<br>0.3 Integral Exponents<br>0.4 Radicals and Rational Exponents<br>0.5 Operations with Algebraic Expr.<br>0.6 Factoring<br>0.7 Algebraic Fractions<br><br>*Chap 1*<br>*Linear Equations and Functions*<br>1.1 Linear Equations and Inequ.s | Weeks 9-10 | 3.3 Gauss-Jordan Elimination<br><br>3.4 Inverse of a Square Matrix, Matrix Equations<br><br>*Chap 4 Inequalities and Linear Programming*<br><br>as time allows |
| Weeks 3-4 | 1.2 Functions<br>1.3 Linear Functions<br>1.5 Solutions of SoLEs<br>1.6 Applications of Functions<br><br>Review | Weeks 11-12 | *Chap 5 Exponential and Logarithmic Functions*<br>5.1 Exponential Functions<br>5.2 Logarithmic Functions<br>5.3 Equations and Applications |
| Weeks 5-6 | *Chap 2 Quadratic and Other Special Functions*<br>2.1 Quadratic Equations<br>2.2 Quadratic Functions: Parabolas<br>2.3 Business Applications<br>2.4 Special Functions<br>2.5 Modeling | Weeks 13-14 | *Chap 6 Mathematics of Finance*<br>6.1 Simple Interest, Sequences<br>6.2 Compound Interest, Geometric Sequences |
| Weeks 7-8 | Review<br>Midterm<br><br>*Chap 3 Matrices*<br>3.1 Matrices<br>3.2 Multiplication of Matrices | Weeks 15-16<br><br>Final Test | Review<br>Review for the Final<br><br>During the Final Week |

The *due time* for finishing a Test will be set. A second time limit, the *cut-off time* will give you up to 15 more minutes to submit your solution. So, after completing a Test, you'll have only limited time for submitting your answers by uploading it to Moodle! *No submission is possible after the cut-off time.* Also, no other way of submission will be accepted, only through Moodle. So, make sure that you manage your time properly during a Test.

**Preliminary Test dates** (any change will be announced in class):

- Midterm: .....  The *Final* is on .....
  December .....

**Evaluation and Grades:**
There will be up to 12 Quizzes, the first collection of up to 6 Quizzes before the Midterm and the second collection of up to 6 more Quizzes after the Midterm till the end of the session. The lowest Quiz will be dropped from both collections, so overall, *two Quizzes of the lowest scores will be dropped.* Quizzes earn up 10 points each, while Tests earn up to *100 points*. Please, note that Moodle calculates your scores automatically, that will be valid for *individual Quizzes* only, but not for your overall class performance. It won't be Moodle, but your instructor who gives you the correct information for overall averages and scores!

- Quizzes: 40 %
- Midterm: 20 %
- Attendance, participation and course evaluation: 10 %
- Final: 30 %
- Total: 100%

**Grading Scale:**

- A: 100 – 90%  - B+: 89.9 – 85%  - B: 84.9 – 80%  - C+: 79.9 – 75%
- C: 74.9 – 70%  - D: 69.9 – 60%  - F: 59.9 – 0%

A Pre-Final Score (including all but the Final Score) that you will have earned by your class work during the session including your Quiz Scores, Midterm Score, attendance, and participation scaled up to 100% will be

calculated and provided to you before you take the Final Test. Grade information can be obtained via email for a limited time after taking the Final. To receive it, you will have to send an email to your instructor after 2 days of the Final. This email will be replied with the following information: Final Test Score, Overall Semester Score, and the Semester Grade you earned.

**Course policies:**

Attend each class on time, participate and do the coursework. Attendance will be recorded. If you cut a class, it is *your responsibility* to make up any missed class material. Pagers, cell phones, or any distractive devices must be *turned off* in the classroom. Be courteous in class, don't chat, respect and pay attention to your instructor/classmate who works at the board. *Focus on learning* so that your understanding benefits the most from your participation in the class activities.

*Academic dishonesty* and *plagiarism* are serious violations of university policy, punished by failing grade and/or suspension. *Never cheat* and *never be dishonest*!

*Make-up policy: No make-up for missed Quizzes or homework*. If you must miss a Test, let your instructor know it in advance. If your excuse is approved, you may make up *one Test* on the last week of classes. You need to give a written request for any make-up Test *at least one week before* you take it.

**Best practices to follow for preparation to classes in this course:**

Study *at least 2 hours* for this course every day. Start with a short *review* of the previous section, making sure that you understand and correct if needed the solutions for the assigned exercises. Also review the last Quiz you received back. *Then read through the current section* from your textbook paying special attention to the worked-out examples. When completed, *compare what you read with your class notes* and go through the examples we had in class again. After this, you are ready to try to *solve the new exercises* from the homework sheet. *Give your best effort*. After finish, check

the solution key in the book. If your answer does not match, try again. Please note that the book may have, occasionally, typos in the solution key.

*Write down the homework* assignments in a separate booklet indicating your name, the date, the section and the exercise number for each exercise. If there is a *work sheet* handed out, work out the answers to those questions, as well. If you get stuck, *seek help* from your instructor. Office hours, phone or email are all suitable ways to contact him. *Do not give up on trying until you succeed.* We'll have time to discuss solutions for the most challenging exercises in class. *Bottom line:* It is a challenging course. You'll have help available to succeed. You'll also need determination.

