DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – FALL 2012
MA0130 – 5(6-0-0) HS 90 HOURS

INSTRUCTOR:	Joelle Reynolds	**PHONE:**	780-539-2204
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OFFICE HOURS:	Weds 8:30 - 12 pm, or by appointment in office or via computer		

PREREQUISITE(S)/COREQUISITE:
MA0120 or equivalent, or equivalent math placement test score.

REQUIRED TEXT/RESOURCE MATERIALS:
- Student Notes and Problems – Math 30 (Pure) Workbook (Rao) Castle Rock Research Corp.
- Student Notes and Problems – Math 30 (Pure) Solution Manual (Rao) Castle Rock Research Corp.
- *Non-graphing* scientific calculator (Texas Instruments TI-30XIIS preferred, but not essential)
- Graph paper (a blue post-it note graph pad is ideal, sold in the GPRC Bookstore)
- Binder, loose leaf and dividers to organize handouts and notes provided

CALENDAR DESCRIPTION:
MA 0130 – Mathematics Grade 12 Equivalent (Pure)
This course explores transformations, exponents and logarithms, sequences, series, trigonometry (including the unit circle, graphs, identities and equations), quadratic relations, conics, permutations and combinations, probability and statistics.

CREDIT/CONTACT HOURS:
5 (6-0-0)   90 contact hours

DELIVERY MODE:
Students are guided through the workbook, additional notes and examples are provided as necessary. First, background concepts and rules are reviewed; then investigative work is done leading to new concepts, laws and formulas. Several related problems are assigned daily to reinforce new ideas and skills.

OBJECTIVES:

Unit 1   Transformations

- Review
- Graph polynomial, linear, quadratic, rational, absolute value, radical and cubic functions.
- Understand function notation and write an inverse function.
- Given the graph of any function, be able to plot the graph of a related function using translations (horizontal and vertical), stretches (about the x or y-axis), and reflections (in x-axis, in y-axis, in line $y=x$).
- Identify transformation(s) from an equation.
- Write an equation to reflect a given translation, reflection, or stretch.
- Identify and perform combinations of transformations on functions.

Complete an assignment at the end of this unit worth 3% of the final grade.

Unit 2   Exponents and Logarithms

- Use the laws of exponents and laws of logarithms to simplify expressions.
- Define logarithmic relationships and be able to interconvert exponential and logarithmic relations.
- Evaluate logarithms to find exact values.
- Evaluate common and natural logarithms using a calculator.
- Plot graphs of exponential & logarithmic functions.
- Identify transformations of exponential & logarithmic functions.
- Solve exponential & logarithmic equations.

Complete an assignment in the middle of this unit worth 3% of the final grade.

- Define **geometric sequence**, common ratio, and general term. Also, be able to identify a geometric sequence.
- Determine the general term as well as specific terms of a geometric sequence.
- Determine the sum of a given geometric sequence to a desired number of terms.
- Expand and evaluate expressions written in Sigma notation.
- Solve related problems
- Develop a model for exponential growth or decay and solve related problems.
- Determine the doubling period, half-life or any other time period for exponential growth or decay, and solve related problems.
- Solve problems based on logarithmic formulas, including Richter, decibel, and pH scales.

Complete an assignment at the end of this unit worth 2% of the total grade.

Complete an exam worth 12% of the final grade

Unit 3   Trigonometry

- Define the primary and reciprocal trigonometric ratios of an angle.
- Define principal and coterminal angles, and state relationship between them.
- Define radian measure of an angle; be able to convert radians to degrees and vice-versa.
- Given one trigonometric ratio of an angle, determine the other 5 ratios.
- Determine reference angle and apply the CAST rule.
- Determine exact values of trigonometric ratios for special angles on the unit circle.

Complete an assignment in the middle of this unit worth 2% of the total grade.

- Solve first and second degree trigonometric equations giving specific and general solutions.
- Verify an identity is true for a specific value of the variable.
- Prove trigonometric identities for all defined values of the variable.
- Apply sum and differences identities as well as double angle identities.

Complete an assignment in the middle of this unit worth 3% of the total grade.

- Define period and amplitude of a periodic function.
- Plot graphs of the basic sine, cosine and tangent functions.
- Determine the period and the amplitude of a periodic function from a given graph, and be able to write the equation of a sinusoidal function given its graph.
- Use transformations to plot the graphs of more complex sine and cosine functions.
- Solve application questions involving sinusoidal functions

Complete an assignment at the end of this unit worth 2% of the total grade.

Complete an exam worth 12% of the total grade.

