MTH 168 – Pre Calculus II (Spring 2015) 3 credits
Operation STEM
Department of Mathematics at Cleveland State University
Section 1 - MWF 10:15am – 11:05am
Classroom location FH 268

ALEKS course code: CMAX6-RX3W6

Instructor: Mrs. Marquard
Phone: 216-523-7152
Office: RT 1522
Office Hours: 11:20-12:10 or by appointment.

Prerequisite: A grade of C or better in MTH 167 or suitable placement-test score.

STEM Peer Teachers (SPTs):
Dreama Sharp email: d.jackman@vikes.csuohio.edu
Savanna Armbruster email: s.m.armbruster@vikes.csuohio.edu

Content covered:
See end of syllabus for a complete list of topics and weekly schedule.

Required Software: ALEKS 360
(ALEKS access can be purchased with textbook online option).
ALEKS stands for Assessment and Learning in Knowledge Spaces. It is an artificial intelligence engine that assesses each student individually and continuously and it is based upon work in a field of study called Knowledge Space Theory. Your ALEKS course has 93 distinct topics divided into chapter objectives with established due dates. If you master a chapter before the deadline, then the system automatically moves your learning to the next chapter.

Required Work and Opportunities for Extra Credit:
Students will be required to work on the ALEKS learning system, to complete three in-class tests, to submit solutions to test reviews, to take a common final exam and to work on group Project Based Learning (PBL) and individual mini projects. Items are explained in detail below.

You are expected to spend 4 to 5 hours per week outside of class time and SPT session time working on Precalculus including your Project Based Learning (PBL) and working in ALEKS.

Cell Phone, Communication Devices and Electronics:
Any electronic devices besides the allowed graphing calculator are not permitted to be used in class unless prior arrangements have been made. Inform your professor prior to the start of class if you have an emergency or extenuating circumstances in which you must access your phone during class time. If you are found using your phone, you will be asked to leave class and will be marked with an unexcused absence.
STEM Peer Teacher (SPT) Sessions:
The instruction of this course includes mandatory SPT sessions on Mondays and Wednesdays in FH268 from 11:20am – 12:10pm. These interactive sessions include individual, pair, and group work, mini lectures, content assessments, application packets and Project Based Learning (PBL) instruction. In order to receive daily full SPT participation/quality of work credit, the following expectations must be met: ask and answer questions, complete all assignments, and active engagement in individual, pair, and group activities. Lack of participation and/or use of cell phones and other electronic devices will result in that day’s loss of participation/quality of work credit and attendance.

Project Based Learning (PBL):
The instruction of this course includes Project Based Learning in the SPT sessions. Project-based learning (PBL) is an innovative approach to learning that teaches a multitude of strategies critical for success in the twenty-first century. Students drive their own learning through inquiry, as well as work collaboratively to research and create projects that reflect their knowledge. From gleaning new, viable technology skills, to becoming proficient communicators and advanced problem solvers, students benefit from this approach to instruction.” (Bell, 2010, p. 39)

You will complete two projects aligned with the content of the first two tests. Each project has been designed to engage the student with mathematics in a complex real life situation; serving to teach students through mathematical applications. If there are questions or concerns about the projects, please do not hesitate to contact your instructor, Dr. Debbie K. Jackson, d.jackson1@csuohio.edu, and/or Candice Quinn, c.m.quinn45@csuohio.edu.

Tests and Practice Tests:
Practice tests are available under the Assignments tab in ALEKS and a score of 90% or better is expected one day before the test takes place. Each practice test has a quick retake option, which allows you to retake the problems you did not answer correctly up a maximum of 3 times. The practice tests can also be opened at any time in the weeks before the test and you can save your work before submitting the test to continue to work on the pie. The first try for each practice test should be submitted at least one week before that particular test date. If you have answered a question incorrectly more than once seek help on that topic before submitting the final attempt.

Test will be held in class and are pencil and paper tests. Each test will be comparable to the material covered in class and on ALEKS and the topics will be chosen from the corresponding online practice test. Each test may also contain a question from the PBL curriculum or application packets from that time.

ALEKS Learning System and Homework:
While working objectives in the ALEKS learning mode, you may be given several assessments. You are expected to complete each assessment in a timely manner in order to determine if you have mastered the objectives that you practiced on ALEKS.

There will be 10 homework assignments that need to be completed in ALEKS by their specified due dates, and 2 hard copy homework assignments that will need to be completed by hand and turned in during class. Each assignment covers topics that are covered in class and are in the ALEKS Pie.
Class and SPT Attendance and Participation:
Attendance for both class and the SPT sessions are mandatory. You are allowed up to two (2) unjustified absences for each class and for each SPT session. NOTE: a justified absence is defined as a documented valid reason, i.e., a doctor’s note, surgery, police traffic/accident report or judicial mandatory court attendance.
For each unjustified absence after 2: deduct 1 point for each day of missed class AND 1 point for each day of missed SPT session.

