COURSE SYLLABUS

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SECTION 1: COURSE INFORMATION

Format: Eight weeks.

Course ID: MATH 1323

Course Title: Explorations in Mathematics

College: College of Unrestricted Education

Prerequisites: None

Credit Hours: 3

Instructor: See the online course in MyFIRE for instructor contact information and availability.

Course Description

This is a discrete mathematics course that demonstrates the beauty and utility of mathematics. Topics for this course are history of mathematics, numbers and number systems, financial mathematics, and systems of linear equations and inequalities, graph theory, voting, and apportionment.

Course Overview

This course is designed to give students a broad-based general overview of mathematics, especially those majoring in the liberal arts, elementary education, and the social sciences. The course is designed to give students a variety of instructional tools to help students become proficient in mathematics and apply it to everyday life.

Course Workload

Time spent on course assignments will vary by student depending on familiarity with course content, reading rate of speed, writing rate of speed, and other individual factors. Based on averages for most students, it is estimated that the course workload estimate for this course is 13 to 15 hours per week.

Course Materials

This course is utilizing Follett Access®, a new and convenient program designed to ensure every student has the course materials they need to succeed. When you register for this course, the required course materials will be ordered for you, and the cost of the materials will be applied to your student account as a course fee. This feature enables you to identify the full cost of your course upfront with no surprises of additional out of pocket expenses for required course materials.
Once you are registered in the Student Information System (JICS) and you gain access to the course, you will automatically have access to the required course materials.
If you have questions about the cost of your course materials, please access your financial statement through the Student Information System (JICS). The cost will be listed as a course material(s) fee.
Grades: Grades that appear in Pearson are not reflective of course grades; course grades will appear in MyFIRE only.

Required and optional textbooks are accessed and ordered through SEU's bookstore.

Disclaimer: The resources utilized in this course provide information, thoughts and insights that should encourage critical thinking on the part of the student. Please note as well that as an Assembly of God institution, Southeastern University does not necessarily endorse specific personal, religious, philosophical, or political positions found in these resources.

Course Topics

The purpose of this course is to introduce, reinforce, and measure learning on the following topics:

1. Systems of Numeration
2. Applications of Algebraic Functions & Graphs
3. Consumer Math
4. Graph Theory
5. Voting & Apportionment

Intended Learning Outcomes

As a result of reading, study, and assessments in this course, the student should be able to:

1. Comprehend early systems of numeration and computational methods.
2. Explain the properties of the Hindu-Arabic numeration system and other place value systems we use today.
3. Solve application problems by applying linear, quadratic, and exponential models.
4. Solve application problems of systems of linear inequalities using linear programming graphing methods.
5. Calculate simple and compound interest to solve real-life loan and investment problems.
6. Apply basic financial mathematics to monthly payments and annual percentage rate for fixed installment loans.
7. Use graphs and trees to represent real-life settings.
8. Demonstrate an understanding of graph movement through paths, circuits, and bridges.
9. Solve real-life problems using Euler and Hamilton paths and circuits.
10. Apply various voting methods to determine the winner of an election.

11. Apply the fairness criteria to determine flaws in voting methods.
12. Apply various methods of apportionment and identify flaws.

Late Work

Work ahead: For planned events (mission trips, vacations, surgeries) you are invited to work ahead in order to submit work by the due date. No permission is needed.

Request an extension: If you know you will not be able to turn in work on time, contact your professor at least 24 hours before the assignment is due. Let the professor know about your circumstances and when you can turn the work in. If the professor decides to grant you an extension and you get the work in when you say you will, there will not be a penalty. You should only request an extension when something unforeseen comes up that you have no control over; a professor has no obligation to grant an extension and will be less inclined to do so if you are asking for one every week.

Late work: Without prior arrangements, late work* submitted within one week of the original due date will be considered for partial credit. Work will ONLY be accepted for the first seven days after it is due. NO WORK will be accepted past the last day of the course.