Unit 4   Permutations and Combinations

- Apply the fundamental counting principle to determine the number of different ways to perform multi-step operations.
- Define permutations of *n* objects and factorials.
- Determine the number of permutations of *n* different objects when all, or part, are used at a time.
- Determine the number of permutations of *n* objects when some of them are identical.
- Define combinations of *n* objects.
- Determine the number of different combinations when *r* objects are selected from *n* different objects.
- Apply the principle of combinations to different situations, and solve related problems.
- Explain Pascal's triangle and how it is related to combinations and the Binomial Theorem.
- Use the Binomial Theorem to expand a binomial or to find a specific term in the expansion of a binomial where the exponent *n* is a natural number.
- Use permutations, combinations, or the fundamental counting principle to solve probability problems.

Complete an assignment at the end of this unit worth 3% of the final grade.

Unit 5   Statistics and Probability Distribution

- Define the measures of central tendency (mean, mode, median) and determine the value for each of them for a set of data.
- Define the measures of dispersion (range, standard deviation).
- Calculate standard deviation for a population and apply to analyse given data.
- Define and display a probability distribution.
- Determine the probability for a binomial experiment.
- Define *z*-score, and calculate *z*-score for a given set of data, and apply to solve related problems.
- Explain normal distribution and standard normal curve.
- Use area under the standard normal curve and *z*-scores to solve related problems.

Complete an assignment at the end of this unit worth 3% of the final grade.

- Identify the parts of a double-napped cone.
- Given information on how a plane intersects a cone, determine whether the conic formed is a circle, ellipse, parabola, hyperbola, or a degenerate of one of these.
- Explain how the values for A and C in the general form of the equation of a conic section determine the shape of the conic.
- Identify the appropriate conic section from an equation given in general form.
- Given an equation in standard form, identify the conic.
- Determine the series of transformations necessary to transform the graph of one conic to the graph of another or the equation of one conic to the equation of another.
- Determine the equation of a conic given an original equation and a series of transformations.
- Write an equation of a conic given specific characteristics.
- Given the equation of a parabola in standard form, determine the direction, vertex, domain and range, intercepts and sketch the graph.
- Given the equation of a circle, determine the centre, radius, domain and range and sketch the graph.
- Given the equation of an ellipse, determine the direction, centre, vertices, domain and range, lengths of major and minor axes, intercepts and sketch the graph.
- Given the equation of a hyperbola, determine the direction, centre, vertices, lengths of transverse and conjugate axes, domain and range, intercepts, slopes of asymptotes and sketch the graph.
- Convert a given equation of a conic section from general to standard form and vice-versa.
- Graph conic sections from equations in standard form, and state the domain, range and defining characteristics of the graph
- Solve application problems that model conic sections

Complete an assignment at the end of this unit worth 3% of the final grade.
Complete an exam worth 12% of the total grade.

Write a Cumulative Final Exam worth 40% of the final grade.

TRANSFERABILITY:
This course is listed in the Alberta Transfer Guide. It is accepted at colleges and universities in Alberta as equivalent to Math 30 Pure.
** Grades of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability

GRADING CRITERIA:

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	**4-point Equivalent**	**Percentage Guidelines**	**Designation**
A$^+$	4.0	90 – 100	**EXCELLENT**
A	4.0	85 – 89	
A$^-$	3.7	80 – 84	**FIRST CLASS STANDING**
B$^+$	3.3	77 – 79	
B	3.0	73 – 76	**GOOD**
B$^-$	2.7	70 – 72	
C$^+$	2.3	67 – 69	**SATISFACTORY**
C	2.0	63 – 66	
C$^-$	1.7	60 – 62	
D$^+$	1.3	55 – 59	**MINIMAL PASS**
D	1.0	50 – 54	
F	0.0	0 – 49	**FAIL**
WF	0.0	0	**FAIL (withdrawal after the deadline)**

EVALUATION:

Unit Assignments: 9 assignments

    (Assignments 2, 4 and 6 are worth 2% each. All others are worth 3% each)   24%

Exams: 3 Section Exams at 12% each   36%

Final Exam: Cumulative   40%

STUDENT RESPONSIBILITIES:

MA0130 is a prerequisite for many post-secondary programs. In taking this course, the primary goal is that students will develop their understanding of and ability to use mathematics. However, students in this course are also learning how to prepare for the demands and expectations of post-secondary education. Please read and ensure you understand the following expectations before we begin:

Assignments must be submitted on time
Assignments are due **at the beginning of class** on the specified dates. Students may submit no more than **one** late assignment. Save this for when you need it.

Exams must be written on the days announced in class
If an emergency prevents attendance on an exam day, students must contact me **immediately** via phone or email, and may be asked to provide documentation to justify their absence. Students will then be scheduled to write *an alternate version* of the exam at the first available opportunity.

Classes will start on time
Students are asked to remain in class for the duration of the class. Late students may be required to wait to enter to avoid disturbing the class in progress.

Complete Daily Homework
At least **1 hour of study per day** outside of class time.

Please stow your phones
Cell phone use is a distraction to you, your classmates, and the instructor. Cellphone calculators will not be permitted during exams.

