PR ECA L C U L U S  SPR IN G 2 0 1 5

Course Number: MATH 1113  Instructor: Robert Staples
Hrs Credit: 4 hours  Office: Boyd 106B  Phone: 678-839-4139

Prerequisites: Four years of high school mathematics including algebra and trigonometry or MATH 1111.

Courses Description: This course is designed to prepare students for calculus, physics and related technical subjects. Topics include an intensive study of algebraic and transcendental functions.


Learning Outcomes: Students should be able to demonstrate:
1. An understanding of functions and how to graph functions.
2. An understanding of operations on functions including function composition.
3. An understanding of polynomial and rational graphs, including intercepts and asymptotes.
4. An understanding of how to find the zeros of a polynomial and how to factor polynomials.
5. An understanding of inverse functions and how to find them graphically and algebraically.
6. An understanding of the properties of exponential and logarithmic equations.
7. An understanding of how to solve exponential and logarithmic equations.
8. An understanding of how to find the values of the trigonometric functions from right triangles and circles.
9. An understanding of how to graph the trigonometric functions.
10. An understanding of how to prove trigonometric identities.
11. An understanding of how to use the sum, difference, double-angle and half-angle formulas for sine and cosine.
12. An understanding of how to solve triangle using the law of sines and law of cosines.
13. An understanding of polar coordinates and graphs.
14. An understanding of how to analyze and solve applied problems.

Calculator Policy: Graphing calculators equivalent to the TI-83 and 84 will be allowed on exams, as will scientific calculators. See instructor about others.

Attendance: Class attendance is encouraged. Missed tests and quizzes may result in zeros.

Assignments: See attached guide. They are due the next class meeting.

Grading: Tests are 60%, Assignments and Quizzes are 15%, and the Final Exam is 25%.

CourseDen is the primary resource and communication portal.

Classroom Conduct: Respect and good character are expected. Students disturbing or interfering with instruction will be asked to leave. Electronic devices are not allowed to be out in class and should not sound.

Help Available: In addition to getting help during office hours students may use the Math Tutor Center and the Excell Center. I will be using a student SI leader.

Other Course Policies: Other course policies, including information regarding students with disabilities and the UWG Honor Code can be found at either of the following websites. You should read this at the beginning of each semester.

SCHEDULE: The following sections of Blitzer's book will be covered:

<table>
<thead>
<tr>
<th>Section</th>
<th>HOURS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Chapter P and 1.1-1.6 **</td>
<td>3</td>
</tr>
<tr>
<td>1.7 Composite Functions</td>
<td>1</td>
</tr>
<tr>
<td>1.8 Inverse Functions</td>
<td>1</td>
</tr>
<tr>
<td>Review Chapter 2.1-2.5 **</td>
<td>2</td>
</tr>
<tr>
<td>2.6 Rational Functions and Their Graphs</td>
<td>2</td>
</tr>
<tr>
<td>2.7 Polynomial and Rational Inequalities</td>
<td>2</td>
</tr>
<tr>
<td>3.1 Exponential Functions</td>
<td>1</td>
</tr>
<tr>
<td>3.2 Logarithmic Functions</td>
<td>1.5</td>
</tr>
<tr>
<td>3.3 Properties of Logarithms</td>
<td>2</td>
</tr>
<tr>
<td>3.4 Exponential and Logarithmic Equations</td>
<td>1.5</td>
</tr>
<tr>
<td>3.5 Exponential Growth and Decay</td>
<td>1</td>
</tr>
<tr>
<td>4.1 Angles and Radian Measures</td>
<td>1</td>
</tr>
<tr>
<td>4.2 The Unit Circle</td>
<td>1</td>
</tr>
<tr>
<td>4.3 Right Triangle Trigonometry</td>
<td>1</td>
</tr>
<tr>
<td>4.4 Trig Functions of Any Angle</td>
<td>2</td>
</tr>
<tr>
<td>4.5 Graphs of Sine and Cosine</td>
<td>1</td>
</tr>
<tr>
<td>4.6 Graphs of Other Trig Functions</td>
<td>1</td>
</tr>
<tr>
<td>4.7 Inverse Trig</td>
<td>1.5</td>
</tr>
<tr>
<td>4.8 Applications of Trig Functions</td>
<td>1.5</td>
</tr>
<tr>
<td>5.1 Verifying Trig Identities</td>
<td>2</td>
</tr>
<tr>
<td>5.2 Sum and Difference Formulas</td>
<td>1</td>
</tr>
<tr>
<td>5.3 Double-Angle and Half-Angle Formulas</td>
<td>1</td>
</tr>
<tr>
<td>5.5 Trigonometric Equations</td>
<td>2</td>
</tr>
<tr>
<td>6.1 Law of Sines</td>
<td>1.5</td>
</tr>
<tr>
<td>6.2 Law of Cosines</td>
<td>1.5</td>
</tr>
<tr>
<td>6.3 Polar Coordinates</td>
<td>1</td>
</tr>
<tr>
<td>6.4 Graphs of Polar Equations</td>
<td>1</td>
</tr>
<tr>
<td>7.1 Systems of Equations in Two Variables</td>
<td>1</td>
</tr>
<tr>
<td>7.2 Systems of Equations in Three Variables</td>
<td>1</td>
</tr>
<tr>
<td>7.4 Systems of Nonlinear Equations</td>
<td>2</td>
</tr>
<tr>
<td>6.6 Vectors</td>
<td>1</td>
</tr>
</tbody>
</table>

