

University of South Carolina Lancaster
Division of Science and Mathematics

This Page includes the Spring 2012 Syllabi for the following courses:

Math 111 COURSE SYLLABUS
College Algebra

Math 112 COURSE SYLLABUS
Trigonometry

Math 142 COURSE SYLLABUS
Calculus II

Math 222 COURSE SYLLABUS
Mathematics for Elementary School Teachers II

University of South Carolina Lancaster
Division of Science and Mathematics

Math 111 College Algebra Course Outline

Instructor: Dr. Dwayne C. Brown (e-mail: dwayneb@mailbox.sc.edu)

Office: 124A Hubbard Hall (Telephone: 313-7037)

Office Hours: Tuesday and Thursday 9am to 9:30am
 Monday through Thursday 11am to 12noon
 Friday 9am to 10am
 & by appointment

Required Text: ‘Mathematics with Applications’, by Lial & Hungerford; 10th edition.

Grading Policy: There will be 6 in-class exams (worth 100pts each), 1 Homework Journal (worth 100pts), 1 Graphmatica/Equation Editor exam (worth 100pts), and 1 cumulative final (worth 200pts). Grades will be determined by the percentage of points accumulated (1000 possible points).

Attendance Policy: Attendance is required and no unexcused absences are given. No late homework is accepted and you may make up exams only if arrangements are made prior to the date of the exam. Students are obligated to complete all assignments by the due dates and to participate in all class discussions.

Exam Schedule:

Exam #1	1/27	Ch1: 1,2,3,4,5
Exam #2	2/10	Ch1: 6,7 & Ch2: 4,5
Exam #3	2/24	Ch2: 1,2 & Ch3: 1,2,4
Exam #4	3/17	Ch2: 3 & Ch3: 3,5
Exam #5	4/2	Ch3: 6,7
Exam #6	4/16	Ch4: 1,2,3,4
Graphmatica Equation Editor	4/18	
Final Exam	4/25	(@ 8am)

HW Journals due 4/23

Chapters and Sections Covered:

Chapter 1: Algebra and Equations

- 1.1 The Real Numbers
- 1.2 Polynomials
- 1.3 Factoring
- 1.4 Rational Expressions
- 1.5 Exponents and Radicals
- 1.6 First-Degree Equations
- 1.7 Quadratic Equations

Chapter 2: Graphs, Lines and Inequalities

- 2.1 Graphs
- 2.2 Equations of a Lines
- 2.3 Linear Models
- 2.4 Linear Inequalities
- 2.5 Polynomial and Rational Inequalities

Chapter 3: Functions and Graphs

- 3.1 Functions
- 3.2 Graphs of Functions
- 3.3 Applications of Linear Functions
- 3.4 Quadratic Functions
- 3.5 Applications of Quadratic Functions
- 3.6 Polynomial Functions
- 3.7 Rational Functions

Chapter 4: Exponential and Logarithmic Functions

- 4.1 Exponential Functions
- 4.2 Applications of Exponential Functions
- 4.3 Logarithmic Functions
- 4.4 Exponential and Logarithmic Equations

Chapter 5:

- 5.1 Simple Interest and Discount
- 5.2 Compound Interest
- 5.3 Future Value of an Annuity
- 5.4 Present Value of an Annuity

Math 111 Learning Outcomes

Students will perform the operations of addition, subtraction, multiplication, division, powers and roots (exponents and radicals) on numeric and variable expressions.

Students will perform these operations on linear, quadratic, polynomial, absolute value, rational, radical, exponential and logarithmic expressions.

Students will solve equations using properties of equality, including linear, quadratic, polynomial, absolute value, rational, radical, exponential and logarithmic equations.

Students will solve linear and nonlinear inequalities, including inequalities involving absolute value; and represent the solution graphically, algebraically and in interval notation.

Given two points in the Cartesian plane, students will locate them, find the distance between them, the slope of the line segment joining them, the coordinates of the midpoint, the equation of the line containing them, and the equation of lines parallel and perpendicular passing through given points.