Take responsibility for your learning
Your instructor will monitor and periodically update you with your progress, but it is ultimately the student's responsibility to direct and manage their own learning. It is your job to recognize when you require additional support and to seek those supports out. This may include:

Participation
Students will be asked for feedback, to answer and to ask questions in class.

STATEMENT ON PLAGIARISM AND CHEATING:

Please refer to pages 49-50 of the College calendar regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.

This schedule is tentative, and may change at any point in the course at the discretion of the instructor.

MA 0130 Fall 2012 Tentative Schedule September

Mon	Tue	Wed	Thu	Fri
3	4	5	6 Course Outline Lesson 1 Review of Functions	7 Lesson 2 Horizontal and Vertical Translations
10 Lesson 3 Reflecting Graphs	11 Lesson 4 Horizontal and Vertical Stretches	12	13 Lesson 5 Combining Transformations	14 **Assignment 1 Due** Lesson 1 Review of Exponents Lesson 2 Logarithms
17 Lesson 3 Laws of Logarithms	18 Lesson 4 Special Cases and Base Conversion Lesson 5 Using the Calculator to Evaluate Logs	19	20 Lesson 6 Solving Exponential and Log Equations	21 Lesson 7 Exponential and Logarithmic Graphs
24 **Assignment 2 Due** Lesson 8 Applications	25 Lesson 10 Intro to Geometric S & S Lesson 11 Geometric Series	26	27 Lesson 12 Sigma Notation	28 Lesson 13 Applications **Assignment 3 Due**

MA 0130 Fall 2012 Tentative Schedule October

Mon	Tue	Wed	Thu	Fri
1 Review for Section 1 Exam	2 **Section 1 Exam**	3	4 Lesson 1 Review, Reciprocal Ratios and Special Angles	5 Lesson 2 Angles in Standard Position
8 **Thanksgiving No Classes**	9 Lesson 3 Radian Measure Lesson 4 Using Radians with Angles in Standard Position	10	11 Lesson 5 Unit Circle Part 1 Lesson 6 Unit Circle Part 2	12 Lesson 7 Unit Circle Part 3 Tangent Ratio Lesson 8 Reciprocal Trig Ratios for Special Angles
15 Lesson 9 Solving Trig Equations involving Special Angles	16 Lesson 10 Solving Trig Equations with a Calculator **Assignment 4 Due**	17	18 Lesson 12 Reciprocal, Quotient and Pythagorean Identities	19 Lesson 13 Sum, Difference, and Double Angle Identities
22 Lesson 14 Using Identities to Solve Equations	23 Lesson 15 Graphing Sine and Cosine Functions **Assignment 5 Due**	24	25 Lesson 16 Amplitude Lesson 17 Vertical Displacement	26 Lesson 18 Phase Shift Lesson 19 Change in period
29 Lesson 20 Summary of Transformations for Sin and Cos	30 Lesson 22 Modelling Problems using Sinusoidal Functions **Assignment 6 Due**	31	1 Review for Section 2 Exam	2 **Section 2 Exam**

MA 0130 Fall 2012 Tentative Schedule November

Mon	Tue	Wed	Thu	Fri
5 Lesson 1 Fundamental Counting Principle Lesson 2 Factorial Notation	**6** Lesson 3 Perms, Coms and Bin Thm	**7**	**8** Lesson 4 Perms of n objects Lesson 5 Perms of n objects taken r at a time	**9** FALL BREAK
12 FALL BREAK	**13** FALL BREAK	**14**	**15** Lesson 6 Perms with restrictions	**16** Lesson 7 Coms of n objects taken r at a time Lesson 8 Applications
19 Lesson 10 Algebraic Calculations with nPr and nCr Lesson 11 At Least/At Most	**20** Lesson 12 Binomial Expansion and Pascal Triangle	**21**	**22** **Assignment 7 Due** Lesson 1 Mean Median Mode Lesson 2 Probability Distributions and the Normal Curve	**23** Lesson 3 Z scores
26 Lesson 4 Applications	**27** Lesson 5 Binomial Experiments and Binomial Distribution	**28**	**29** **Assignment 8 Due** Lesson 1 Sections of Conics Lesson 2 Equations of Conics – the Circle	**30** Lesson 3 Equations of Conics – The Ellipse Lesson 4 Equations of Conics –The Hyperbola

MA 0130 Fall 2012 Tentative Schedule December

Mon	Tue	Wed	Thu	Fri
3 Lesson 5 Equations of Conics – The Parabola	**4** Lesson 6 Conics Summary Lesson 7 Applications **Assignment 9 Due**	**5**	**6** Review for Section 3 Exam	**7** **Section 3 Exam**
10 Section 3 Review Section 2 Review	**11** Section 1 Review	**12**	**13** Exams	**14** Exams
17 Exams	**18** Exams	**19** Exams	**20** Exams	**21** Exams
24	**25**	**26**	**27**	**28**