*Discussion Posts: late participation in discussion forums is not accepted for late credit. The purpose of the discussion forum is to engage with your classmates on substantive ideas related to the course material, and your classmates will not revisit forums past the due dates. Similarly, professors will not revisit forums to grade past discussion due dates.

Professors of Foundational Core courses have been instructed to follow this policy to ensure fairness across all FC classes. Your professor will work with you if true emergencies occur, but your busy schedule will not be considered an emergency. If you have travel, a vacation, a wedding, or any other plannable event, it is up to you to communicate with your instructor to avoid grade penalties.

Extra Credit

No extra credit accepted.

SECTION 2: SOUTHEASTERN POLICIES

Academic Policies

View this link to see Southeastern's Policies regarding SEU's Mission and Vision Statements, Title IX Statement, Student Services, Class Participation, Official Email, MyFIRE Use, Technical Difficulties, Technical Support, Disability Statement, Academic Honesty, Course Evaluation, Official Withdrawal, Grading Scale, and Netiquette.

SECTION 3: COURSE SCHEDULE

The **Course Schedule** provides a listing of your work in this course. The assessments are listed by Module and include the due dates and point values.

Note: Assignments are due by 11:59 p.m. EST on the due date, unless otherwise noted.

AIM, LEARN, AND APPLY DESCRIPTIONS

Aim

 When you see the Aim icon, you will be introduced to topics and ideas that will be covered throughout this module. The AIM will also provide you with a glimpse into your learning objectives and an introduction to this module.

Learn

 When you see the Learn icon, all of your reading assignments will be listed and may include additional resources that your instructor is providing to help you complete the activities and assessments for the module.

Apply

 When you see the Apply Icon, it will be time to demonstrate your learning for the module. The items here are those in which you'll be graded and may include discussions, activities, assignments, quizzes, exams, and projects.

MODULE 1

XX/XX/XX – XX/XX/XX

- Complete the College Readiness Test
- Complete the course Pretest
- Gain experience using discussion boards by introducing yourself to the class
- Demonstrate an understanding of the difference between numbers and numerals
- Write numbers using additive systems of numeration such as Hindu-Arabic, Egyptian hieroglyphic, and the Roman system
- Demonstrate an understanding of the place-value base-10 numeration system by writing numbers in expanded form

- Readings
  - eText links included in the individual assignment page
  - Section 4.1 – Additive Systems of Numeration, Pages 163 – 167
  - Section 4.2 – Place-values, Pages 172 – 173
- Learning Resources
  - MyFire assigned videos for Sections 4.1 and 4.2 included in the individual assignment page
  - Homework help in MyFire (View an Example, Help Me Solve It, Ask My Instructor, etc.)

- College Readiness Test
  - ILOs: N/A
  - Due: Tuesday (As soon as possible to open up the rest of the assignments)
  - Points: Ungraded (Grade used to determine the need for supplemental instruction)
- Pretest
  - ILOs: 1-12
  - Due: Tuesday (As soon as possible to open up the rest of the assignments)
  - Points: Ungraded (Grade used to determine the need for supplemental instruction)
- Discussion Forum 1
  - Due: Saturday (initial post), Tuesday (response posts)
  - Points: 100
- 4.1 / 4.2 Systems of Numeration & Place Value
  - ILOs: 1
  - Due: Tuesday
  - Points: 20
- 4.1 Quiz
  - ILOs: 1
  - Due: Tuesday
  - Points: 8

MODULE 2:
XX/XX/XX – XX/XX/XX

- Convert between Hindu-Arabic numerals and numerals with bases less than ten
- Convert between Hindu-Arabic numerals and numerals with bases greater than ten
- Add numerals with bases other than base 10
- Subtract numerals with bases other than base 10
- Multiply whole numbers using the duplation and mediation method
- Multiply whole numbers using the lattice method
- Research and discuss a historical number system from a culture in Bible times
- Demonstrate understanding of the objectives from Modules 1 and 2 in a summative assessment

- Readings
    - eText links included in the individual assignment page
    - Section 4.3 – Other Bases, Pages 179 – 183
    - Section 4.4 – Computation in Other Bases, Pages 186 – 189
    - Section 4.5 – Early Computational Methods, Pages 194 – 196
- Learning Resources
    - MyFire assigned videos for Sections 4.3, 4.4, and 4.5 included in the individual assignment page
    - Homework help in MyFire (View an Example, Help Me Solve It, Ask My Instructor, etc.)