Students will graph and analyze basic relations, representing all translations (vertical and horizontal shifts). These basic relations include the basic linear, quadratic, cubic, absolute value, rational, radical, exponential, logarithmic and the circle centered at the origin.

Students will graph and analyze general linear, quadratic, polynomial, rational, exponential and logarithmic functions, labeling x and y intercepts and any vertical and horizontal asymptotes.

Students will state the Fundamental Theorem of Algebra and the Rational Root Theorem, and use them along with the synthetic division algorithm to find the roots of polynomial equations or functions.

Students will graph and analyze continuous (exponential) growth and decay functions and compare them with linearly related quantities that increase and decrease.

Students will apply algebraic problem solving strategies to business applications; revenue generated, fixed and variable cost and profit.

Grading Scale (%):

* See General Education Goals Below

A : 92-100
B+: 88-91
B : 82-87
C+: 78-81
C : 72-77
D+: 68-71
D : 60-67
F : Below 60

University of South Carolina Lancaster
Division of Science and Mathematics

Math 112 COURSE SYLLABUS
Trigonometry

INSTRUCTOR: Dr. Dwayne C. Brown (dwayneb@mailbox.sc.edu)

OFFICE: 124A Hubbard Hall (Telephone: 313-7037)

OFFICE HOURS: Tuesday and Thursday 9am to 9:30am
Monday through Thursday 11am to 12noon
Friday 9am to 10am
& by appointment

REQUIRED TEXT: 'Algebra and Trigonometry' by Larson; 8th edition.

GRADING POLICY:

There will be 6 in-class exams (worth 100 pts each), 1 Graphmatica/Equation Editor Exam (worth 100 pts), 1 Homework Journal (worth 100 pts), and a cumulative final (worth 200 pts). Grades will be determined by the percentage of points accumulated (1000 possible points).

ATTENDANCE POLICY:

Attendance is required and no unexcused absences are given. No late homework is accepted and you may make up exams only if arrangements are made prior to the time of the exam. Students are obligated to complete all assigned by the due dates and to participate in class discussion.

EXAM SCHEDULE:

Exam #1	1/24	Chapter 6: 1,2,3,4	
Exam #2	2/7	Chapter 6: 5,6,7	
Exam #3	2/21	Chapter 7: 1,2,3	
Exam #4	3/13	Chapter 7: 3,4,5	
Exam #5	3/29	Chapter 8: 1,2	
Exam #6	4/17	Chapter 8: 3,4,5	
Graphmatica/EE	4/19		
Final Exam	5/1 (@ 1pm)	Cumulative	

HW Journals due 4/19

Chapters Covered:

Chapter 6: Trigonometry

- 6.1 Angles and Their Measure
- 6.2 Right Triangle Trigonometry
- 6.3 Trigonometric Functions of Any Angle
- 6.4 Graphs of Sine and Cosine Functions
- 6.5 Graphs of Other Trigonometric Functions
- 6.6 Inverse Trigonometric Functions
- 6.7 Applications and Models

Chapter 7: Analytic Trigonometry

- 7.1 Using Fundamental Identities
- 7.2 Verifying Trigonometric Identities
- 7.3 Solving Trigonometric Equations
- 7.4 Sum and Difference Formulas
- 7.5 Multiple-Angle and Product-to-Sum Formulas

Chapter 8: Additional Topics in Trigonometry

- 8.1 Law of Sines
- 8.2 Law of Cosines
- 8.3 Vectors in the Plane
- 8.4 Vectors and Dot Products
- 8.5 Trigonometric Form of a Complex Number

Math 112 Learning Outcomes fo PreCalculus

- Given two points in the Cartesian plane, students will locate them, find the distance between them, the slope of the line segment joining them, the coordinates of the midpoint, the equation of the line containing them, the equation of lines parallel and perpendicular passing through given points, and the angle of inclination of all lines,

- Students will graph and analyze basic relations, representing all translations (vertical and horizontal shifts). These basic relations include the basic trigonometric and the circle centered at the origin.

