



DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – SPRING 2014

MA0130 – 5(6-0-0) HS 90 HOURS

INSTRUCTOR: Sukhvir Sandhu **PHONE:** 780-539-2234
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daily 11:30 am – 12:00 noon, 3:00 pm – 3:30 pm
OFFICE HOURS: or by appointment

PREREQUISITE(S)/COREQUISITE:

MA0120 or MA0132 or equivalent, or equivalent math placement test score, or 60% or better in Math 20-1 or Math 30-2 or equivalent within the previous two years

REQUIRED TEXT/RESOURCE MATERIALS:

- Pre-Calculus 12 – My Worktext (Czucar) Pearson Canada Inc.
- *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)

CALENDAR DESCRIPTION:

MA 0130 – Mathematics Grade 12 Equivalent (Pre-Calculus 30-1)

This course explores polynomial, radical, rational, exponential and logarithmic functions, transformation and combinations of functions, trigonometry (including the unit circle, graphs, identities and equations), and permutations and combinations.

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 Polynomial Functions

- Divide polynomials with long division and synthetic division.
- Write division statements for polynomials.
- Factor polynomials.
- Use the Remainder Theorems to determine the remainder when a polynomial is divided by a binomial.
- Use the Factor Theorem to find factors.
- Sketch the graph of polynomial functions using the zeroes of a function to plot x-intercepts, the constant term as the y – intercept and the leading coefficient as the end behaviour for a graph.
- Write polynomial functions to model situations.

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

Unit 2 Radical and Rational Functions

- Sketch the graph of a radical function where the radicand is a linear function.
- Sketch the graph of a radical function where the radicand is a quadratic function.
- Compare the domain and range of a radical function to the domain and range of the radicand function.
- Sketch the graph of a rational function.
- Determine whether a rational function will have a vertical asymptote or a hole for a non-permissible value.
- Determine whether a rational function will have horizontal or oblique asymptotes.

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

Complete an exam worth 7% of the total grade.

Unit 3 Transformations

- Given the graph of any function, be able to sketch the graph of a related function using translations (horizontal and vertical), stretches (about the x or y -axis), and reflections (in x -axis or the y -axis).
- Given $y = f(x)$ and $y = af(b(x-h))+k$ be able to sketch the graph of a related function using translations (horizontal and vertical), stretches (about the x or y -axis), and reflections (in x -axis or the y -axis).
- Write an equation to reflect a given translation, reflection, or stretch.
- Identify combinations of transformations to graph or write an equation.
- Graph and find equations for inverse relations.

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

Unit 4 Combining Functions

- Combine functions graphically to sketch graphs of functions that are the sum, difference, product or quotient to two functions.
- Combine functions algebraically to write equations of functions that are the sum, difference product or quotient to other functions.
- Determine the domain and range for combined functions.
- Determine the value of a composition of functions at a point.
- Determine the equation of a composition function.
- Sketch the graph of a composition function.
- Identify restrictions for composition functions.

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

Complete a midterm worth 15% of the total grade.

Units 5 and 6 Trigonometry

- Define the primary and reciprocal trigonometric ratios of an angle.
- Define principal and conterminal 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.
- 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.
- Solve application questions involving sinusoidal functions.

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

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

Complete an exam worth 7% of the total grade.

Unit 6 Exponents and Logarithms

- Plot graphs of exponential & logarithmic functions and describe their characteristics.
- Apply transformations to the equations and graphs of exponential & logarithmic functions.
- Evaluate logarithms to find exact values.
- Use the laws of exponents and laws of logarithms to simplify expressions.
- Define logarithmic relationships and be able to interconvert exponential and logarithmic relations.
- Solve exponential & logarithmic equations.
- Evaluate common and natural logarithms using a calculator.
- Solve problems by modelling situations with exponential and logarithmic equations.

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

Unit 7 Permutations and Combinations

- Apply the fundamental counting principle to determine the number of different ways to perform multi-step operations.
- Use factorial notation to determine permutations and combinations, or to solve for n or r .
- 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.

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

Complete an exam worth 7% 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 30-1

**** 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: 8 Assignments (3% each)	24%
Exams: 3 Unit Exams (7% each)	21%
Midterm	15%
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.

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

Students should expect to complete 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

The instructor will monitor and periodically update students with their progress, but it is ultimately the students' responsibility to direct and manage their own learning.

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.

MA0130 TIMELINE

Unit	TOPIC/DESCRIPTION	Approximate Timeline	Your Mark
1	Polynomial Functions 1.1 – 1.5	3 days	
2	Radical and Rational Functions 2.1 – 2.4	3 days	
	Review, Test 1	May 14	
3	Transformations 3.1 – 3.4	2 days	
4	Combinations of Functions 4.1 – 4.4	2 days	
	Review, Midterm	May 26	
5	Trigonometry 6.1 – 6.7	4 days	
6	Trigonometry 7.1 – 7.5	3 days	
	Review, Test 2	June 9	
7	Exponents and Logs 5.1 – 5.8	4 days	
8	Permutations and Combinations 8.1 – 8.6	4 days	
	Review, Test 3	June 24	
	Review for Final Exam	1 day	
	Final Exam	Friday June 27	

Timelines are tentative and may change at the instructor's discretion!