- Discussion Forum 2
  - ILOs: 1
  - Due: Saturday (initial post), Tuesday (response posts)
  - Points: 100
- 4.3 Other Bases
  - ILOs: 1 and 2
  - Due: Tuesday
  - Points: 16
- 4.3 Quiz
  - ILOs: 1 and 2
  - Due: Tuesday
  - Points: 5
- 4.4 Computation in Other Bases
  - ILOs: 1 and 2
  - Due: Tuesday
  - Points: 13
- 4.4 Quiz
  - ILOs: 1 and 2
  - Due: Tuesday
  - Points: 5
- 4.5 Early Computational Methods
  - ILOs: 1 and 2
  - Due: Tuesday
  - Points: 10

- 4.5 Quiz
    - ILOs: 1 and 2
    - Due: Tuesday
    - Points: 5
- Exam 1 (4.1, 4.3, 4.4, 4.5)
    - ILOs: 1 and 2
    - Due: Tuesday
    - Points: 20

MODULE 3:
XX/XX/XX – XX/XX/XX

- Evaluate formulas for science, finance, geometry, and mathematics
- Use function notation to evaluate linear and quadratic functions
- Solve applications involving linear, quadratic, and exponential functions
- Graph linear equations by plotting points
- Graph linear equations by using the x and y intercepts
- Graph linear equations by using the slope and y-intercept

- Readings
  - eText links included in the individual assignment page
  - Section 6.2 / 6.10 – Formulas & Functions for the Real World,
  - Pages 295 – 297, 370 – 373, 377 – 379
  - Section 6.6 – Graphing Linear Equations, Pages 323 – 332
- Learning Resources
  - MyFire assigned videos for Sections 6.2 / 6.10 and 6.6 included in the individual assignment page
  - Homework help in MyFire (View an Example, Help Me Solve It, Ask My Instructor, etc.)

- 6.6 Graphing Linear Equations
  - ILO: 3
  - Due: Tuesday
  - Points: 31
- 6.6 Quiz
  - ILO: 3
  - Due: Tuesday
  - Points: 8
- 6.10 Formulas and Functions for the Real World
  - ILO: 3
  - Due: Tuesday
  - Points: 26
- 6.10 Quiz
  - ILO: 3
  - Due: Tuesday
  - Points: 7

MODULE 4:
XX/XX/XX – XX/XX/XX

- Determine if an ordered pair is a solution to a system of linear equations
- Solve a system of linear equations by graphing
- Graph a linear inequality in two variables
- Solve a system of linear inequalities
- Solve a linear programming application problem
- Research and discuss the recommended heart rate goal for your age and the recommended activities to reach this goal
- Demonstrate understanding of the objectives from Modules 3 and 4 in a summative assessment

- Readings
  - eText links included in the individual assignment page
  - Section 6.7 – Solving Systems of Linear Equations, Pages 337 – 339, 343 – 344
  - Section 6.8 – Solving Systems of Linear Inequalities and Linear Programming, Pages 350 – 357
- Learning Resources
  - MyFire assigned videos for Sections 6.7 and 6.8 included in the individual assignment page
  - Homework help in MyFire (View an Example, Help Me Solve It, Ask My Instructor, etc.)