Common Final:
The final is comprehensive. The final PBL essay must be handed in at the start of the common final accounts for 20% of your final exam grade. Bring a graphing calculator, a photo ID, pencils and an eraser to the final exam. The final is on **Friday May 8, 2015** from 10:15am to 12:15pm in MC 202.

<table>
<thead>
<tr>
<th>Required Work for Total Course Grade</th>
<th>Percent</th>
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<tbody>
<tr>
<td>3 Tests (Written Tests weighted equally)</td>
<td>35%</td>
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<tr>
<td>Written Final</td>
<td>Final Essay (20% of Final Exam Grade)</td>
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<tr>
<td>Homework and ALEKS Pie</td>
<td>25%</td>
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<tr>
<td>PBL – 2 Projects</td>
<td>10%</td>
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<tr>
<td>Class Attendance / Participation</td>
<td>5%</td>
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<tr>
<td><strong>TOTAL Course Grade</strong></td>
<td><strong>100%</strong></td>
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How To Improve Your Grade By Completing Extra Credit Work

| Practice Tests - 1 per written test On ALEKS, due 1 day before each Test | 1% each maximum of 3 points added to your: TOTAL COURSE GRADE |
| Complete 100% of your entire ALEKS PIE before the final AND take the COURSE COMPLETION ASSESSMENT | Add 2 points to your TOTAL COURSE GRADE |
| Complete by final exam day: The Practice Final Exam in ALEKS AND take advantage of the 3 Quick Retakes (QRs) | The following points will be added: 1 point for 70%-80% completion, 2 points for 80% to 90% completion, 3 points for above 90% completion to your TOTAL COURSE GRADE. |

**NOTE:** If you obtain less than 50% in the final, your final course grade is **F**.

<table>
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<tr>
<th>If you obtain at least 50% in the final exam and your TOTAL WORK is between</th>
<th>Then your final grade is</th>
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<tbody>
<tr>
<td>95 to 100%</td>
<td>A</td>
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<td>90 to 95%</td>
<td>A-</td>
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<td>87 to 90%</td>
<td>B+</td>
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<td>C</td>
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<td>60 to 70%</td>
<td>D</td>
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<tr>
<td>Below 60%</td>
<td>F</td>
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Grading Scheme and Make Up Policy for Tests:
Make ups are for students who missed a test and have provided a documented valid reason for doing so (such as a doctor’s note, policy traffic accident report or judicial mandatory court attendance) and are arranged by the instructor.

Computer Labs:
To use the labs on campus, you will need your CSU ID number and CSU password. You can call X5050 and have your password reset if you forgot it. Labs that have ALEKS plug-ins: RT 1501 and satellite lab (RT 1530), MC 435, RT 403 on the fourth floor of the library and the Math Emporium on the second floor of the library. (Other labs might have the ALEKS plug ins installed on some but not all machines).

Graphing Calculator Policy and its integration in the course:
TI 84 plus or equivalent. Calculators with algebraic capability such as TI 89 series, TI 92 series, TI-Voyager 200 and TI Nspire CAS are not allowed. Cell phones are not allowed during tests. You are expected to use calculators in various class situations, and for your work in ALEKS. There is a built in calculator in ALEKS that is only provided for specific problems that require a calculator to solve the problem. Note that all numbers in ALEKS must be exact (as a rule of thumb, do not use decimal representation) unless it is specified otherwise.

ALEKS Gradebook:
All required and extra work scores as well as midterm and final grades will be calculated and recorded in the ALEKS grade book.

Special Accommodations:
Educational access is the provision of classroom accommodations, auxiliary aids and services to ensure equal educational opportunities for all students regardless of their disability. Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Disability Services at (216)687-2015. The Office is located in MC 147. Accommodations need to be requested in advance and will not be granted retroactively.

Resources for CSU Students:
TASC Tutoring & Academic Success Center, MC 233, 687-2012, tutoring@csuohio.edu, www.csuohio.edu/academic/tasc


The Writing Center, RT105, 216-687-6981, http://www.csuohio.edu/writingcenter/

College of Science Advising Center, Main Classroom 218B, 216-687-9321, cosadvising@csuohio.edu.

Visit http://sciences.csuohio.edu/advising/.
M1: Angles & Unit Circle (21 topics)

- Converting between degree and radian measure: Problem type 1
- Converting between degree and radian measure: Problem type 2
- Sketching an angle in standard position
- Coterminal angles
- Arc length and central angle measure
- Area of a sector of a circle
- Angular and linear speed
- Finding coordinates on the unit circle for special angles
- Finding a point on the unit circle given one coordinate
- Sine, cosine, and tangent ratios: Variables for side lengths
- Trigonometric functions and special angles: Problem type 1
- Finding trigonometric ratios from a point on the unit circle
- Trigonometric functions and special angles: Problem type 2
- Trigonometric functions and special angles: Problem type 3
- Finding trigonometric ratios given a right triangle
- Reference angles: Problem type 1
- Reference angles: Problem type 2
- Determining the location of a terminal point given the signs of trigonometric values
- Finding values of trigonometric functions given information about an angle: Problem type 1
- Finding values of trigonometric functions given information about an angle: Problem type 2
- Finding values of trigonometric functions given information about an angle: Problem type 3