** any student having difficulties during the review sections should be encouraged to switch to MATH 1111.
STANDARD TOPICS:

1.7 Combinations of Functions/ Composite Functions
- Find the domain of a function (#1-30)
- Find the sum, difference, product and quotient of 2 functions and their domains (#31-48)
- Find the composition of 2 functions (#51-66, #67-74 with domain)
- Break a composition into its parts (#75-82)
- Applications (#87-102)

1.8 Inverse Functions
- Determining if 2 functions are inverses (#1-10)
- Find an equation for the inverse and verify (#11-28)
- Horizontal line test (#29-34)
- Graphing inverses (#35-38)
- Inverses with domain/range (#39-52)
- Applications (#65-69)

2.6 Rational Functions
- Find domain (#1-8)
- Limits from graph (#9-20)
- Vertical asymptotes (#21-36)
- Horizontal asymptotes (#37-44)
- Students should know how to use a graphing calculator to obtain the graphs given in #45-88.

2.7 Polynomial and Rational Inequalities
- Solving polynomial inequalities (#1-42)
- Solving rational inequalities (#43-60)
- Applications (#75-80)

3.1 Exponential Functions
- Graphing exponential equation (#11-18)
- Identifying equation using vertical/horizontal shifts and reflections (#19-24)
- Graphing using horizontal/vertical shifts and reflections (#25-46)
- Compound Interest (#53-56)
- Students should be able to use a graphing calculator to graph the functions given in #11-18, 25-52.
- Applications (#65-76)

3.2 Logarithmic Functions
- Switching between exponential and logarithmic form (#1-20)
- Evaluating logs using definition and inverse properties (#21-42)
- Identifying equations using vertical/horizontal shifts and reflections (#47-52)
- Log and ln notation (#81-100)
- Students should know how to use a graphing calculator to obtain the graphs given in #43-46, 53-74.
- Applications (#113-119)

3.3 Properties of Logarithms
- Expand logarithmic expressions (#1-40)
- Condense logarithmic expressions (#41-70)
- Change of basis formula (#71-78)
- Applications (#103-104)

3.4 Exponential and Logarithmic Equations
- Solve exponential equations (#1-43)
- Solve logarithmic equation involving single log (#49-66)
- Solve logarithmic equation involving multiple logs (#67-92)
- Applications (#103-120)

3.5 Modeling with Exponential and Logarithmic Functions
- Exponential growth and population models (#1-14)
- Exponential decay and half-lives (#15-36)
- Logistic growth (#37-46)
- Newton’s Law of Cooling (#47-50)

4.1 Angles and Radian Measure
- Convert between radians and degrees (#13-40)
- Draw angles in standard position (#41-56)
- Finding coterminal angles (#57-70)
- Finding arc length (#71-74)
- Applications (#75-100)

4.2 Trigonometric Functions: The Unit Circle
- Find values of the 6 trig functions from a unit circle point (#1-4)
- Find common trig values given the unit circle points (#5-24, 53-60)
- Using basic identities to find trig values (#25-28)
- Using Pythagorean identity to find other trig values (#29-32)
- Using basic identities to evaluate expressions (#33-38)
- Using properties to evaluate a trig expression (#39-52)
- Applications (#51-84)

4.3 Right Triangle Trigonometry
- Finding values of 6 trig functions given 2 sides of a right triangle (#1-8)
- Properties of cofunctions (#9-28)
- Finding common trig values using right triangles (#9-20)
- Using trig to find the length of one side of a right triangle (#21-34)
- Applications (#53-60)
4.4 Trigonometric Functions of Any Angle
   - Finding 6 trig values given point on a circle (#1-8)
   - Finding the quadrant given signs of trig functions (#17-22)
   - Finding trig values given one value and quadrant (#23-34)
   - Finding reference angles (#35-60)
   - Finding exact values using reference angles (#61-86)

4.5 Graphs of Sine and Cosine
   - Finding amplitude and period (#7-12, 35-42)
   - Finding amplitude, period and phase shift (#17-30, 43-52)
   - Applications (#75-88)
   - STUDENTS SHOULD KNOW HOW TO USE A GRAPHING CALCULATOR TO OBTAIN THE GRAPHS GIVEN IN #7-30, 35-52.