- Discussion Forum 3
  - ILO: 3
  - Due: Saturday (initial post), Tuesday (response posts)
  - Points: 100
- 6.7 Systems of Linear Equations
  - ILO: 4
  - Due: Tuesday
  - Points: 19
- 6.7 Quiz
  - ILO: 4
  - Due: Tuesday
  - Points: 5
- 6.8 Systems of Linear Inequalities
  - ILO: 4
  - Due: Tuesday
  - Points: 24
- 6.8 Quiz
  - ILO: 4
  - Due: Tuesday
  - Points: 4
- Exam 2: (6.6, 6.7, 6.8, 6.10)
  - ILOs: 3 and 4
  - Due: Tuesday
  - Points: 23

MODULE 5:
XX/XX/XX – XX/XX/XX

- Convert between a percent, a fraction, and a decimal number
- Solve problems involving percent change and percent equations
- Use the simple interest formula to calculate interest charges for loans and the total repayment
- Use the compound interest formula to find the accumulated amount of an investment
- Use the present value formula to find the investment needed to reach a future financial goal
- Use the Annual Percentage Rate Table for Monthly Payment Plans to find the monthly payment of a fixed installment loan
- Use the Monthly Principal and Interest Payment per $1000 Table to find the monthly payment for principal and interest of a home mortgage
- Discuss the interest rates of pawn shops and payday loans in your city, and the ethics involved with this business model
- Demonstrate understanding of the objectives from Module 5 in a summative assessment

- Readings
  - eText links included in the individual assignment page
  - Section 10.1 – Percent, Pages 563 – 569
  - Section 10.2 – Personal Loans and Simple Interest, Pages 573 – 576
  - Section 10.3 – Compound Interest, Pages 583 – 588

- Section 10.4 – Installment Buying including Mortgage Payments, Pages 592 – 593, 607 – 610

- Learning Resources
  - MyFire assigned videos for Sections 10.1, 10.2, 10.3, and 10.4 included in the individual assignment page
  - Homework help in MyFire (View an Example, Help Me Solve It, Ask My Instructor, etc.)

- Discussion Forum 4
  - ILO: 5
  - Due: Saturday (initial post), Tuesday (response posts)
  - Points: 100
- 10.1 Percent
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 25
- 10.1 Quiz
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 5
- 10.2 Personal Loans & Simple Interest
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 14

- 10.2 Quiz
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 5
- 10.3 Compound Interest
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 14
- 10.3 Quiz
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 5
- 10.4 Installments Buying
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 16
- 10.4 Quiz
  - ILO: 5 and 6
  - Due: Tuesday
  - Points: 5
- Exam 3 (10.1, 10.2, 10.3, 10.4)
  - ILOs: 5 and 6
  - Due: Tuesday
  - Points: 15

MODULE 6:
XX/XX/XX – XX/XX/XX

- Represent problems using graphs
- Demonstrate an understanding of paths, circuits, and bridges
- Solve problems involving Euler paths and Euler circuits
- Demonstrate an understanding of Hamilton paths, Hamilton circuits, and complete graphs
- Use trees to represent real-life problems
- Solve problems involving minimum-cost spanning trees
- Discuss how using a weighted graph, brute force method, nearest neighbor method, and optimal solution can help you when planning a trip
- Demonstrate understanding of the objectives from Module 6 in a summative assessment

- Readings
  - eText links included in the individual assignment page
  - Section 13.1 – Graphs, Paths, and Circuits, Pages 801 – 808
  - Section 13.2 – Euler Paths and Euler Circuits, Pages 812 – 815
  - Section 13.3 – Hamilton Paths and Hamilton Circuits, Pages 824 – 831
  - Section 13.4 – Tree Graphs, Pages 836 – 83
- Learning Resources
  - MyFire assigned videos for Sections 13.1, 13.2, 13.3, and 13.4 included in the individual assignment page
  - Homework help in MyFire (View an Example, Help Me Solve It, Ask My Instructor, etc.