M2: Graphing (7 topics)

- Sketching the graph of a sine or cosine function: Problem type 1
- Sketching the graph of a sine or cosine function: Problem type 2
- Sketching the graph of a sine or cosine function: Problem type 3
- Sketching the graph of a secant or cosecant function: Problem type 1
- Sketching the graph of a secant or cosecant function: Problem type 2
- Sketching the graph of a tangent or cotangent function: Problem type 1
- Sketching the graph of a tangent or cotangent function: Problem type 2

M3: Functions & Inverses (18 topics)

- Special right triangles
- Using a trigonometric ratio to find a side length in a right triangle
- Using trigonometry to find distances
- Using a trigonometric ratio to find an angle measure in a right triangle
- Using trigonometry to find angles of elevation or depression
- Solving a right triangle
- Amplitude and period of sine and cosine functions
- Amplitude, period, and phase shift of sine and cosine functions
- Writing the equation of a sine or cosine function given its graph: Problem type 1
- Writing the equation of a sine or cosine function given its graph: Problem type 2
- Word problem involving a sine or cosine function: Problem type 1
- Word problem involving a sine or cosine function: Problem type 2
- Matching graphs and equations for secant, cosecant, tangent, and cotangent functions
- Values of inverse trigonometric functions
• Composition of a trigonometric function and an inverse trigonometric function: Problem type 1
• Composition of a trigonometric function and an inverse trigonometric function: Problem type 2
• Composition of a trigonometric function and an inverse trigonometric function: Problem type 3
• Composition of a trigonometric function and an inverse trigonometric function: Problem type 4

**M4: Trig Formulas (18 topics)**

• Simplifying trigonometric expressions
• Using cofunction identities
• Verifying a trigonometric identity
• Proving trigonometric identities: Problem type 1
• Proving trigonometric identities: Problem type 2
• Proving trigonometric identities: Problem type 3
• Proving trigonometric identities using odd and even properties
• Sum and difference identities: Problem type 1
• Sum and difference identities: Problem type 2
• Sum and difference identities: Problem type 3
• Proving trigonometric identities using sum and difference properties
• Double-angle identities: Problem type 1
• Double-angle identities: Problem type 2
• Half-angle identities: Problem type 1
• Half-angle identities: Problem type 2
• Product-to-sum and sum-to-product identities: Problem type 1
• Product-to-sum and sum-to-product identities: Problem type 2
• Proving trigonometric identities using double-angle properties

**M5: Trig Eqs - Interval (12 topics)**

• Finding solutions in an interval for a basic equation involving sine or cosine
• Finding solutions in an interval for a basic tangent, cotangent, secant, or cosecant equation
• Solving a basic trigonometric equation using a calculator
• Finding solutions in an interval for a trigonometric equation in factored form
• Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 1
• Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 2
• Finding solutions in an interval for a trigonometric equation using Pythagorean identities
• Finding solutions in an interval for an equation with sine and cosine using double-angle identities
• Solving a trigonometric equation modeling a real-world situation
• Using a graphing calculator to solve a trigonometric equation
• Finding solutions in an interval for a trigonometric equation with an angle multiplied by a constant
• Finding solutions in an interval for an equation with sine and cosine using sum and difference identities
M6: Trig Eqs - Line (9 topics)

- Solving a basic trigonometric equation involving sine or cosine
- Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
- Solving a trigonometric equation involving a squared function: Problem type 1
- Solving a trigonometric equation involving a squared function: Problem type 2
- Solving a trigonometric equation involving more than one function
- Solving a trigonometric equation involving an angle multiplied by a constant
- Solving a trigonometric equation using sum and difference identities
- Solving a trigonometric equation using double-angle identities
- Solving a trigonometric equation using half-angle identities

M7: Laws & Vectors (21 topics)

- Solving a triangle with the law of sines: Problem type 1
- Solving a triangle with the law of sines: Problem type 2
- Solving a word problem using the law of sines
- Solving a triangle with the law of cosines
- Solving a word problem using the law of cosines
- Finding the area of a triangle using trigonometry
- Magnitude of a vector
- Unit vectors
- Multiplication of a vector by a scalar: Geometric approach
- Translation of a vector
- Vector addition and scalar multiplication
- Linear combination of vectors: Algebraic approach
- Vector addition: Geometric approach
- Vector subtraction: Geometric approach
- Calculating the magnitude and direction of a vector
- Finding the components of a vector
- Solving a force problem with vectors
- Dot product
- Using the dot product to find perpendicular vectors
- Finding the angle between two vectors
- Writing a complex number in trigonometric form