

MATH 156 Integrated Mathematics II

Objective: The purpose of this syllabus is to guide the participant in the requirements, demands, logistics and expectations of this course.

Getting Help:

To receive technical assistance on issues related to WebCT contact:

Academic Instructional Technology Help Desk

ES 102

Monday-Thursday 8:00 a.m. - 9:00 p.m. Friday 8:00 a.m. - 5:00 p.m.

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Colorado Springs, CO 80920

Welcome from your instructor

Welcome to MATH 156: Integrated Mathematics II.

This is the second of a 2-course sequence for Teacher Certification. This course covers subjects such as informal geometry, measurement, coordinate geometry, transformations and symmetries, data analysis, geometry, measurement, and tessellations. This course is not a methods course, but it does touch on this subject. Intermediate algebra is a prerequisite for this course, so you should be comfortable with these topics prior to taking this course.

In this class, you will need graph paper, lined paper, a calculator, and an open mind. There is a graph paper sheet included at the end of this document. You are welcome to copy this. All graphs must be done on graph paper. If you need this file as a Word document, please e-mail me and I will send it as an attachment. Mathematics can be great fun, so don't be apprehensive, regardless of your past experiences with it. I happen to love math and I love to teach, so I will help you to succeed in this class.

You will find contact information for me on the syllabus. Whenever you have any questions, please let me know and I will help you work through them.

Please send your assignments to me as you complete them. Please submit them through the assignment tab. After sending them, continue to work on the syllabus.

I look forward to working with you.

Sincerely,
Dr. Smith

Course Description/Objective: This is the second of a 2-course sequence. Topics include probability, statistics, geometric figures, congruencies, similarities, and coordinate geometry.

Credit hours: Three semester hours

Course Prerequisites:

MATH 099: Intermediate Algebra

MATH 155: Integrated Mathematics I

Required Textbook:

To order textbooks or obtain information about book titles you may go to www.exstudies.adams.edu and click on the “ASC Bookstore” icon.

Use **Section Number: 1061** to order books from Bookstore site.

Billstein, Rick; Libeskind, Shlomo; Lott, Johnny W. A Problem Solving Approach to Mathematics for Elementary School Teachers, 9th Edition. Boston: Pearson Education/Addison Wesley, 2007. ISBN 0-321-33179-6.

Optional Textbook:

Levy, Louis L. Student’s Solutions Manual, 9th Edition. Boston: Pearson Education/Addison Wesley, 2007. ISBN 0-321-33126-5.

This book contains detailed, worked-out solutions to all odd-numbered section exercises and all Chapter review exercises.

This solutions manual is highly recommended by your instructor

Student Learning Outcomes:

The student will:

1. Utilize the key mathematical processes of communicating, reasoning, solving problem, and making connections.
2. Demonstrate an understanding of data analysis.
3. Justify geometric conjectures with informal, but valid arguments.
4. Make judgments under conditions of uncertainty.
5. Solve problems using geometry, transformations, and symmetries

Course Requirements:

There are seven homework modules. The first six each require assigned exercises to be submitted to the instructor. The seventh is the development of a module plan.

Course Instructions

Written Homework Assignments:

All module assignments are to be submitted to the instructor. Every problem must be attempted on all assignments. I will grade the even problems and verify that the odd ones are completed. You must show all work on homework for full credit. This means you are to show the steps you took to solve the problems. View each problem as an example you would present to your own math students. Looking at your problem should provide sufficient information for them to follow the steps to arrive at the solution you did. The examples in the text are one example of this. The solutions manual also provides examples of what is expected here. Note that all graphs must be done on graph paper.

For the “questions from the classroom,” a typed, well-written paragraph is required for each. This means a minimum of three sentences for each question. This will be combined with the problem sets to make up the homework portion of your grade.

CAPS Assignments:

CAPS means Collected and Assessed Problems. There is one CAPS Assignment for each of the first five modules. Each CAPS Assignment is worth 20 points. These assignments are the preliminary problem found on the title page of each chapter. Note that there is a hint before the “Questions from the Classroom.” The write-up for these should include a paragraph of introduction, a paragraph detailing the strategy, diagrams, figures, and/or formulas as necessary to explain the solution, and the steps taken to arrive at the solution. This will be graded based on the thoroughness of the explanation and the correctness of the solution.