- Discussion Forum 5
  - ILOs: 7, 8, and 9
  - Due: Saturday (initial post), Tuesday (response posts)
  - Points: 100
- 13.1 Graphs, Paths, & Circuits
  - ILOs: 7 and 8
  - Due: Tuesday
  - Points: 20
- 13.1 Quiz
  - ILOs: 7 and 8
  - Due: Tuesday
  - Points: 5
- 13.2 Euler Paths & Euler Circuits
  - ILOs: 8 and 9
  - Due: Tuesday
  - Points: 15
- 13.2 Quiz
  - ILOs: 8 and 9
  - Due: Tuesday
  - Points: 5
- 13.3 Hamilton Paths & Hamilton Circuits
  - ILOs: 8 and 9

- Due: Tuesday
- Points: 15

- 13.3 Quiz
  - ILOs: 8 and 9
  - Due: Tuesday
  - Points: 5
- 13.4 Tree Graphs
  - ILOs: 7
  - Due: Tuesday
  - Points: 16
- 13.4 Quiz
  - ILOs: 7
  - Due: Tuesday
  - Points: 5
- Exam 4: (13.1, 13.2, 13.3, 13.4)
  - ILOs: 7, 8, and 9
  - Due: Tuesday
  - Points: 20

MODULE 7:
XX/XX/XX – XX/XX/XX

- Use the plurality method, the Borda count method, the plurality with elimination method, or the pairwise comparison method to determine the winner of an election
- Solve apportionment problems using Hamilton's and Jefferson's methods
- Understand that all voting methods and apportionment methods are flawed in some way by being familiar with the vocabulary of the flaws (the majority criterion, head-to-head criterion, monotonicity criterion, the irrelevant alternatives criterion, the Alabama paradox, population paradox, and the new-states paradox)
- Demonstrate understanding of the objectives from Module 7 in a summative assessment

- Readings
  - eText links included in the individual assignment page
  - Section 14.1 – Voting Methods, Pages 853 – 866
  - Section 14.3 – Apportionment Methods, Pages 885 – 897
  - Section 14.2 / 14.4 Vocabulary of Voting Methods Flaws & Apportionment Methods Flaws,
  - Pages 879 - Tables 14.23 and 14.24, Page 906 - Table 14.52
- Learning Resources
  - MyFire assigned videos for Sections 14.1 and 14.3 included in the individual assignment page
  - Homework help in MyFire (View an Example, Help Me Solve It, Ask My Instructor, etc.

- 14.1 Voting Methods
  - ILOs: 10 and 11
  - Due: Tuesday
  - Points: 24
- 14.1 Quiz
  - ILOs: 10 and 11
  - Due: Tuesday
  - Points: 8
- 14.3 Apportionment Methods
  - ILOs: 12
  - Due: Tuesday
  - Points: 15
- 14.3 Quiz
  - ILOs: 12
  - Due: Tuesday
  - Points: 5
- Vocabulary - Voting Methods Flaws & Apportionment Method Flaws
  - ILOs: 11 and 12
  - Due: Tuesday
  - Points: 12
- Exam 5 (14.1, 14.3, Vocabulary of the Flaws)
  - ILOs: 10, 11 and 12
  - Due: Tuesday
  - Points: 15

MODULE 8:
XX/XX/XX – XX/XX/XX

- Use a discussion board to interact with peers regarding assigned topics
- Review, study, and practice the objectives from all modules
- Attend a live, synchronous session scheduled by the instructor for the class
- Demonstrate understanding of the objectives from all modules from the course in a cumulative final assessment

- Reference Readings for Cumulative Review
  - Section 4.1 – Additive Systems of Numeration, Pages 163 – 167
  - Section 4.3 – Other Bases, Pages 179 – 183
  - Section 4.4 – Computation in Other Bases, Pages 186 – 189
  - Section 4.5 – Early Computational Methods, Pages 194 – 196
  - Section 6.2 / 6.10 – Formulas & Functions for the Real World,
  - Pages 295 – 297, 370 – 373, 377 – 379
  - Section 6.6 – Graphing Linear Equations, Pages 323 – 332
  - Section 6.7 – Solving Systems of Linear Equations, Pages 337 – 339, 343 – 344
  - Section 6.8 – Solving Systems of Linear Inequalities and Linear Programming, Pages 350 – 357
  - Section 10.1 – Percent, Pages 563 – 569
  - Section 10.2 – Personal Loans and Simple Interest, Pages 573 – 576