4.6 Graphs of Other Trigonometric Functions
   - STUDENTS SHOULD KNOW HOW TO USE A GRAPHING CALCULATOR TO OBTAIN THE GRAPHS GIVEN IN #5-12, 17-24, 29-44.
   - Using graph of sine/cosine to obtain graph of sec/csc (#25-28)

4.7 Inverse Trigonometric Functions
   - Finding exact values (#1-18)
   - Using calculator to obtain values (#19-20)
   - Inverse properties (#31-46)
   - Making sketch to evaluate expressions involving trig and inverse trig functions (#47-62)
   - Writing an expression involving trig and inverse trig function as an algebraic expression (#63-72)
   - Applications (#93-98)

4.8 Applications of Trig Functions
   - Solving triangles (#1-12)
   - Bearings (#13-16)
   - Harmonic motion (#17-28)
   - Applications (#41-50, 59-62)

5.1 Verifying Identities
   - Verify Identities (#1-40)

5.2 Sum and Difference Formulas
   - Using sum/difference formulas (#1-8, 13-24)
   - Rewriting an expression using sum/difference formulas (#25-32)
   - Verifying Identities (#9-12, 33-54)

5.3 Double Angle, Power Reducing and Half-Angle Formulas
   - Using Double Angle Formulas (#1-22)
   - Verifying Identities (#23-34)
   - Use Power Reducing Formulas (#35-38)
   - Use Half-Angle Identities (#39-54)

5.5 Solving Trigonometric Equations
   - Determine if an x-value is a solution to a trig equation (#1-10)
   - Find all solutions to a trig equation (#11-24)
   - Find all solutions on a given interval (#25-62)

6.1 The Law of Sines
   - Solve a triangle (#1-16)
   - Determine of the given info produces 0, 1 or 2 triangles (#17-32)
   - Applications (#43-56)

6.2 The Law of Cosines
   - Solve a triangle (#1-24)
   - Heron's area formula (#25-30)
   - Applications (#37-52)

6.3 Polar Coordinates
   - Plotting points in polar coordinates (#1-20)
   - Switch between polar and Cartesian coordinates of a point (#33-48)
   - Switch equations between polar and rectangular coordinates (#49-74)

6.4 Graphs of Polar Equations
   - STUDENTS SHOULD KNOW HOW TO USE A GRAPHING CALCULATOR TO OBTAIN THE GRAPHS GIVEN IN #13-24.

7.1 Systems of Linear Equations in Two Variables
   - Show a particular ordered pair is (not) a solution to a 2x2 system (#1-4)
   - Solve a 2x2 system by substitution (#5-18)
   - Solve a 2x2 system by addition method (#19-30)
   - Solve a 2x2 system by any method (#31-42)
   - Word problems (#43-46)
   - Applications (#55-94)

7.2 Systems of Linear Equations in Three Variables
   - Show an ordered triple is (not) a solution to a 3x3 system (#1-4)
   - Solve a 3x3 system (#5-18)
   - Word problems (#23-24)
   - Find a quadratic passing thru 3 points (#19-22)
   - Applications (#31-41)

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**Additional Topics**

<table>
<thead>
<tr>
<th>7.1 Systems of Nonlinear Equations in Two Variables</th>
<th>6.6 Vectors</th>
<th>8.1 Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve a nonlinear system by substitution (#18)</td>
<td>Slope, vectors and equations (#3-42)</td>
<td>Matrix solution page 405 (#91-98)</td>
</tr>
<tr>
<td>Solve a nonlinear system by addition method (#20)</td>
<td>Finding vectors given rationalincluded points (#13-20)</td>
<td></td>
</tr>
<tr>
<td>Solve a nonlinear system by any method (#21-42)</td>
<td>Computation with vectors (#13-50)</td>
<td></td>
</tr>
<tr>
<td>Word problems (#25-50)</td>
<td>Unit vectors (#3-46)</td>
<td>Vectors (9-50)</td>
</tr>
<tr>
<td>Applications (#51-63)</td>
<td>Finding vector components (9-50)</td>
<td>9.2-100</td>
</tr>
<tr>
<td>Applications (95-50)</td>
<td>Finding component to vector (94-50)</td>
<td>Applications (96-50, 79-82)</td>
</tr>
</tbody>
</table>