DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – SPRING 2020
MA0131 (A4) - Mathematics Grade 12 Calculus Equivalent 5 (0-0-7.5) HS
112.5 hours for 15 Weeks

INSTRUCTOR: Reddy Ganta **PHONE:** (780) 539-2810 or 2850

OFFICE: Virtual **E-MAIL:** RGanta@gprc.ab.ca

OFFICE HOURS: Monday and Tuesday 11:00 – 12:30

CALENDAR DESCRIPTION:

This course includes limits of sequences, series, and functions, secants and tangents, derivatives from first principles, chain rule, product rule, quotient rule, implicit differentiation, curve sketching, maximum and minima applications, relates rates applications, anti-derivatives and area, limits, and derivatives of trigonometric functions.

PREREQUISITE(S)/COREQUISITE:

MA0120 or equivalent. Pre or Co-requisite: MA0130

REQUIRED TEXT/RESOURCE MATERIALS:

Textbook: Package of MA0131 modules, 2007;
Scientific calculator, Computer with internet access, Printer and Scanner.

DELIVERY MODE: Students will join the class on Zoom as this course will be delivered online due to the COVID-19 Pandemic. MA0131 is a modularized math course divided into 9 separate units called modules. The instructions for each topic are given in the modules, followed by several examples and exercises. Study the instructions and work through the examples before starting each exercise. The answers for each exercise are given at the end of each module. Check your work often to make sure you understand each topic. The key to success in working with modules is to ask questions whenever you have difficulty understanding the instructions, the examples, or the exercises. **Do not hesitate to ask for help.**

- **Module tests must be written as listed on page 5.** You must revise and review the material thoroughly before taking a Module test/ exam. When writing a test, be sure to show all your work on the test paper. Marks are given for the method as well as the final answer. Even though 50% is a passing mark, a mark of **at least 60% in any module test** is recommended.

- **One lowest test mark out of 5 test marks will be ignored. Best 4 test marks out of 5 test mark will be used for the final grade.**

- Upon completion of the first four modules, a midterm test will be written on Monday**, May 25**. Upon completion of all nine modules, you will write a final exam on Friday**, June 26**. Be sure to leave time to prepare for this important exam! It is worth a large percentage of your final grade.

- **Consult your instructor immediately if you find yourself falling behind schedule.**

COURSE OBJECTIVES:

The Course introduces students to:

- the review of graphing of functions by applying transformations to the graphs of a known function
- the review of factoring expressions with integral and rational exponents, rationalizing expressions, and the four basic operations
- the limit of a function using the graph of the function and using the limit theorems
- the concept of a continuous and discontinuous function
- the definition of a derivative to determine the derivative of $f(x) = x^n$ where *n* is a positive integer
- differentiation of a polynomial function and derivative to determine a rate
- the chain rule in combination with a product and quotient rule to determine derivatives
- slope and equation of tangents at a given point using the derivative of a function
- intervals where the derivative is greater than zero or less than zero
- the use of derivatives to determine maximum and minimum values for applications, and to solve rate of change applications
- anti-derivatives of polynomial, radical, and rational functions
- area between a curve and the x-axis over a given interval
- the limit for a trigonometric function as the angle approaches a finite or infinite value
- derivatives of the three primary and the three reciprocal trigonometric functions
- derivative of more complicated trigonometric functions using the power, chain, product, and quotient rules

COURSE OUTCOME:

As a result of taking this course, students will gain the ability to:

- draw graphs of functions by applying transformations to the graphs of known functions
- simplify rational expressions, using any of the four basic operations
- determine the limit of a functions for a given value using the graph of the function
- compute limits of functions, using definitions and limit theorems
- determine the slopes and equations of the tangent and the normal lines at a given point on a curve, using the definition of a derivative
- differentiate polynomial functions, using the derivative theorems for sum and difference
- determine the derivatives of combination functions with product and/or quotient using the chain rule
- differentiate a function using implicit differentiation
- sketch the graph of a function using first and second derivatives to find maxima, minima, and inflection point
- determine intervals where the derivative is greater than zero or less than zero in order to predict where the function is increasing or decreasing
- determine whether or not a critical point is a maximum or a minimum
- determine maximum or minimum values for application involving numbers, geometry, distance and time, economics, and science
- solve rate of change applications relating to science, area, volume, and related motion
- determine the area between a curve and the x-axis over a given interval
- determine velocity and displacement by finding the anti-derivatives of acceleration and velocity functions
- determine the limit for a trigonometric function as the angle approaches a finite or infinite value
- find the derivative of more complicated trigonometric functions using the power, chain, product and quotient rule

TRANSFERABILITY: N/A

GRADING CRITERIA:

Alpha Grade	4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100		C+	2.3	67-69
A	4.0	85-89		C	2.0	63-66
A-	3.7	80-84		C-	1.7	60-62
B+	3.3	77-79		D+	1.3	55-59
B	3.0	73-76		D	1.0	50-54
B-	2.7	70-72		F	0.0	00-49

How to use a module:

1. Read the title of each module, table of contents page, and title of each section. You will observe a progressive growth of operations/concepts.

2. Read and thoroughly understand the concepts and terminology of a section.

3. Understand and do each example very carefully using the terminology. ***If difficulties arise, meet with your instructor*.**

4. Match each question in an exercise with the corresponding examples before the exercise. *If difficulties arise, return in your module and rework the examples.*

5. Attempt the exercise questions and check the answers before moving on to the next section. ***If difficulties arise, meet with your instructor*.**

6. Review the terminology of the module(s) before taking any test/exam.

EVALUATION CRITERIA:

Your final mark is determined by:

4 Module tests	40 %
Midterm	20 %
Final Exam	40 %

Test Schedule for Spring 2020

Topics / Tests / Exams

Test #	% Towards the final exam	Module's Title	Recommended Time & Test Date	Date written	Your mark
1	10%	Review & Limits	May 12 Tuesday		
2	10%	The Derivative & More Derivatives	May 21 Thursday		
	20%	**MIDTERM** - must be written on or before	**May 25 Monday**		
3	10%	Curve Sketching Applications: & Maximum/Minimum	June 2 Tuesday		
4	10%	Applications: Rate of Change & Anti-derivatives and Area	June 12 Friday		
5	10%	Derivatives of Trigonometric Functions	June 22 Monday		
Final Exam	40%		**Friday June 26**		

STUDENT RESPONSIBILITIES:

In addition to the ***Student Rights and Responsibilities*** as set out in the college website, the following guidelines will maintain an effective learning environment for everyone:

1. Please mute your mike when you are not talking during the class.

2. Regular attendance is expected of all students in all mathematics courses. Your success in math is directly linked to your attendance. Attendance will be taken daily.

3. Students must actively communicate with their instructor. If you have questions or concerns throughout the course, please send an email or call.

ELECTRONIC DEVICES:

No unspecified electronic devices will be allowed in exams.

STATEMENT ON PLAGIARISM AND CHEATING

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Admission Guide at http://www.gprc.ab.ca/programs/calendar/ or the College Policy on Student Misconduct: Plagiarism and Cheating at www.gprc.ab.ca/about/administration/policies/**

**Note: All Academic and Administrative policies are available on the same page.