Examinations:

All exams must be proctored and are timed. All exam questions are similar to homework questions. You will not have multiple choice or true/false questions. Partial credit can be earned if you show your work. You will have two hours to complete each exam. You may use one (1) 8/5x11 sheet of paper with notes for each exam as well as a calculator, which does not calculate payments, interest, etc. Please refer to the Guidelines for Proctored Exams and submit your Exam Request Form three weeks BEFORE you plan to take the exam. [Guideline for Proctored Exams.pdf](#) and [Request Exam.pdf](#) will be used to assist you in completing the proctored exam.

Course Time Limits:

You have one year from your date of registration to complete this course. If you are receiving federal or private financial aid, requirements may differ. However, the minimum requirement for course completion, regardless of the number of credit hours, is six weeks. No student may complete course requirements in less than six weeks. It is important to schedule your course study to fit into your academic plan. If you have important deadlines to meet such as graduation, be sure to complete and submit all of your assignments and take the final examination at least five weeks before the credit is needed. It is your responsibility to ensure the credits for this course will apply toward graduation or certification deadlines.

Course Schedule

Module 1 – Probability

Goals and Objectives

In this module, the student will learn about probability and how to calculate it.

Objectives:

1. Understand the definition of probability.
2. Identify and mathematically describe and compute permutations and combinations.
3. Write an equation and apply properties of equations to systems of equations.
4. Utilize simulations for probability experiments.

Reading

Read Chapter 7.

Assignment

CAP: Preliminary problem for Chapter 7 found on the Title page for Chapter 7.

Complete the following problem sets:

7.1 – 2, 4, 6, 8, 9, 10, 16

7.2 – 1, 5, 7, 8, 11

7.3 – 4, 5, 6, 7, 10, 11

7.4 – 1, 2, 3, 4, 5, 10, 11, 12, 13

7.5 – 1, 2, 3, 4, 5, 6, 7, 8, 10

Questions from the Classroom – choose any 2 questions

Chapter Review: 1, 2, 3, 4, 5, 6, 11

Module 2 – Data Analysis and Statistics

Goals and Objectives

In this module, the student will learn about data analysis involving graphs. Additionally, the student will learn about measures of central control and variation and how to calculate these. Finally, ethical issues related to statistics will be covered.

Objectives:

1. Identify and construct a variety of graphs given a data set.
2. Define and compute the mean, median, mode, variance, and standard deviation.
3. Define a normal curve and identify its characteristics.
4. Identify ethical issues and how statistics can be misused.

Reading

Read Chapter 8.

Assignment

CAP: Preliminary problem for Chapter 8 found on the Title page for Chapter 8.

Complete the following problem sets:

8.1 – 1, 4, 6, 10, 18

8.2 – 1, 2, 3, 4, 5, 7, 8, 10, 15, 16

8.3 – 1, 2, 11, 22

Questions from the Classroom – choose any 2 questions

Chapter Review: 1, 3, 7, 9, 12

Exam 1

Exam 1 covers Modules 1 and 2. One (8½" x 11") page (one side) of notes may be used, as well as a calculator. This exam is two hours in duration.

Module 3 – Introduction to Geometry**Goals and Objectives**

In this module, the student will learn the basic notation utilized in geometry, specifically concerning polygons. Additionally, the student will learn about angles and three-dimensional geometry.

Objectives:

1. Understand and utilize the basic notation and terminology utilized in geometry.
2. Define and draw various polygons.
3. Define and compute a variety of angles in various graphs and polygons.
4. Define and draw various three polyhedral.

Reading

Read Chapter 9.

Assignment

CAP: Preliminary problem for Chapter 9 found on the Title page for Chapter 9.

Complete the following problem sets:

9.1 – 1, 3, 5, 9, 11

9.2 – 1, 4, 5, 7, 8

9.3 – 2, 3, 5, 7, 8

9.4 – 1, 2, 5, 6, 9, 10, 13, 14

Questions from the Classroom – choose any 2 questions

Chapter Review: 1, 3, 5, 8, 19, 20

Module 4 – Constructions, Congruency, and Similarity

Goals and Objectives

In this module, the student will learn about congruence and constructions. This module also includes similar shapes, trigonometric ratios, and lines in the Cartesian plane.

Objectives:

1. Construct geometric figures.
2. Understand and apply the properties of congruence.
3. Compare and construct similar geometric shapes, including but not limited to triangles.
4. Compute trigonometric ratios using similarity.
5. Construct lines using equations, points, and characteristics using a variety of formulas.
6. Solve linear equations with two variables

Reading

Read Chapter 10.

Assignment

CAP: Preliminary problem for Chapter 10 found on the Title page for Chapter 10.