- Section 10.3 – Compound Interest, Pages 583 – 588
- Section 13.1 – Graphs, Paths, and Circuits, Pages 801 – 808
- Section 13.2 – Euler Paths and Euler Circuits, Pages 812 – 815
- Section 13.3 – Hamilton Paths and Hamilton Circuits, Pages 824 – 831
- Section 13.4 – Tree Graphs, Pages 836 – 839
- Section 14.1 – Voting Methods, Pages 853 – 866
- Section 14.3 – Apportionment Methods, Pages 885 - 889, 894 – 897
- Section 14.2 / 14.4 Vocabulary of Voting Methods Flaws & Apportionment Methods Flaws, Pages 879 - Tables 14.23 and 14.24, Page 906 - Table 14.52

- Learning Resources
  - Pearson eText link
  - HTML eBook link
  - Redshelf Course Materials link
  - MyLab Math Multimedia Library link

- Discussion Forum 6
  - ILOs: N/A
  - Due: Saturday (initial post), Tuesday (response posts)
  - Points: 100
- Cumulative Review Practice
  - ILOs: 1 - 12
  - Due: Tuesday
  - Points: 45

- Live, Synchronous Review Session
  - ILOs: 1 - 12
  - Due: Tuesday
  - Points: 100
- Cumulative Final Exam
  - ILOs: 1-12
  - Due: Tuesday
  - Points: 25

SECTION 4: ASSESSMENTS

Discussion Forums

Description

Each week, students will participate in a class discussion. The discussion topics will relate to the readings and encourage students to apply what they have learned during the module as they engage with both the instructor and their fellow students. In each module, students will be required to respond to the given discussion questions with a substantial post that demonstrates depth of understanding and is supported by a minimum of one cited and referenced source. A student's initial post should be at least 200 words in length. This initial post should be posted for each forum by Saturday at 11:59 p.m. EST.

In addition to the initial post, students must respond substantially to a minimum of two of their peers' initial posts. These posts must add breadth and depth to the discussion, continue to build on the initial post, and add additional insights and questions. It is expected that a strong response post would be at least 100 words in length. These posts should be made for each forum by Tuesday at 11:59 p.m. EST.

A synchronous session (via Virtual Classroom) will be required in Module 8.

Total Possible Points

700

Grade Weight

5%

College Readiness Test

Description

This test is mandatory and must be taken before you may access the rest of the course. It will not count for your grade, but it's important that you do your best, because it will determine if you will need supplemental instruction this semester. There are 35 questions and you will have one hour to take it. You may only take it once, and you

must click "Submit" when you are finished to ensure that your results are saved.

Total Possible Points

35

Grade Weight

0%

Pretest

Description

This test is mandatory and must be taken before you may access the rest of the course. It will not count for your grade, but it's important to see where you currently stand with the topics from the course. There are 25 questions and you will have one hour to take it. You may only take it once, and you must click "Submit" when you are finished to ensure that your results are saved.

Total Possible Points

25

Grade Weight

0%

MyLab Math Homework

Description

Use MyLab Math to work through all homework assignments. Grade will be the cumulative average of all homework grades. MyLab Math will tabulate this grade automatically.

Total Possible Points

390

Grade Weight

10%

Online Exams

Description

Exams will be taken on the MyLab Math website.

Total Possible Points

118

Grade Weight

80%

Online Quizzes

Description

Use MyLab Math to work through all quizzes. Grade will be the cumulative average of all quiz grades. MyLab Math will tabulate this grade automatically.

Total Possible Points

100

Grade Weight

5%