- Students will sketch and label at least 14 parts of a circle; including the center, radius, diameter, chord, interior, exterior, sector, tangent line, secant line, normal line, major arc, minor arc, semi-arc, and the circle itself (simple closed curve).

- Students will graph and analyze general trigonometric functions, labeling x and y intercepts and any vertical and horizontal asymptotes.

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Grading Scale (%):

A : 92-100
B+: 88-91
B : 82-87
C+: 78-81
C : 72-77
D+: 68-71
D : 60-67
F : Below 60

*** See General Education Goals Below**

University of South Carolina Lancaster
Division of Science and Mathematics

Math 142 COURSE SYLLABUS
Calculus II

INSTRUCTOR: Dr. Dwayne C. Brown (dwayneb@mailbox.sc.edu)

OFFICE: 117 Hubbard Hall (Telephone: 313-7037)

OFFICE HOURS: Tuesday and Thursday 9am to 9:30am
Monday through Thursday 11am to 12noon
Friday 9am to 10am
& by appointment

REQUIRED TEXT: CALCULUS: Early Transcendentals by Stewart; 6th ed.

GRADING POLICY:

There will be 6 in-class exams (worth 100 pts each), 1 homework journal (worth 100 pts), 1 Maple Exam (worth 100 pts), and a cumulative final (worth 200 pts). Grades will be determined by the percentage of points accumulated (1000 possible points).

ATTENDANCE POLICY:

Attendance is required and no unexcused absences are given. No late homework is accepted and you may make up exams only if arrangements are made prior to the time of the exam. Students are obligated to complete all assigned by the due dates and to participate in class discussion.

EXAM SCHEDULE:

Exam #1	1/24	Ch7:1-5
Exam #2	2/7	Ch7:5-8
Exam #3	2/21	Ch8:1-5
Exam #4	3/13	Ch9:1-5
Exam #5	3/29	Ch11:1-7
Exam #6	4/17	Ch11:8-11
Maple/EEditor	4/19	
Final Exam	5/1 (@ 9:30am)	Cumulative

NOTE: Homework Journal is due 4/23.

Chapters Covered

Chapter 7: Techniques of Integration

- 7.1 Integration by Parts
- 7.2 Trigonometric Integrals
- 7.3 Trigonometric Substitutions
- 7.4 Integrating Rational Functions by Partial Fractions
- 7.5 Strategy for Integration
- 7.6 Using Tables and Computer Algebra Systems
- 7.7 Approximate Integration
- 7.8 Improper Integrals

Chapter 8: Further Applications of Integration

- 8.1 Arc Length
- 8.2 Area of a Surface of Revolution
- 8.3 Applications to Physics and Engineering
- 8.4 Applications to Economics and Biology
- 8.5 Probability

Chapter 9: Differential Equations

- 9.1 Modeling Differential Equations
- 9.2 Direction Fields and Euler's Method
- 9.3 Separable Equations
- 9.4 Models for Population Growth
- 9.5 Linear Equations
- 9.6 Predator – Prey Systems

Chapter 11: Infinite Sequences and Series

- 11.1 Sequences
- 11.2 Series
- 11.3 The Integral Test and Estimates of Sums
- 11.4 The Comparison Tests
- 11.5 Alternating Series
- 11.6 Absolute Convergence and the Ratio and Root Tests
- 11.7 Strategy for Testing Series
- 11.8 Power Series
- 11.9 Representations of Functions as Power Series
- 11.10 Taylor and Maclaurin Series
- 11.11 Applications of Taylor Polynomials

Grading Scale (%):

*** See General Education Goals Below**

- A : 92-100
- B+: 88-91
- B : 82-87
- C+: 78-81
- C : 72-77
- D+: 68-71
- D : 60-67
- F : Below 60