Complete the following problem sets:

10.1 – 3, 4, 9, 10, 11

10.2 – 1, 4, 8, 9, 20

10.3 – 3, 5, 7, 9, 10, 14

10.4 – 1, 2, 5, 13

10.5 – 1, 2, 4, 6, 7, 9

10.6 – 1, 2, 5, 7, 8, 10

Questions from the Classroom – choose any 2 questions

Chapter Review: 10, 13, 14, 16

Exam 2

Exam 2 covers Modules 3 and 4. Please refer to the Guidelines for Exams. One (8½” x 11”) page (one side) of notes may be used, as well as a calculator. This exam is two hours in duration.

Module 5 – Measurement

Goals and Objectives

In this module, the student will learn about linear measurement, area, the Pythagorean Theorem, the formula for distance, surface areas, volume, mass and temperature conversions.

Objectives:

1. Understand the definition of measurement and apply it to distances, arc lengths, and circumferences.
2. Understand the concept of area and calculate this for a variety of geometric shapes.
3. Define then utilize the formulas for distance, surface areas, volume, mass and temperature conversions.

Reading

Read Chapter 11.

Assignment

CAP: Preliminary problem for Chapter 11 found on the Title page for Chapter 11.

Complete the following problem sets:

11.1 – 1, 3, 4, 5, 10, 12

11.2 – 2, 3, 6, 8, 11

11.3 – 2, 6, 8, 10, 11, 14, 16, 18

11.4 – 1, 2, 3, 4, 5, 8, 9, 12

11.5 – 1, 2, 3, 4, 6, 8, 9, 18

Questions from the Classroom – choose any 2 questions

Chapter Review: 1, 2, 3, 12, 15, 16

Module 6 – Motion Geometry and Tessellations

Goals and Objectives

In this module, the student will learn about a variety of translations, rotations, and reflections. This module also includes symmetries and tessellations of a plane.

Objectives:

1. Understand and utilize properties of translations and rotations.
2. Understand the definition of reflections.
3. Construct reflections.
4. Understand and construct size transformations.
5. Define the three types of symmetry.
6. Determine symmetry of shapes.
7. Define tessellations of a plane.
8. Construct tessellations.

Reading

Read Chapter 12.

Assignment

CAP: Preliminary problem for Chapter 12 found on the Title page for Chapter 12.

Complete the following problem sets:

12.1 – 1, 4, 5, 6, 10, 14

12.2 – 1, 3, 4, 7, 10

12.3 – 1, 3, 7, 10, 12

12.4 – 1, 2, 5, 9, 10

12.5 – 2, 4, 7, 8, 10

Questions from the Classroom – choose any 2 questions

Chapter Review: 3, 4, 12, 13, 14

Exam 3

Exam 3 covers Modules 5 and 6. One (8½” x 11”) page (one side) of notes may be used, as well as a calculator. This exam is two hours in duration.

Module 7 – Module Planning

Goals and Objectives

To create a module for an elementary classroom based upon the material from this course.

Assignment

Choose a topic and grade level based on the material covered in Modules 1-6. Design a module plan to introduce the concepts, a group activity that reinforces the concepts, props, and/or other physical materials to demonstrate the concepts. Document the module plan in a paper at least five pages in length. The paper should use a standard module format such as those used in all public schools. The choice of format is yours, but the written portion of this assignment is to be at least three pages, double-spaced. This should include all visual aids and handouts. You must site your sources and have at least three sources. This module plan will be graded on the requirements listed above plus effectiveness, creativity, visual aids, format, and clarity.

Final Exam

The Final Exam covers Modules 1-6. One (8½” x 11”) page (one side) of notes may be used, as well as a calculator. This exam is two hours in duration.

GRADE DISTRIBUTION AND SCALE:

In alignment with ASC academic policies, no D may apply to a major or minor field.

Grade Distribution:

| | |
|------------------------------|-------------------|
| Written Homework Assignments | 150 points |
| Lesson Plan | 100 points |
| CAPS Assignments | 100 points |
| Exam 1 (Lessons 1, 2) | 150 points |
| Exam 2 (Lessons 3, 4) | 150 points |
| Exam 3 (Lessons 5, 6) | 150 points |
| Final Exam (Lessons 1-6) | <u>200 points</u> |
| Total Points | 1,000 points |

Scale:

| | |
|---------------|---|
| 90-100% | A |
| 80-89% | B |
| 70-79% | C |
| 60-69% | D |
| 59% and below | F |