DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – SPRING 2011
MA0130 A4 – 5(6-0-0) 90 HOURS

INSTRUCTOR:	Chris Schneider	**PHONE:**	780-539-2894
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OFFICE HOURS:	MTWRF 8:30 – 9:00 am, 12:00-12:30 pm or by appointment		

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 (blue post-it note graph pads are 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) 5 (6-0-0) HS
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; in order to succeed in this course, students must commit to a **minimum of two hours** of homework per day.

OBJECTIVES:

Students will develop problem solving skills and gain an appreciation of the mathematics of modern society. This course prepares students for university transfer mathematics courses.

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:

Unit Assignments: 8 assignments at 3% each	24%
Exams: 3 exams at 12% each, approximately breaking the course content into thirds	36%
Final Exam: Cumulative	40%

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)**

EXAMINATIONS:

There will be 8 assignments in this course, covering the following areas: Transformations, Exponents and Logs, Geometric Sequences and Series, Trigonometry(Angles, Unit Circle and Solving Equations), Trigonometry (Identities and Graphs), Permutations and Combinations, Statistics and Probability, and Conic Sections. Assignments are due **at the beginning of class** on the specified dates. Due to the speed at which content is covered during spring session, late assignments will only be accepted **up to 24 hrs** after the deadline at a deduction of 15% to ensure that assignments can be returned to the class in a timely manner.

There will also be three equally weighted exams in addition to a final exam in this course. The first exam will cover Transformations, Logarithms, Exponents and Geometric Sequences and Series. The second exam will cover Trigonometry. The third exam will cover Permutations, Combinations, Statistics and Conic Sections. The final exam at the end of the course is cumulative.

Any students not attending class on a test date will receive a **grade of zero** for that test unless a phone call is made prior to the time of the test and an explanation for the absence satisfactory to the instructor is provided. Students may be required to produce documentation supporting the absence (a doctor's note, etc) at the discretion of the instructor. Students with acceptable explanations for missing a test will be scheduled to write an alternate version of the test outside of class time at the earliest opportunity.

STUDENT RESPONSIBILITIES:

Attendance: Regular attendance is expected of all students in all mathematics courses. *Your success in math is directly linked to your attendance.* Attendance is taken daily and may influence discretional decisions (assignment extensions, rescheduling of exams, etc) of the instructor. It is the **responsibility of the student** to find out what material was covered during an absence, and to cover that material independently before seeking assistance from the instructor. Additional help will be limited for students with chronic absences and no acceptable explanations.

Punctuality: Students are expected to be on time for class. Students coming late to class will knock on the door and wait until the instructor finds a suitable time in the lesson to open the door, to prevent the distraction of students engaged in the lesson. Students more than 15 minutes late for a class will be recorded as absent and may not be permitted to enter.

Homework and Study: Students in this course must be prepared to commit to an average of **2 hours of study per day**, outside of class time.

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.

COURSE SCHEDULE/TENTATIVE TIMELINE:

UNIT DESCRIPTIONS with Corresponding Textbook Lessons and Projected Timelines

Unit 1   Transformations   (Workbook Lessons 1-5)   3 days
- 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   (Workbook Lessons 1-8, 10-13)   8 days
- 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 3% of the total grade.
Complete an exam worth 12% of the final grade

Unit 3   Trigonometry   (Workbook Lessons 1-23)   **10 days**

- 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.
- Solve first and second degree trigonometric equations giving specific and general solutions.

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

- 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.
- 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.
- Identify reciprocal trigonometric functions from their graphs.

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

Unit 4   Permutations and Combinations   (Workbook Lessons 1-8,10-13)   **6 days**

- 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   (Workbook Lessons 1-5)   **3 days**

- 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

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.