Make special preparation for *review classes, Quizzes,* and the *Midterm*. If you have a question, *don't hesitate to ask* in the class or visit me during my office hours. There is no guarantee that you would obtain a passing grade easily in this course, but if you follow these best practices, *you will have the best chances to earn a good grade.*

**Policy on Academic Integrity:**

Academic honesty is fundamental to our learning community. The University maintains a Code of Academic Integrity. A confirmed violation of that Code in this course will result in *failure* for the course. Cheating is strictly prohibited because it *devalues the degree* you are working hard to get. As a member of the University community, it is your responsibility to protect your educational investment by knowing and following the rules. *Academic dishonesty* and *plagiarism* are serious violations of university policy, punished by failing grade and/or suspension. *Never cheat* and *never be dishonest*!

Professional and ethical conduct is always expected. 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. 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 those assignments and/or exam or possibly an "F" for the entire course.

All Students should be aware that the Division of Mathematical Sciences takes the University *Code on Academic Integrity* very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects or assignments, or any form of cheating in quizzes and exams. *Academic dishonesty* includes cheating, fabricating or falsifying information or improper collaboration. *Plagiarism* is taking credit for someone else's work whether deliberately or unintentionally. This includes but is not limited to turning in all or part of a written assignment by *someone other than yourself* (a friend, an *internet source*, etc.) and claiming it as your own. If you use a *solution manual*, you have to provide exact reference for it.

To be successful in this class, all work on exams and quizzes must be *yours and yours alone.* You may not receive outside help. On examinations and Quizzes, you will never be permitted to use your notes, textbooks, cell phones, or any other study aids.

**ADA Accommodation Services:**

DSS Accommodation Services
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.

**Family Education 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

**Tobacco Policy:**

The University of Guam is a tobacco-free campus and has a total ban on sales, smoking and distribution and use of tobacco and tobacco-based products on campus. UOG is committed to promoting the health, wellness and social well-being of the University Community, the people of Guam and the Western Pacific.

**Contact for classmates:**

You are encouraged to exchange *contact information* with your classmates. Choose at least one *study partner*. Contact your classmate(s) if you miss a class and make up the missed material. You are also encouraged to form *study groups.*

List here some contact information from your classmates:

| Name | Phone Number | Email address | Study partner?(y/n) |
|---|---|---|---|
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LEARNING OUTCOMES INFORMATION

**Intended Student Learning Outcomes (SLOs):**
After completing the course, successful students will be able to:

- *MA 110 SLO1 – demonstrate* familiarity with linear, quadratic, exponential and logarithmic functions,
- *MA 110 SLO2 – apply* the concept of function in making models for problem solving,
- *MA 110 SLO3 – solve* systems of equations and *perform* operations on matrices,
- *MA 110 SLO4 – construct* mathematical models and solutions for optimization problems graphically.

**General Education Essential Skills in Math SLOs:**
Students completing general education in mathematics at the UOG will:

- *GE MA SLO1 – utilize* algebraic skills to *interpret* and *process* quantitative data,
- *GE MA SLO2 – identify* and *classify* functions by properties and application areas,
- *GE MA SLO3 – demonstrate* familiarity with basic mathematical concepts and methods,
- *GE MA SLO4 – develop* skills to *present, visualize* and *solve* problems using mathematical modeling.

**Mathematics Program Learning Outcomes (PLOs):**
Students completing the mathematics program at the UOG will:

- *MA PR PLO1 – 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 PLO2 – 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 PLO3 – 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 PLO4 – 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 PLO5 – show* maturity in mathematical knowledge and thinking that prepares and encourages students to pursue graduate studies in mathematics or in related fields,
- *MA PR PLO6 – 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 Learning Outcomes (ILOs):**

After graduating at the UoG, successful students will *demonstrate* and *apply:*

- *UoG ILO 1* – mastery of *critical thinking* and *problem solving,*
- *UoG ILO 2* – mastery of *quantitative analysis,*
- *UoG ILO 3* – effective oral and written *communication,*
- *UoG ILO 4* – understanding and appreciation of *culturally diverse* people, ideas and values in a democratic context,
- *UoG ILO 5 – responsible* use of knowledge, natural resources, and technology,
- *UoG ILO 6* – an appreciation of the *arts* and *sciences,*
- *UoG ILO 7* – an interest in *personal development* and *lifelong learning.*

**Curriculum Mappings:**

| | *MA PR PLO1* | *MA PR PLO2* | *MA PR PLO3* | *MA PR PLO4* | *MA PR PLO5* | *MA PR PLO6* |
|---|---|---|---|---|---|---|
| *MA 110 SLO1* | x | | | | x | x |
| *MA 110 SLO2* | x | | | | | |
| *MA 110 SLO3* | x | | | | | |
| *MA 110 SLO4* | x | | | | | |

| | *UoG ILO1* | *UoG ILO2* | *UoG ILO3* | *UoG ILO4* | *UoG ILO5* | *UoG ILO6* | *UoG ILO7* |
|---|---|---|---|---|---|---|---|
| *MA PR PLO1* | x | x | | | | | |
| *MA PR PLO2* | x | x | | | | | |
| *MA PR PLO3* | x | x | x | | | | |
| *MA PR PLO4* | x | x | x | | | x | |
| *MA PR PLO5* | | | | | x | x | |
| *MA PR PLO6* | | | | | x | x | x |