Math 142 Learning Outcomes for Calculus II

- Students will distinguish between relations which are functions, continuous functions and/or differentiable functions. These relations will be represented graphically, or explicitly and implicitly written.
- Students will compute limits, and apply limits to determine the continuity and differentiability of a relation at or in the neighborhood of a point.
- Students will differentiate and integrate, linear, quadratic, polynomial, radical, rational, exponential, logarithmic, trigonometric and hyperbolic trigonometric functions along with their inverses and composites of these functions.
- Students will integrate functions using the Fundamental Theorem of Calculus, u-substitution, trigonometric substitutions, integration by-parts, tables and Computer Algebra Systems (MAPLE 12), improper integrals and numeric integration.
- Students will graph linear, quadratic, polynomial, radical, rational, exponential, logarithmic and trigonometric functions, labeling x and y intercepts, critical points, inflection points and analyzing the function and its first and second derivatives for intervals of increase or decrease and the concavity of the function.
- Students will classify differential equations by stating their order, linearity (linear or nonlinear), and partial or ordinary differential equations.
- Students will solve separable and first-order linear ordinary differential equations, analyze slope-fields and apply Euler's Method of approximating solutions to differential equations and analyze graphical solutions of autonomous differential equations.
- Students will analyze finite and infinite sequences, series, and power series; finding the nth terms, determining convergence or divergence using the formal definitions of sequential and series convergence.
- Students will state and apply the following tests for series convergence; the integral test, comparison tests, ratio and root tests, alternating series tests
- Students will construct Taylor Series and Maclaurin Series of given functions about points, differentiating, integrating and provide error estimates for the Taylor and Maclaurin Polynomials for these functions.
- Students will be introduced to the real world applications of Taylor Series, Maclaurin Series, and Fourier Series.

University of South Carolina Lancaster
Division of Science and Mathematics

Math 222 COURSE SYLLABUS
Mathematics for Elementary School Teachers II

INSTRUCTOR: Dr. Dwayne C. Brown (dwayneb@mailbox.sc.edu)

OFFICE: 117 Hubbard Hall (Telephone: 313-7037)

OFFICE HOURS: Tuesday and Thursday 9am to 9:30am
Monday through Thursday 11am to 12noon
Friday 9am to 10am
& by appointment

REQUIRED TEXT: A Problem Solving Approach to Mathematics for Elementary School Teachers, by Billstein, Libeskind and Lott; 10th edition.

GRADING POLICY: There will be 6 in-class exams (worth 100 pts each), 1 Geometer's Sketchpad Exam (worth 100 pts), 2 Class projects (worth 50 pts each), 1 Homework Journal (worth 100 pts), and a cumulative final (worth 200 pts). Grades will be determined by the percentage of points accumulated (1100 possible points).

ATTENDANCE POLICY: Attendance is required and no unexcused absences are given. No late homework is accepted and you may make up exams only if arrangements are made prior to the time of the exam. Students are obligated to complete all assigned by the due dates and to participate in class discussion.

EXAM SCHEDULE:

Exam #1	1/27	Ch11:1-4	Introductory Geometry
Exam #2	2/10	Ch12:1-4	Constructions, Congruence and Similarity
Exam #3	2/24	Ch13:1 – 5	Concepts of Measurement ; Base Units, Perimeter - Area of Shapes; Solids
Exam #4	3/19	Ch13:1 – 5	Concepts of Measurement ; Base Units, Shapes and Surface Area - Volume of Solids
Exam #5	4/2	Ch12:5*	Coordinate Geometry
Exam #6	4/16	Ch14:1 – 5	Motion Geometry
Sketchpad Exam	4/18	Geometer's Sketchpad	Geometer's Sketchpad Exam
Class Projects	4/23		
Final Exam	5/4 (@ 10am)		Cumulative

HW Journals due 4/23

Chapters Covered:

Chapter 11	11.1 Basic Notions 11.2 Polygons 11.3 More About Angles 11.4 Geometry in Three Dimensions 11.5 Networks
Chapter 12	12.1 Congruence Through Constructions 12.2 Other Congruence Properties 12.3 Other Constructions 12.4 Similar Triangles and Similar Figures 12.5 Lines in a Cartesian Coordinate System 12.6 Trigonometry Ratios via Similarity
Chapter 13	13.1 Linear Measure 13.2 Areas of Polygons and Circles 13.3 The Pythagorean Theorem 13.4 Surface Areas 13.5 Volume, Mass, and Temperature
Chapter 14	14.1 Translations and Rotations 14.2 Reflections and Glide Reflections 14.3 Size Transformations 14.4 Symmetries 14.5 Tessellation of the Plane
	*Geometer Sketchpad

Grading Scale (%):*** See General Education Goals Below**

A : 92-100
B+: 88-91
B : 82-87
C+: 78-81
C : 72-77
D+: 68-71
D : 60-67
F : Below 60

*Math 222 Learning Outcomes for Mathematics for Elementary
And Early Childhood Teachers II*

- Students will state and apply the Jordan Curve Theorem and Euler's Theorem.
- Students will construct geometric objects including, but not limited to points, segments, rays, lines, planes, curves (open or closed, simple or non-simple, polygonal or non-polygonal), and angles, using the protractor, compass, ruler (metric and standard), and the Geometer's Sketchpad as tools.
- Students understanding of angles will include, but is not limited to acute angles, obtuse angles, right angles, straight angles, complementary and supplementary angles, vertical angles, and dihedral angles and explain how they are measured.
- Students will construct geometric shapes, including but not limited to circles, polygons (triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, and decagon), using the protractor, compass, ruler (metric and standard), and the Geometer's Sketchpad as tools.
- Students will construct geometric solids, including but not limited to polyhedra (cubes, tetrahedron, octahedron, dodecahedron, icosahedron, prisms, and pyramids), nonpolyhedron (spheres, hemispheres, cylinders and cones), using the protractor, compass, ruler (metric and standard), and the Geometer's Sketchpad as tools.
- Students will convert metric and standard (British) base units for length, area, volume, temperature, and speed.
- Students will compute the perimeters and areas enclosed by shapes, and the total surface area and volume enclosed by solids.
- Students will perform motion-geometry (translations, reflections, glide-reflections, rotations, reductions, enlargements and tessellations) on shapes in the plane and on solids in space.
- Students will sketch and label the Coordinate Sphere (labeling the axis of rotation, north and south poles, the equator, circles of latitude and longitude), the linear (\mathcal{R}), the Cartesian Plane (\mathcal{R}^2) and the Space (\mathcal{R}^3) coordinate systems, locating points and computing distances between points in each system.

University of South Carolina Lancaster

General Education Goals

General education is the set of fundamental skills (reading, writing, reasoning, and oral communication), the knowledge, and the capacity for thought needed to pursue further learning, to succeed in chosen career fields, and to assume the responsibilities of informed and enlightened citizenship.

Communication Skills

USC Lancaster helps its students read effectively and attain a basic familiarity with the basic texts of Western and other cultures. In the area of writing skills, USC Lancaster students work to develop the ability to write effectively for both academic and professional audiences. In addition, USC Lancaster helps its students learn to listen critically and speak effectively before a group.

Critical Thinking

USC Lancaster helps its students acquire analytical reasoning abilities and exercise informed value judgments. USC Lancaster students also work to develop mathematical and/or computational skills.

Cultural Literacy

USC Lancaster strives to give its students an understanding of the history and culture of Western civilization as well as provide some exposure to other cultures. USC Lancaster also recognizes the centrality of science and technology to modern culture; therefore, the USC Lancaster student is offered opportunities to increase his/her understanding and familiarity in these crucial subject areas.

Student Development

USC Lancaster supports the intellectual, personal, physical, and social development of students, in recognition of the critical interdependency of all these areas. By providing opportunities for productive interaction with students, faculty and staff, USC Lancaster helps students develop a spirit of curiosity, integrity, and confidence in planning and pursuing academic, career, and personal goals.